Ecological Anthropology of Households in East Madura, Indonesia

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Wilson Glenn Smith

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This dissertation results from enthusiasm, hopefully not ill-placed, that anthropology could become the premier social science discipline for empirically-grounded understanding of human societies, and a determination to help clear some of the hurdles on the road to such understanding. Along the way, I also hope to contribute new perspectives on a misunderstood Indonesian society. I am grateful to the ethnomusicologist Jacques Brunet for suggesting Madura as a site for field research and for alerting me to the excellent work being done there by Dutch scholars.

Anke Niehof, along with her husband Roy Jordaan, were among those Dutch researchers I was instructed to contact at that time, and to this day they remain a constant source of support and insight into Madurese society. Professor Niehof's study of fertility in central Madura provided direct inspiration for my comparative fertility study further east, and the overarching concept of households present in all her work to date provided my framework for observation and analysis. Fittingly, Professor Niehof was to become my Wageningen University (WUR) academic supervisor (*promotor)* for this dissertation, ensuring through patience, prodding and proofreading that something worthwhile could be produced. In concert with Professor Yves Goudineau – who graciously accepted to take over direction of my doctoral studies at the Ecole des Hautes Etudes en Sciences Sociales (EHESS) following the retirement of Professor Georges Condominas, and provided invaluable support and guidance in Paris – this WUR-EHESS *cotutelle* and my dissertation could finally come to fruition. For this they have my deepest gratitude. To Professor Condominas, I must also express my enduring gratitude for accepting to direct my studies back in 1982, and my equally deep apologies that I could not defend this thesis while he was still active at EHESS.

Special credit must be given to several scholars who influenced my thinking early on. It was Gerald Berreman's introduction to anthropology course at the University of California, Berkeley that first convinced me of the discipline's value for getting at what he called "the politics of truth," for uncovering the unequal power relations at the root of injustice, and for getting me thinking about impression management and the promise and perils of ethnographic informants. Similarly, the course in anthropology of law given by Laura Nader at Berkeley convinced me that decision making processes represented an essential element of study, particularly when they could clarify issues of power, inequality and elite culture. Serendipity being what it is I would only later come to realize the methodological and ethical affinities that linked Professor Berreman and Professor Condominas (particularly the latter's concept of *préterrain* and his Distinguished Lecture to the American Anthropological Association in November 1972). All of these influences led me to see quantitative behavioural observation and conscious efforts at ethical and political sensitivity as vital controls on informant discourse. William Abruzzi was the first to suggest to me that ecological theory is relevant to understanding societal processes; without his insights my rendering would have been hopelessly muddled. Eric Ross impressed upon me the importance of taking economic and social class differentials into account in any analysis, though I still need his help in grasping dialectics. Benjamin Matalon's advice that the best way to contribute to progress in science was to take one direction and go

all the way with it dispensed with any qualms I had about adopting a research strategy that was not particularly popular in France. Although the sum total of their insights left me feeling less empowered to issue general and definitive statements regarding "Madurese *society*" and "Madurese *culture*" this predicament I find myself in is more liberating than constraining, for in exchange I feel I am now equipped to say some things of value about specific Madurese *communities*.

In addition to the individuals already named above, I am indebted to the many teachers, colleagues and friends who have at one time or another suggested avenues of inquiry to pursue or pitfalls to avoid, and who have provided feedback and forums for my ideas. They include Taufik Abdullah, Dewi Fortuna Anwar, Jean Benoist, Claude Blanckaert, Muriel Charras, Michael Dove, Andrée Feillard, Maurice Godelier, Robert and Nancy Hefner, Marvin Harris, Huub de Jonge, Bernard-Germain Lacombe, Allen Johnson, Pierre-Yves Manguin, William Mitchell, Eugenia Piza-Lopez, Dominique Schnapper, William Shack, Riwanto Tirtosudarmo, Robert Wessing, Benjamin White, Michel Wieviorka and Latief Wiyata. While each of the aforementioned individuals contributed something to the formulation of my approach, none can be held responsible for any of its shortcomings or assumed to be necessarily in agreement with the doctrine espoused.

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CHAPTER ONE
INTRODUCTION

1.1 Approaching Madurese society

This dissertation is the result of anthropological study of rural households in Northeast Madura, Indonesia, carried out on eight separate visits between August 1985 and March 2009. On two of the visits, I stayed for a year or longer (August 1985 to June 1987 and June 1995 to June 1996), the other visits ranged from a few weeks to two months.

The year 1985 was an exciting time to be studying on Madura. The Indonesian-Dutch Madura Research Project had been operating for several years supporting PhD research by Dutch and Indonesian scholars, helping Madura emerge from the shadow of the much more studied neighbouring islands of Java and Bali. My plans were to focus on animal husbandry and my wife Hélène on performing arts, subjects central to Madurese society that had not been studied since well before Independence. I looked forward to understanding more about Madura's high levels of poverty and notably how sedentary villagers could raise cows using a cut and carry mode of fodder collection in a savannah ecosystem prone to drought and without the benefit of communal grazing lands. I also wanted to try out a relatively new random spot-check methodology to determine time allocation in this dispersed agricultural community, a technique that had not been used in Madura, nor in Indonesia for that matter at the time. This routine observational task would facilitate learning the local language and provide regular access to the households, and I sensed (correctly, it turned out) that time would be "of the essence" for understanding production, reproduction, and exchange.

The field lessons in economic anthropology led me to undertake various research and development projects in different parts of Indonesia during intervening years, but I always took advantage of opportunities to return to the village in order to continue observing the unfolding lives of the same people and their households followed since January 1986, and to dig into yet another aspect of village life that the previous visit had identified as indispensible for a proper study. The early focus on animal husbandry immediately expanded to cover other productive activities, which in turn raised questions about the value of children. A fertility study would be needed to confirm what seemed to be unusually low fertility rates in comparison with other parts of Madura and Indonesia. The incoming data from the time allocation study provided a wealth of new questions on household consumption and expenditures, inter-household and inter-generational exchange, and social organization. Patron-client ties, high levels of violence, political, religious and secular networks and growing cash-cropping provided additional focus as the study went into its second decade. Back in France, I watched from afar as the December 1996 ethnic violence between Dayak and Madurese unfolded on the island of Kalimantan, and then as the fall of Suharto and the beginning of the *Reformasi* period brought skyrocketing rice prices, debt and uncertainty to the village, recounted in letters. Violence would continue in Kalimantan until a paroxysm occurred in Central Kalimantan in June 2001. Unravelling the causes and consequences of the Kalimantan troubles would require research in both Kalimantan

and Madura. The research extensions and dissertation delays were salutary in that they provided the opportunity and privilege to do both comparative and diachronic study as an adjunct to the classic doctorate following a year of fieldwork. A year of study on migration and settlement in South Sumatra and several projects on conflict-sensitive development planning and post-conflict recovery gave me different perspectives that fed back to the still-ongoing Madura research. These experiences only reinforced my desire that my research could improve understanding of the lives of rural farmers like those in Northeast Madura, and at the same time that I could use the Madura data to address key issues in anthropological methodology and theory. Among the social sciences, anthropologists have a special capacity and position (by virtue of its quasi-obligatory long term immersion of fieldwork) to provide relevant and verifiable data on a wide range of subjects generally studied at a fair distance by practitioners of other disciplines. In-depth historical, linguistic and comparative knowledge is generally also part of the anthropologist's toolkit. From my education at UC Berkeley and EHESS Paris, I also gathered that anthropology could have much to learn from, but also perhaps much to teach to, disciplines as far flung as psychology, economics and ecology. And with teachers like Laura Nader, Gerald Berreman and Georges Condominas, I had to be constantly aware of the political and power relations inherent in fieldwork. A product thus of my educational career, the hands-on experience of fieldwork and consulting, not to mention the serendipity of literature found in used book stores or library stacks—the approach I eventually settled on was ecological anthropology. The subfield of ecological anthropology tolerated, even encouraged, a wide range of techniques and approaches from the qualitative to the quantitative, from ethnoscience to political ecology, and was accessible with just one Berkeley undergraduate course in natural resources and some remedial reading.

Ecological anthropology seemed to offer the most appropriate frame for viewing Madurese society. The ecological setting was a harsh one; the inter-relationships people entertained with nature appeared to be complex and evolving. It appeared that Madurese agricultural ecology, household economy, fertility, religious practice, interpersonal violence, and other aspects of life would be better viewed as parts of a mutually-interacting system than as discreet elements detached from each other. An ecological approach had been used before in Madura, by Jef Leunissen (1982), studying rice farmers in the mid-1970s in a village (Manding Daya) close to the border with my subdistrict of Batuputih, but using a different farming system based on irrigated and rain-fed rice. A historical study by Kuntowidjoyo (1980) also referred frequently to the ecological limitations of the island and the effects that had on society. These significant contributions to the ethnographic and historical knowledge of Madura at the beginning of the Madura Research Project were, however ecological in spirit, descriptive in focus and did not present a theoretical or explanatory framework, ecological or otherwise.

I was interested in problem-oriented research, and keen on trying to build an explanatory framework for some of the critical questions regarding Madurese society. For example, I wanted to know what was keeping the Madurese poor, for it certainly was not for lack of hard work for which they were legendary, and of which the time allocation data was providing further documentation. It seemed fairly obvious to outsiders and to the Madurese themselves, that the reason for Madurese poverty had to do with the poor general quality of the soil, the paucity of irrigation infrastructure and the lack of high income-generating opportunities for most. But two questions kept nagging me. First I needed to know how poverty (or wealth) was inherited, and why some people acquiesced to asymmetrical offers of work in exchange for simple meals. This question brought up the issue of exploitation, and

the possibility of one day arriving at a cross-culturally valid theory of exploitation. Indeed, I am hard-pressed to come up with a more important long term goal for an engaged anthropology. Second, I needed to know more precisely in what ways and through what mechanisms individuals and households were liable to become mired in poverty traps.

Another question had to do with the well-known practice of racing bulls in pairs, and competing pairs of cows in beauty and agility contests. These sports were very popular in the villages I was working in and I sensed they must have roles that went beyond mere amusement. Also in the domain of agriculture, I was perplexed by the resistance local farmers expressed towards high-yielding varieties of maize that had been adopted by farmers in other parts of Madura. I needed to know if this was a manifestation of peasant conservatism or resistance to change – as the agri-cultural extension services maintained – or if there were other factors involved. In seeking answers to these questions, I found it useful to map fields and collect taxonomies of plants and animals to better understand the relationships villagers entertained with the natural environment.

The realization that high levels of interpersonal violence were a part of life in the rural areas of Madura made me reconsider my initial view that the image of the violent Madurese was merely an urban Indonesian habit of pigeonholing ethnic groups according to ethnic typologies. The stereotypes were inaccurate in that they lumped together any act of violence under a standard appellation of *carok*, symbolized by the sickle-wielding revenge killer portrayed in a feature film by the same name that appeared in cinemas briefly in 1986. But the phenomenon was sufficiently widespread on the island and protagonists were accessible to be interviewed. Historical research provided depth to the analysis to complement a set of one hundred case studies collected in 1995-1996. The Kalimantan violence provided a necessary comparative perspective on the roots and sociology of violence.

Tying together the specific ecology of the study village, the productive system, the economic challenges and the often dramatic social insecurity to the development, maintenance and transmission of household units over time became my overall objective during the length of my research. In trying to resolve each of the questions, the mechanism and the processes involved were equally, if not more important than solving the different conundrums that motivated the search in the first place. I began increasingly to believe that the understanding and explanation of these Madurese cultural phenomena and processes were most parsimoniously advanced by systematic reference to material factors, processes and contingencies, and moreover that Madurese sentiments, values, ideologies and conceptual schemes were largely (or probabilistically) determined by these material constraints. Indeed, it was only after collecting numerous accounts of the villagers' day-to-day struggles and strategies for getting by that I came to appreciate the determinisms they have to live under. In arriving at this point, I realized that such a position would put me at odds with some of my colleagues working on Southeast Asia in France who were convinced that the societies we studied were primarily governed by, and best understood through consistent reference to, systems of mentalities, of symbols and of hierarchical worldviews. I felt torn between loyalty to French anthropological traditions and to my *Asiatisant* colleagues, and a deep-felt conviction that the materialist scientific enterprise of the Enlightenment, forged to a large extent in France, was a precious gift indeed, perhaps the most precious of all. Moreover, the subjects of my research appeared to have chosen the latter, so who was I to wrap the discourses they were offering me in the wrong paradigmatic canvas? Nothing could be more pusillanimous, or foreign to the purpose of scientific inquiry, it seemed,

than to force a politically-correct interpretation where both subjects and observer did not see it. I pushed on, to give the data a chance to show the way.

As I worked through these quandaries, I felt increasing tugs and nudges toward a wing of ecological anthropology (the left wing?) made up of rationalists – identifying themselves as materialists, cultural materialists, human ecologists or the like – who maintain a strong commitment to bolstering the scientific credentials of anthropology. Many of them also looked to the Enlightenment for inspiration. I decided I would pitch my tent near this movement, as long as it looked promising. As the philosopher of science Larry Laudan reminded us, in science "the co-existence of rival theories is the rule rather than the exception, so that theory evaluation is primarily a comparative affair" (Laudan 1981:145) based on the ability to solve problems. My "cognitive stance" regarding the theory could be one of accepting, rejecting, pursuing, entertaining, etc. Laudan (1981:144) declared: "Any theory of rationality which discusses only the first two will be incapable of addressing itself to the vast majority of situations confronting scientists." So there I had it: I could just "play with" a materialist approach, entertain it as long as I wished, so long as it helped me get work done.

This systemic – thus non-reductionist – strategy is founded on the notion that cultural stability and change is a product of interrelationships between the natural, social and individual spheres and is played out at the ecosystem, community, household and individual levels. The "boundaries" between these spheres and levels are largely heuristic, given that each is to a certain degree "embedded" in the other. Nevertheless, the role of the investigator, as I see it, is to disentangle the layers and strands of interconnectedness, identify the various, sometimes contradictory forces at work, and, at least tentatively, evaluate their direction and importance. This is what I understood Lévi-Strauss was saying when he defined anthropology as "a system of interpretation accounting simultaneously for the physical, physiological, psychological and sociological aspects of all behaviour" (Lévi-Strauss 1968:xxv). The emphasis laid on ecology and economy in the study reflects the recognition that human societies must satisfy basic biologically- and culturally-defined needs within particular natural and social environments.

My emphasis, even before stumbling on the ecological school, was on explanation, convinced that ethnology is "first of all, a will for knowledge and a methodological intention" (Toffin 1990:145), premised on the conviction that there is a reality "out there" (D'Andrade 1995a), and that objective facts exist (Cresswell 2001:187-188, 192-194). Explanation requires further that some idea of the direction and intensity of causal forces be addressed (O'Meara 1989). I advocate a systems model of causality (rather than a single-factor or prime-mover model), one which does not, however, assume all causes are of equal force (Johnson 1978:27; Price 1982:710). In the 1980s, this emphasis on cause seemed archaic to some who considered the role of anthropology to contemplate form, text and meaning in postmodern fashion, in the most radical formulations even writing off the search for objective knowledge of another culture as modernist manifestations of hegemonic Western objectification, and its "scientific rhetoric that entails 'objects,' 'facts,' 'descriptions,' 'inductions,' 'generalizations,' 'verification,' 'experiment,' 'truth,'" and other "empty invocations" (Tyler 1986:130). For some, conventional notions of causality are illusory in the context of a nature-culture monism that is forever irreducible to its constitutive parts or in any case untranslatable to Western scientific data languages, exhibiting "indeterminacy of translation" (Quine 1960:26-79; cf. Hookway 1978).

This is not the place for a critique of postmodernism in anthropology.[1] It is enough to state my belief that the more radical postmodern positions are misguided, particularly in the realm of nature and society. Mainstream postmodernism, on the contrary, can provide extremely useful insights by suggesting improvements or refinements that may be made in our way of handling nature-culture relationships, politics, and gender, and in keeping a stance of reflexivity towards our subjects and their view of our enterprise. Radical postmodernism often simply issues methodological condemnations[2] which may have the consequence, even unintended, of discouraging research into nature and society, a field of study where questions of domination, exploitation and cultural survival invariably arise. By way of explaining my approach, and defending its legitimacy within ethnology, it is necessary to look back on the development of ecological anthropology and then consider the more or less explicit causal frameworks employed in ecological studies.

1.2 Ecological anthropology as a research strategy

Ecology is "the science of the interrelations between living organisms and their environment" (E. Odum 1971:3). Cultural ecology and human ecology (or ecological anthropology), study the ecological relationships linking human populations with their environment. Speculation about the role of environment in moulding human behaviour dates back to the *humoral theory* of Hippocrates (Hardesty 1977:1-2). Various forms of environmental determinism[3] persisted into the early twentieth century, when, under the influence of Boas,[4] and his students Wissler (1929; see Ellen 1982:21) and Kroeber (1939, 1969), they were replaced in anthropological discourse by what has been referred to as possibilism, the notion that environment can be invoked to explain the absence or modification of certain cultural features, but not their presence or origin (Hardesty 1977:4-6). In both environmental determinism and possibilism, the underlying premise was the same: environment and culture were two separate domains, thus any explanatory direction would be, by necessity, unidirectional. As Kroeber (1939:1) declared: "The

[1] Others have given cogent and comprehensive responses to this movement (Boghossian 2006, D'Andrade 1995a; Gross and Levitt 1994, 1996; J. Harris 1992; M. Harris 1995, 1999; Kuznar 1997; Reyna 1994, 2010; Roscoe 1995; Rosenau 1992; Zammito 2004, 2010). Elsewhere (Smith 2000:148-149), I have noted the limitations of the postmodernist conception of emotion as sociocultural construction. I feel, however, that there is a space for dialogue and cross fertilization between ecology and postmodern thought, perhaps along the lines sketched by Mitchell 1994.

[2] Methodological condemnation refers to the exclusion of hypotheses from discussion as socially disreputable without engaging in empirical controversy, or without proposing an alternative with superior explanatory power (Miller 1991 [1983]:761; Smith 1993:41).

[3] For example, the Enlightenment debates in the works of Montesquieu (1949), D'Holbach (1990 [1770]), Helvetius (1988 [1758], 1989 [1773]), and others focused on the relative importance of natural and cultural determination, and later, the geographical determinism or anthropo-geographical school of Karl Ritter (1836, cf. Acot 1988:162-163) and Friedrich Ratzel (1889, 1896). The ancient notion that climate determined culture was carried well into the twentieth century by the geographer Ellsworth Huntington (1945), who criticized attempts to explain historical changes with reference to human agency (Raumolin 1984:812).

[4] Franz Boas' transition or "conversion" from a geographical determinist (Boas 1888) to a possibilist (Boas 1948) position is treated with some detail in Harris (1968:250-289; for a different view, see Stocking 1965).

immediate causes of cultural phenomena are other cultural phenomena."[5] Diffusionism, another dominant mode of the North American culturalist school founded by Boas (Taylor 1988:175-180), was one of the primary explanans for cultural diversity. C. Daryll Forde (1963) was one of the few in England (along with the archaeologist V. Gordon Childe) to take an interest in human-environment interrelations. Like his North American counterparts, he shared the anti-determinist stance, focusing on particular ecological relations and technological adaptations (Ellen 1982:27-28), although he was among the first to propose the concept of ecology as a common point of reference for the various sub-disciplines of anthropology (Forde 1951, cited in Eggan 1954:760n3).

Possibilism was to remain for many years a dominant mode of explaining human-environment relations, largely because, with the concept of culture areas, it was able to solve the problem of classifying and ordering the masses of ethnographic knowledge accumulated up until then, and under its auspices. Disatisfaction with the historical, particularizing approach of the Boas school was expressed most notably from the 1930s to the 1950s in the work of three people, V. Gordon Childe, Leslie White, and Julian Steward. In basic terms, what united them was the quest for cultural regularities. As Steward declares at the outset of *Theory of Culture Change:*

> In cultural studies it is important to distinguish a scientific, generalizing approach from a historical, particularizing approach. The former attempts to arrange phenomena in orderly categories, to recognize consistent interrelationships between them, to establish laws of regularities, and to make formulations which have predictive value. The latter is more concerned with the occurrence of phenomena in time and place, the uniqueness of each constellation, and the ethos or value systems which characterize culture areas. The concepts and methods of the former must differ in part from those of the latter. My purpose in this collection of essays is to develop a methodology for determining regularities of form, function, and process which recur cross-culturally among societies found in different cultural areas (Steward 1955:3).

Where Childe and White focused on identifying cultural-evolutionary stages, Steward was more interested in the relationship between habitat and production processes as revealed through particular case studies. Little can be gained here, however, by categorizing their work as materialist, unilinear-evolutionist or multilinear-evolutionist, simplifications which do justice neither to the contexts of their career trajectories, nor to the differences between programmatic statements and the substantive anthropology they accomplished, nor even to the impacts they left on their disciplines.[6]

Leslie White was interested in the dynamics of technological evolution (measured by energy use and efficiency), social structure, and ideology. In his programmatic statements on evolution and technological determinism, the influence of Marx's early writings and Engel's interpretation of Morgan can be discerned, although the political climate of the time in North America did not permit him to clearly document it:

> Culture thus becomes primarily a mechanism for harnessing energy and of putting it to work in the service of man, and, secondarily, of channelling and regulating his behaviour not directly concerned with subsistence and offense and defence. Social systems are therefore determined by technological

[5] Of course, Kroeber was neither the first nor the last to make such a statement.

[6] An idea of their influence can be obtained by consulting Trigger 1980, Harris 1968, and Sahlins and Service 1960. The "New Archaeology" (Binford 1962, 1972; Binford and Binford 1968) was a prominent offshoot (Gibbon 1989; Spaulding 1988; Redman 1991; Cowgill 1993).

> systems, and philosophies and the arts express experience as it is defined by technology and refracted by social systems [White 1959:390-391].

The monistic technological determinism of this statement finds few adherents today. But his emphasis on energy as a basic currency of human systems is still relevant in light of the advances made possible for ecological theory (H. Odum 1971), and perhaps eventually the field of economics will find the usefulness of an energy theory of value (Costanza 2004).

Most readers of Marx claim that he did not differentiate between the forces of production and the relations of production, but considered them an inseparable totality.[7] A minority position is exemplified in the work of G. A. Cohen (1978), who argues that Marx gave primacy to the forces of production, essentially to the technological aspect. Cultural materialists also separate the forces from the relations of production, but they enlarge White's formulation to include ecology, demography, and economy along with technology among the productive forces, and posit synergetic feedback processes linking the forces and relations of production (Harris 1979:51-56).[8] In the latter research strategy, a synthesis of Marx and the Darwinian mechanism of natural selection employs energy[9] as the currency to explain differential adaptations, cultural similarities and differences, stability and change (Price 1982).[10] One can only speculate what our disciplines might have looked like had Serhii Podolinski, one of the first to imagine human energetics in the 1880s, been more successful in his attempts to convince Marx and Engels of the importance of thermodynamics (Martinez-Alier 1987:45-63, Engels 1992 [1882]).

No school of human ecological energetics was to form in France, despite the early formulations of energetic and environmental degradation by Bernard Brunhes (1908), taken up by his brother, the geographer Jean Brunhes (1925, I:469; see Martinez-Alier 1987:124-126 and Raumolin 1984). A small measure of White's thinking, combined with a much greater amount of Steward's attention to ecology and specific case studies – not to mention the expansion in research grants aimed at the natural sciences and the growing ecological awareness of the times – were to provide the main impetus for the schools of cultural ecology, human ecology, and

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[7] As Godelier notes, "although productive forces and relations of production are distinct phenomena, they never exist separately; they always exist together in some specific combination" (Godelier 1978:763).

[8] Harris (1969) has stressed that his research strategy is based on the "expectation that a general causal priority exists among demo-techno-econo-environmental relationships," but any deterministic statement is qualified by the notion of "probabilistic" causality.

[9] An alternative to cultural energetics under materialist auspices is the social energetics of Richard N. Adams (1975, 1988), which develops White's sketchy linking of energy to cultural evolution, emphasizing Lotka's principle of the selective advantage of dissipative structures (Lotka 1922, 1956, cited in Adams 1988:36) and the thermodynamics of non-equilibrium structures (Prigogine 1947).

[10] Price (1982:718) stresses the importance of the synthesis and the energy currency: "A separation – dialectical opposition, if you will – of man and nature explicitly or implicitly underlies much of Western social science (it seems perhaps most notably, though not uniquely, developed in France); but its mere persistence does not guarantee its productivity, and cultural materialism rejects the dichotomy. While Darwin and Marx are more often contrasted than conjoined as thinkers, there is a solid substantive and epistemological bridge between them; to the cultural materialist they accomplish more together than does either taken separately. What provides that bridge is the concept of energy, here understood as the capacity to do work, and seen as potentially constituting the direct link not only between human society as a special case and the biosphere in general, but between the biosphere as a special case and the rest of the universe. An energy criterion, in sum, provides a foundation for what could approach a unified-field-theory for the social sciences."

cultural materialism. White's following was limited, and the very general and global nature of his notions on evolution were much more difficult to apply to ethnographic data than the pragmatic evolutionism – more a methodology than a developmental schema – offered by Steward (Murphy 1976). Although Steward opposed "classical evolutionism by rejecting the idea of a single reference axis on which the overall progression of human societies could be situated" (Guille-Escuret 1989:71), his broad disciplinary expertise enabled him to integrate New World archaeological findings for the first time into a global evolutionary sequence (Steward 1949). Among the numerous studies done on the relations between habitat, productive processes, and cultural forms, a sample may be touched on here. Steward's own contributions to ethnography are notable in his pre-1960s work.[11]

Steward saw culture change as a process in which ethnicity, but also ecology, class relations, occupational patterns, and regional economic forces had roles to play. The perspectives opened up by Steward were vast indeed. With them, ethnologists interested in the human-environment interface could work in something other than a cataloguing mode, and look beyond the limits of specific cultures and ethnic groups. It became easier for ethnologists to consider the similarities shared by members of different ethnic groups who belong to an analogous class, and draw theoretical implications, the most basic of which being the notion that similar conditions – ecological, economic, and social – could give rise to similar forms. He paid particular attention to regional and global processes (Steward 1956, 1967), stimulating work by students and others on capitalist penetration into peasant societies and class (to name a few, Wolf 1966, 1971, 1982; Mintz 1974, 1985; Wagley and Harris 1958; Harris 1964; and others).[12]

This homage to Steward should not let us lose sight of the wider intellectual movement towards a recognition that societies were not isolated from the outside world, felt notably in history through the *Annales* school (e.g., Braudel 1979), the "dependency" scholars (Frank 1967, 1978)and the world systems theorists (Wallerstein 1974, 1980, 1989), as well as in ethnology through, for example, the concept of "social space" (Condominas 1980:11-94).[13]

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[11] As an ethnographer, he was careful to stress the provisional character of his results, and inserting a critique of particularism, he insisted on the need for theory and facts to inform each other: "[...] it is obvious that the minutiae of culture history will never be completely known and that there is no need to defer formulations until all archaeologists have laid down their shovels and all ethnologists have put away their notebooks. Unless anthropology is to interest itself mainly in the unique, exotic, and non-recurrent particulars, it is necessary that formulations be attempted no matter how tentative they may be. It is formulations that will enable us to state new kinds of problems and to direct attention to new kinds of data which have been slighted in the past. Fact-collecting of itself is insufficient scientific procedure; facts exist only as they are related to theories, and theories are not destroyed by facts—they are replaced by new theories which better explain the facts. Therefore, criticisms of this paper which concern facts alone and which fail to offer better formulations are of no interest" [Steward 1949:25].

[12] On Steward's education, theories and legacy see Murphy 1977.

[13] For a general introduction to world-system theory and its direct antecedents, see Shannon 1989. Interest in the effects of colonization and culture change were, of course, long-standing, and found in the work of many others, among them Balandier ([1955] 1971) and Bastide (1956), who proposed the notion of "internal and external causality" for such studies.

1.2.1 The spectre of functionalism

As I am intent on identifying processes through which households deal with the exigencies of daily life in an often difficult physical and social environment, I set myself up for being labelled a functionalist, or worse, a neo-functionalist with an adaptationist agenda. I am tempted to dawn the cloak of Marcel Mauss, who, in his study of the Eskimo (Mauss and Beuchat [1904-1905] 1980) arguably provided the world's first human ecological study.[14] I will save that *pis aller* for another occasion and respond to the critique at present. Functionalism has long been a favourite target of criticism, sometimes taking on "the appearance of a mandatory ritual in the exercise of anthropology" (Lenclud 1988:63), from denunciations of the structural-functionalism of Radcliffe-Brown and Evans-Pritchard to methodological condemnations levelled at ecological anthropology and systems theory.[15] Although these rituals no doubt have their function, I will limit myself in this section to a brief review of their legitimacy.[16]

Early forms of functionalism in anthropology sought to identify or explain phenomena by demonstrating their role in maintaining equilibrium within a given social system. Anthropological functionalism is inspired by Durkheim, through his views on sociological holism, the irreducibility of the social, and social causality (Galey and Lenclud 1992). Radcliffe-Brown introduced Durkheim to the Anglo-Saxon world, emphasizing the structural and positivist elements (Barrett 1984) and how certain customs and beliefs function to maintain the structural integrity of a society. By the 1950s, the entire tradition of French sociology could be said to have merged with British social anthropology (Lienhardt 1992:613). Malinowski developed independently a position that emphasized function to the point that virtually all cultural elements in a society could be seen as playing functional roles.[17] He conceived culture as ultimately an adjustment to human needs and desires: basic bio-psychological needs give rise to social organization which in turn gives rise to culture. His concept of culture as "the widest context of human behaviour" (Malinowski 1944a:5) was significantly broader than Radcliffe-Brown's social structure or system.[18] Where Malinowski's functionalism saw culture and society as contributing to satisfying individual needs, Radcliff-Brown's structural

[14] If Marvin Harris were still around to read it, he might have changed his opinion of French anthropology, and worried for his legacy as founder of cultural materialism. Curiously, Guille-Escuret (1989:111) regards this early interest in ecological anthropology as part of a French "anti-functionalist tradition."

[15] A detailed consideration of systems theory would expand this discussion beyond any reasonable length. Let it just be said that to attack systems theory as a legitimate mode of reasoning in anthropology is to simultaneously deny general equilibrium theory to economists, homeostatic reasoning to psychologists, or morphogenic analysis to biologists (for a similar formulation, see Weintraub 1979:72).

[16] Elsewhere (Smith 1993) I have already treated the criticism that human ecology is reductionist, so I can skip that issue.

[17] "The functional view of culture insists therefore upon the principle that in every type of civilization, every custom, material object, idea and belief fulfills some vital function, has some task to accomplish, represents an indispensable part within a working whole" (Malinowski 1936).

[18] In Malinowski's homage to Frazier (Malinowski 1944b [1942]) toward the end of his own life, he embraced a return to evolutionism and spoke of its reconciliation with the "concrete, historical, geographic and ecological approach," anticipating the development of ecological anthropology.

functionalism reversed the focus to emphasize the role of individuals in maintaining social systems.

The strengths and weaknesses of both these types of functionalism have long been the subject of debate in the social sciences. Early functionalist formulations were most frequently criticized for their tendency to view social structures as static, closed systems, and their dependency on synchronic data—two defects which rendered them incapable of explaining sociocultural change and liable to view any interaction between cultural elements as contributing to restoring harmony to the system. The sociologist Merton made an early attempt to reform functionalism by introducing new terminology to call attention to the differences between "manifest" and "latent function" and the role of "dysfunction" (Merton [1949] 1957). In anthropology, recognition of the need for diachronic study went some way towards correcting the limitations of short-term ethnographic fieldwork (Eggan 1954; Firth 1951). Conflict models arose to deal with the evidence that structural oppositions and tensions existed in many societies (Gluckman [1956] 1963; Evans-Pritchard 1940; Fortes 1940),[19] though these "dysfunctions" were generally seen to be mutually corrective and beneficial in the long term, serving to re-establish social cohesion. Yet, functionalist explanation was further shackled by operational deficiencies (see below).

Beginning in the 1960s, cultural ecologists inspired by epistemological assessments of functionalism were in the vanguard of those seeking to replace the loose formulations with more rigorous systemic frameworks. Despite the reforms made, some still attribute to ecological anthropology the same defects of the old structural functionalism. Debates over the last 50 years, though providing proof of the sub-discipline's vitality, have often generated more heat than light, enough of the former perhaps to persuade ethnologists ill-inclined to winnow the chaff of destructive critiques from the grain of productive reflection, to steer away from ecological anthropology to a "safer," less troubled sub-field, where one can simply get on with one's work. My own feeling is that ecological anthropology, or at least much of what goes under that label, is such a radically transformed descendent of structural functionalism or "weak" functionalism that any homology becomes superficial. Should the sins of the father be visited upon the son? I think not, and to demonstrate why not I will now need to explain in a more technical sense exactly how the functionalism (if it can still be called that) used by many ecological anthropologists is superior and bears little resemblance to earlier fomulations.

1.2.2 Systems and processes

Where older functional formulations tried to explain the presence of cultural institutions or traits (such as religion) by the functions they fulfilled (social solidarity), cultural ecology sought to explain behaviour, or the operation of systems rather than the presence of traits. In turning attention to the behaviour of systems, cultural ecology could avoid the logical fallacy of suggesting that only one functional alternative exists in a given social system to effect a desired outcome. This fallacy was illustrated in schematic form by Hempel (1965:310), for a system *s* at time *t:*

[19] A conflict model in sociology is Coser [1956] 1964. In sociobiology, see Sanderson 2001, 2007.

(*a*) At *t, s* functions adequately in a setting of kind *c* (characterized by specific internal and external conditions)
(*b*) *s* functions adequately in a setting of kind *c* only if a certain necessary condition, *n,* is satisfied
(*c*) If trait *i* were present in *s* then, as an effect, condition *n* would be satisfied
(*d*) (Hence), at *t,* trait *i* is present in *s*

Functionalist formulations sometimes attributed indispensability to a particular trait, claiming that only the presence of *i* could satisfy the condition *n.* Indispensability in anthropology, exemplified by Malinowski's claim that only magic could enable early man to master his practical difficulties (Malinowski [1948] 1954:90), rests, however, on highly questionable empirical grounds (Hempel 1965:311; Nagel 1961:533-534; Rappaport 1984:353). Cultural ecology therefore leaves to the side the question of origins,[20] taking Hempel's conclusion ("at *t,* trait *i* is present in *s*") as part of the premise of the explanation, or in other words, as one of the boundary conditions for system *s* (Collins 1965:277). Functional explanation conceived in this way "depends on the isolation of a functional system, and the explanation provided is of the changes in the values of variables of the system and of the operation of its mechanisms. The 'mechanisms' of the system are dependent on the values of certain variables for their operation, and may therefore be stated in terms of the values of these variables" (Collins 1965:277-278). Explanations of this type have two components: the first establishes the existence of a functional system and predicts changes in the elements of the system on the basis of system-specific laws, and the second consists of general laws accounting for changes in variables or the operation of mechanisms. The first component can be formalized as follows:

(*a*) At *t,* if *s* is a functional system, then in a given setting variable *v* will undergo *x* change in value (or mechanism *m* will operate).
(*b*) *s* is a functional system.
(*c*) (Hence,) variable *v* will undergo *x* change in value (or, mechanism *m* will operate) (Collins 1965:278).

Most work in cultural ecology has dealt with this first component, by seeking to isolate functional systems and determine the system-specific laws governing changes within them. Such an emphasis on particular cases is understandable in light of the fact that the relationship between culture and environment has only recently become a major concern of anthropology. However, to complete the explanation, as Collins (1965:278) notes, "system-specific laws must be shown to be derivable from general laws unlimited in scope of prediction given the conditions under which the system operates." For some, though far from all ecological anthropologists, the formulation of general theoretical principles capable of accounting for and subsuming local phenomena has been seen as one of the primary goals (Abruzzi 1993; Harris 1979). However, as Spaulding (1988) notes:

> employing the scientific method does not commit one to rigid determinism, to "the view that every event which occurs is subsumable under some universal law" (Salmon 1982:14). There may be statistical laws as well; some relationships can be described only by frequency distributions.

Most often, these laws are only tacitly assumed, the primary goal being the establishment of the functional component (Collins 1965:278). A caveat is in order here because, for the social sciences: it is more exact to speak of retrodiction than prediction, and explanation need not be equated with prediction. This must be said

[20] Neglecting the study of origins, or making it a separate question, is defensible in the same way that biology or physiology may study the workings of organs or organisms without reference to their origin.

in response to claims that the lack of predictive power makes social science somehow incompatible with the scientific method (Winch [1958] 1990:91-94). In ethnology, and throughout the social sciences, to predict future configurations one must be prepared to account for the vagaries of "probabilistic, stochastic sequences and unpredictable interactions" (Aberle 1987:556). The uncertainty of predicting future events in history, for example, must not deter us from judging some historical accounts of past events more likely than others.

Other examples of unreasonable conditions often set on ecological anthropology include the argument heard now and then that ecological explanations must demonstrate unique causal chains "from the biological substrate to the institution that forms the adaptive response" through which would emerge unique forms of cultural adaptation and imply perfect predictability (Descola 1988:43), or the corollary that if different cultural responses arise out of "similar" initial conditions in two distinct areas this somehow "disproves" ecological explanation. Such adaptive perfectionism has been rightly critiqued by Gould and Lewontin (1979). Importantly, biology is not ecology. Ecological anthropologists are not particularly interested in the biological basis *and its forms,* but rather the ecological basis and *its processes.* Perfect prediction is not a defining characteristic of natural sciences,[21] so no need to place the bar any higher for social science. While we should not rule out informed, though tentative, prediction when ethnology is called upon to make specific contributions to social debate and transformational development programs, prediction remains an inexact, probabilistic endeavour. For most uses in anthropology retrodiction is sufficient.

Philosophical reservations have been raised by Sperber (1996:47-48), Lett (2007) and others. One critique is that feedback mechanisms have not been identified that explain how, say, religion and mode of production are causally linked. This critique can be levelled at most if not all anthropological paradigms, with ecological anthropology probably not the most sinful in this respect. Ecological anthropology generally is quite careful to examine the microfoundations of the systemic pathways postulated (see below).

If one of the epistemological criticisms of functional analysis, namely the question of origin and presence of traits, can be sidestepped by accepting the traits as given and focusing upon demonstrating how they interact with other aspects of the system, the very problem of demonstrating these interactions poses operational difficulties. Early functionalist explanations were couched in vague and imprecise language that could not be subjected to rigorous empirical analysis. Without some empirical measure, it becomes impossible to determine if, and to what extent a trait is "adequately functioning" or contributing to "the maintenance of the structural continuity."[22] Furthermore, the formulations were overly ambitious in attempting to explain the contribution of traits to the maintenance of entire societies. More feasible than such "strong programmes," and potentially more rewarding, are studies that seek to explain the maintenance of some state in more circumscribed systems (Nagel 1961:531), such as a particular clan, population or institution. In order for a more limited functional analysis to attain predictive (or at least retrodictive)

[21] The biological theory of evolution does a fairly good job of explaining the evolution of the species, but it is incapable of predicting future mutations.

[22] The latter quotation is taken from Radcliffe-Brown (1952:180): "The social life of the community is here defined as the *functioning* of the social structure. The *function* of any recurrent activity, such as the punishment of a crime, or a funeral ceremony, is the part it plays in the social life as a whole and therefore the contribution it makes to the maintenance of the structural continuity."

significance, a hypothesis of self-regulation must be established. Such a hypothesis, according to Hempel,

> would be to the effect that within a specified range *C* of circumstances, a given system *s* (or: any system of a certain kind *S*, of which *s* is an instance) is self-regulating relative to a specified range *R* of states; i.e., that after a disturbance which moves *s* into a state outside *R*, but which does not shift the internal and external circumstances of *s* out of the specified range *C*, the system *s* will return to a state in *R*. A system satisfying a hypothesis of this kind might be called *self-regulating with respect to R* (Hempel 1965:324).

In order to make explanatory statements more amenable to testing, the challenges to the "new" cultural ecology have been to delineate the boundaries of functional systems, to provide empirical definitions for the terms and units of analysis, and to explicitly formulate the hypotheses of self-regulation. The early cultural ecology of Julian Steward explored the role of environment and culture more systematically than did its predecessors, but it could not satisfy the criteria of Hempel and others, to "pursue the investigation of specific functional relationships to the point where they can be expressed in terms of reasonably precise and objectively testable hypotheses" (Hempel 1965:330). As we shall see, if ecological anthropology has approached without, however, meeting these strict requirements, in striving toward them it has encouraged new perspectives in fieldwork and has raised a number of fundamental issues concerning theory and method.

1.2.3 Causality and teleology: boring and exciting attacks

Perhaps the most thorough and sustained attempt to apply the ecological perspective in ethnology is Roy Rappaport's study of the Maring ritual cycle in *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People* (Rappaport [1968] 1984). It is not my intention to review the argument in detail here, since it is fairly well-known and has been summarized elsewhere (see, for example, Barrau 1975:34-38; Guille-Escuret 1989:92-99). His succinct summary of aims and method may suffice for the moment:

> It will be argued here that Tsembaga ritual, particularly in the context of a ritual cycle, operates as a regulating mechanism in a system, or set of interlocking systems, in which such variables as the area of available land, necessary lengths of fallow periods, size and composition of both human and pig populations, trophic requirements of pigs and people, energy expended in various activities, and the frequency of misfortunes are included. There are numerous additional variables to be considered as well. While it has not been possible in all cases, numerical values have been assigned to most of the variables on the basis of measurements performed in the field (Rappaport [1968] 1984:4-5).

One of the most influential ethnographies of the post-War period, it has attracted both praise and criticism, the latter often for its perceived functionalism, though the work was guided by *criticisms* of the doctrine (Rappaport [1968]: 1984:345, Vayda [1968] 1984). As Rappaport defended and explicated his position in light of criticism, the work has long stimulated debates.

If I may be allowed an amusing analogy from another field, criticism of Rappaport's study and other works in ecological anthropology may be divided into "boring attacks" and "exciting attacks." In dealing with the controversy over the rationalist model of science, Newton-Smith (1981:8-9, 103, 273) coined the term "boring attacks" to refer to criticism of the rational model by those who regard it as

a defensible ideal, but find much in scientific practice that deviates from the rational norm. Those who wage "exciting attacks," claim that the presuppositions of any rational model of science are untenable.[23] Stated in terms of the debate over functionalism, an exciting attack would purport to show that the functionalist explanation is defective at the core, since any explanation of phenomena in terms of its purposes or effects is epistemologically unjustified. A boring attack might grant that functionalist explanation could potentially be of value in shedding light on some important questions, but the present formulation is defective or insufficiently productive.

As a prime example of ecological anthropology, the work of Rappaport has frequently been the object of exciting attacks, and a good place to start is the one aimed at his notion of causality in self-regulated systems. In arguing that the Tsembaga ritual cycle operates as a regulating mechanism within a larger system, Rappaport is assumed to be making a simple final causal (or teleological) statement to the effect that the ritual cycle is a means of regulating and helping to endure the larger system of which it is a part. Controversy over the legitimacy of attribution of final cause has been with philosophy since Aristotle proposed the four types of cause (efficient, final, material, and formal), and has always plagued the weaker forms of functionalism. It should be noted first that not all final or teleological explanations pose the philosophical problem of explaining a present event by a future event. Explanations of intentional human actions in terms of the goals toward the attainment of which the actions are means pose no such problems. It is possible to simply regard the human intentions as (in the Aristotelian terminology) efficient causes preceding the goals (final causes), and explain the goal-directed behaviour as goal-intended behaviour (Braithwaite 1955:324-325). Difficulties inherent in reducing non-intentional goal-directed explanations to non-teleological explanations in terms of present or past causes are, however, seen by some as fatal to teleological explanation. Avoiding these difficulties by assuming that all teleological explanations are in some way reducible to intentions (or goal-directed activities are reduced to goal-intended activities) is unhelpful in the many cases, including the Tsembaga Maring case, in which humans manifestly have incomplete or incorrect knowledge of the final goals toward the attainment of which their actions are the means. A more radical solution, an eliminative materialism which would reduce social or biological phenomena to physico-chemical causal forces is, of course, even less satisfactory. The question becomes: is there any non-reductionist way to legitimize knowledge gained of a phenomenon by reference to its future effects? The canonicity of the negative response to this question having often been affirmed (e.g., Descola 1988:32-33), it is useful to take a closer look at the causal language involved.

Although some have read Rappaport's account of the Tsembaga ritual system as if he were implying that it is in the nature of ritual to regulate ecological and political relations as they do in this particular instance, Rappaport cautions that one must not conflate, as is often done in anthropology, final causal explanations with formal causal accounts:

> Environmental changes are of the class of processes that can qualify as efficient causes, as are internal perturbations, inducing systems to respond (change their states or structures) within the constraints of their previously

[23] In this domain, exciting attacks have been launched, notably, by Kuhn ([1962] 1970), Feyerabend ([1975] 1988, 1987), and Bloor ([1976] 1991) while boring attacks have come from Newton-Smith (1981) and Chalmers (1990), the targets in both cases being the more or less "strong programmes" of scientific rationality identified with Popper (1968), Lakatos (1978), and Laudan (1977).

> existing constitutions (material cause) in such a way as to perpetuate themselves (final cause, or what is ordinarily meant by "function").
>
> Aristotle proposed a fourth type of cause, namely formal cause. I take this to refer to the entailment of operations of particular sorts by the formal characteristics of structures. Some confusion has resulted from the conflation of formal and final causal accounts under the label "functional" (Rappaport 1984:358).

As Rappaport explains, final causal formulations can only be system-specific. If, for the Tsembaga Maring, a ritual cycle regulates social, political, and ecologic relationships "such that the frequency of warfare, the intensity of land use, and the divisive effects of internal quarrelling among the members of local groups are all kept within viable limits," this does not imply that anywhere else in the world similar functions are performed by ritual forms or structures. "The specification of a particular form or item (e.g., ritual) does not entail the specification of its *particular* contribution to any system in which it appears. Conversely, the specification of a particular *function* in a particular system does not entail the form of the mechanism fulfilling it. This autonomy of form and of function is sometimes considered to be lethal to the notion of function as an explanatory concept. In fact, it simply proposes the limitations of final causal statements" (Rappaport 1984:358-359).

Although often labelled "functional," a formal causal formulation is "virtually the inverse of the final causal type. Its aim is not to elucidate the contribution that some "item" or "component" or "form" makes to the system of which it is a part, but to elucidate what *follows from,* or is *entailed by* or *intrinsic to,* a particular form or *structure*" (Rappaport 1984:359). It is appropriate, for example, for the closed causal loop structure of a cybernetic mechanism to be described through a formal causal formulation: "Intrinsic to, or entailed by, the operation of a simple cybernetic structure is "negative feedback," such that deviations of the states of loop components from reference values initiate processes tending to return those states to their reference values" (Rappaport 1984:359).[24] Rappaport argues that formal causal accounts should only be applied to structures, which he defines as "phenomena that may be formally described in terms of enduring *internal* relations among their components" (Rappaport 1984:359). The class of such phenomena includes cybernetic structure, and perhaps also ritual, marriage, and other structures.

One can demonstrate a formal causal link between ritual structure and its entailments, which Rappaport identifies as "social contract, morality, a paradigm of creation, a concept of the sacred and a notion of the divine" (Rappaport 1984:360). But to claim that ritual regulates all societies in the way it does for the Maring would be to make a formal causal statement where on the basis of empirical evidence only a final causal statement is warranted, since the entailments of ritual cannot be properly considered functions in the final causal sense. To be so considered, an entailment would, in itself, have to constitute a specific contribution to the maintenance of the particular system in which it appears (Rappaport 1984:360).

Two ways of achieving non-teleological explanations of non-intentional goal-directed behaviour – by assumption of some form of intentionality, or reduction to physico-chemical causality – have been rejected above. A more satisfactory resolution consists in examining the *causal chain* of events lying between the explicandum (or explanandum, the description of the phenomenon to be explained) and the goal (Braithwaite 1955:328-341). The notion of causal chain is as fundamental here as it is in the non-teleological explanations of the physical

[24] Leaving aside the role of "positive feedback" or "deviation amplification" (Rappaport 1985:359). On feedback in cybernetic systems, see Wiener [1948] 1961:95-115.

sciences, since the cause of a physical phenomenon does not necessarily precede it *directly*, but often is linked to it by a causal chain. But the specific causal chain links at work between the explicandum and the goal, *taken individually*, should not be assumed to be final causal themselves. Material and efficient causes are found along the causal chain, and a goal of ecological anthropology is to find ways of measuring their direction and force (I will return to the notion of causal chain in a moment). Furthermore, those concerned with the misuse of the future reference in causal formulations should remember that biology and social science make use of teleological explanations because of the plasticity of goal-directed behaviour in biological and social systems, and the perceived need to focus attention on the contribution of parts of systems to the maintenance of the whole from the perspective of the integrated systems to which they belong. The difference in explanatory formulation is one of emphasis and perspective:

> [where teleological explanations are] concerned with characteristics of the parts of such wholes, only insofar as those traits of the parts are relevant to the various complex features or activities assumed to be distinctive of those wholes, [nonteleological explanations] exhibit the integrative behaviors of complex systems as the resultants of more elementary factors, frequently identified as constituent parts of those systems; and they are therefore concerned with traits of complex wholes almost exclusively to the extent that these traits are dependent on assumed characteristics of the elementary factors (Nagel 1961:422).

Furthermore, it may be untenable to consider a rigorous "functionalist" formulation of self-regulation as teleological at all (Hempel 1965:325), since, what causes present changes is not the future event which might never come about, but the present disposition to return to or to maintain a given state.[25] Functional explanations, if they are in fact teleological formulations, can finally be reformulated in non-teleological language (Hempel 1965:326). In sum, there are no systematic grounds on which to declare that the patterns or logic of functional explanation are incomparably different from explanations found in the physical sciences (Hempel 1965:326; Nagel 1961:328).[26]

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[25] Hempel (1965:325) provides the following example: "in a hydra that has just had a tentacle removed, certain regenerative processes will promptly set in; but these cannot be explained teleologically by reference to a final cause consisting in the future event of the hydra being complete again. For that event may never actually come about since in the process of regeneration, and before its completion, the hydra may suffer new, and irreparably severe, damage, and may die. Thus, what accounts for the present changes of a self-regulating system *s* is not the "future event" of *s* being in [a specific range] *R* [of states], but rather the *present disposition* of *s* to return to *R;* and it is this disposition that is expressed by the hypothesis of self-regulation governing the system *s*."

[26] Braithwaite distinguishes between two types of teleological explanations based on the different sources of knowledge available. The most useful type infers the behaviour of a system from inductive experimental knowledge of similar behaviour in the past in the same or a similar system. In the second type, which Braithwaite considers without value, knowledge of the behaviour, mechanisms, and plasticity of the system can be deduced from knowledge of the relevant causal laws (Braithwaite 1955:332-334). The latter would include cybernetic systems, and, following Rappaport's distinction, would seem to require formal causal accounts. While Braithwaite's distinction is useful in that it supports Rappaport's separation of final and formal cause, his differential valuation is misleading. Both types are useful in anthropology, and it would seem, in other sciences as well. As Nagel (1961:423) remarks, descriptions of artificial self-regulating systems whose plasticity can be deduced from general theoretical principles are worthwhile in their own right, as evidenced by the volumes of technical treatises devoted to the mechanics of governor-

If it were the case that ecological anthropology limits its scope to consideration of formal and final causes (as claims Descola 1988:40), an argument for explanatory incompleteness could well be made on the basis that the non-teleological links in the causal chain have not been elucidated. As we have seen above, establishing that a trait fulfils a functional role in one society does not imply that it functions similarly in any other society. Nor does this imply that a different trait could not satisfy the same function in the first society. Such plasticity characterizes biological and social systems. But with the advent of ecological anthropology, terminological shortcomings become particularly cumbersome as they no longer reflect scientific practice. Notably, Rappaport (1984:363) suggests replacing the inadequate term *functional,* with *adaptive,* since simple functionalist formulations are merely final causal, while adaptive formulations (of the ecological or systemic type) also take into account material causal and efficient causal factors. It is quite true that ignoring the role of efficient and material causal links within a systemic causal chain, or confounding different levels of causality, leaves one with one of two unattractive alternatives: complete determinism (due to lack of intermediate causal chain) or possibilism verging on indeterminacy (due to inadequate empirical or theoretical analysis of the actual component elements of the system and the relations or forces between them). That ecological anthropology seeks a useful middle path between determinism and possibilism seems to be what Rappaport is getting at in a further reference to causality:

> Environmental perturbations qualify as efficient causes of events in societies or even of changes in the structures of societies. Systems respond to efficient causes within the constraints of their previously existing orders (i.e., structured contents) which, in this terminology, constitute material cause. To claim that the specific characteristics of environments or perturbations in them cannot account for the specific nature of the responses to them—a common complaint—is, first, simply to say that efficient cause is not material cause. (The related complaint that functions do not specify how they are fulfilled in like manner criticizes final cause for not being material cause). Perhaps more important, the claim, if radically construed, is exaggerated to the point of being misleading or even erroneous. With the possible exception of genetic responses, the characteristics of environments and changes in them do more than stimulate adapting systems to random activity. Problems posed by environments have particular properties that must be accommodated, circumvented, overridden, domesticated, ameliorated, or corrected. While characteristics of or changes in the environment do not determine the specific nature of responses to them, they may establish the general direction or trajectory of those responses more or less stringently and, of course, it is in terms of them that the appropriateness, adequacy, or success of those responses is minimally assessed. That adaptive formulations can seldom provide "uniquely correct answers," as critics have charged, is of course true. Ordered versatility is, after all, the essence of adaptiveness. That the "answers" provided by adaptive formulations are not "uniquely correct" does not mean that they are incorrect or of no account, however (Rappaport 1984:438-439).

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regulated machines and other cybernetic systems. In anthropology, the importance of the study of ritual, kinship, classificatory, and other structures cannot be minimized. The distinction is not particularly useful to ecological anthropology, which ideally employs both inductive and deductive operations depending on the particular link in the causal chain or the hierarchical level under study.

The distinction between causal formulations is thus central to an understanding of ecological formulations. The characteristics of environments and the particular properties of the problems posed to them both interact, not teleologically to uniquely determine responses, but processually in a trajectory that is more or less stringently limited. The causality is not unilinear, pre-determined or single-factor, but neither is it nonlinear, indeterminate, or random. The causal dynamics may be presented through a systems model as Rappaport has done (see Rappaport 1984:362-370) or regarded as largely opportunistic selection by consequences (Harris 1999:144, Skinner 1976:140-141, 1984); in either way, the criticism of teleology is not sustained.[27] Before some closing words on systems, I would like to clarify what is meant by causal chains, the vehicle that transmits individual action into aggregate social change.

1.2.4 Causal chains and microfoundations

It is only natural that anthropologists remark order and patterns in analyses of sociocultural systems that could suggest cause and effect relationships. In order to avoid the justifiable criticism of "weak functionalism" – where links and regularities are weak or where all elements of the system are simply declared related in an unspecified way – we need to employ rigorous methods: "first, a theoretical orientation that clearly identifies the relevant variables and predicts the expected relations among them; and second, a more quantitative sense of the strength and direction of the influences exerted by each variable upon each of the others in the system" (Johnson 1978:24). In advocating quantitative analysis, Johnson (1978) in fact includes under the term a wide variety of data types including not only input-output, but also cognitive-structural and exchange analyses as well as those that employ spatial network mapping. To demonstrating the strength and direction of causal influences, spatial and temporal scales enter in. Since causal influences typically manifest themselves along a causal chain, composed of individual linkages, these must often be broken down to show just how one element can affect the other.

A causal argument to the effect that a cultural phenomenon is an adaptation to an environmental or social context may be disputed in the social sciences when the distance is too great, the networks of transmission missing, or the time span prohibitive. We know from evolutionary theory that adaptation is necessarily short-term and opportunistic. To speak of long-term adaptation is in a sense a contradiction in terms (Price 1982:716), since Romer's Rule[28] points to the immediate survival value of any innovation. "'The long run' is nothing more than a continuous series of short runs, of nows, placed end to end – and if a 'long run' is to

[27] Teleology is not always demonized in anthropology. Magnarella (1993:13-16) argues that social science should readmit individual-level teleology in order to account for the propensity of humans to actively cognize their environment, select goals and develop strategies to achieve those goals: "Even if one is primarily interested in causal explanation, one cannot escape the question of whether people act because of environmental contingencies or because they have certain needs, desires, and perceptions of environmental contingencies" (Magnarella 1993:15).

[28] The palaeontologist Alfred Sherwood Romer first remarked that important evolutionary changes generally enabled organisms to continue in the life they were living rather than adapt to an altogether new mode of life. The development of stronger bony elements that could act as limbs at first enabled fish to crawl from one pool of water to another in response to drying trends, rather than transform directly into terrestrial animals.

be discerned at all – linked by an uninterrupted positive feedback loop; whatever the 'payoffs' of a given trait, these are and must be in the now only" (Price 1982:716).

This process of adaptations along this pathway from cause to effect is what needs to be identified and measured to avoid the trap of weak functionalism. Similarly, economists and some social scientists refer to *microfoundations,* the pathways through which micro-level regularities create social phenomena (Little 1991:195-201). By demonstrating the micro-adaptations made, or the individual decisions taken, along these causal pathways, more rigorous and testable theories of sociocultural causation more likely stand to be within reach. The operations involved in ecological anthropology go beyond a summing up of individual actions to equate a social product, in a mechanical approach coming under the rubric of methodological individualism. Naturally, individuals are part of the equation, to be ignored at one's strategic risk, but social analysis cannot leave out the many groupings and institutions that existed before and survive beyond the individuals that compose them. Structures such as colonial governments, security forces, religious groupings, community associations of many kinds, and yes, households – leave them out and our explanatory framework is weak indeed.[29]

Following these pathways will usually require time, often at least the one-year rule of thumb for anthropologists to capture an entire agricultural or social cycle; some cycles may require much longer observation, as in the case of Rappaport's Maring ritual cycles. The study of households, it can be argued, requires at least a generation in order to go through a cycle of parent-children, and more if we wish to chart multi-generational development of the domestic unit. Moreover, synchronic or cross-sectional data of the kind often collected in rapid assessments cannot establish empirical developmental relationships; for those, we need time-structured information (Abruzzi 1993:11; Graves et al. 1969). We touch here on one of the dilemmas of anthropological research, the difficulty of reconciling the production of valid knowledge with the imperatives of dissertation deadlines and teaching schedules. Perhaps one of the reasons for the proliferation in modern anthropology of analyses of myths, taxonomies, texts, and rules of behaviour (rather than observing behaviour itself) can be located therein.

1.2.5 Homeostasis and critical transitions

We recall that Rappaport's study concentrated on defining the cybernetic system and its limits. Although the results of his fieldwork demonstrated it functioning to maintain equilibrium, nothing in his approach would prevent him or another researcher from detecting system-transforming events or processes. The value of his approach is that it can deal with both system-maintaining and transformational processes. Against the charge that homeostatic mechanisms were over-emphasized in Rappaport's study, it might be argued that a logical first step is to deal with relatively stable systems, since only after doing so can one hope to appreciate the magnitude of conflict and perturbations that can occur in situations of change, and the degree of systemic transformation they can effect.

[29] Ecological anthropology, especially ethnoecology, would not be opposed to (rather it would mandate) including here ritual or kinship structures. In Eastern Sumba, Indonesia, the descendants of the *Mangu Tanangu*, "the occupants and therefore the owners of the soil, who are referred to as the mother, the owner of the land, the father, the lord of the streams who presides over the tribal village and rules over the mouth of the river" (Onvlee 1977). In ecological language, social intercourse always entails energy transfer; in Sumba, the *Mangu Tamangu* care for the irrigation system, for instance.

Those who still find Rappaport's treatment of homeostasis irreparably damning any use of the term system might first consider alternative formulations. One which I find attractive because it can deal with phenomena from a living cell, a plant or animal, the biosphere and, arguably, the disks of spiral galaxies, is Lee Smolin's notion of a *self-organized, non-equilibrium system,* which he defines as:

> a distinguishable collection of matter, with recognizable boundaries, which has a flow of energy, and possibly matter, passing through it, while maintaining, for time scales long compared to the dynamical time scales of its internal processes, a stable-configuration far from thermodynamic equilibrium. This configuration is maintained by the action of cycles involving the transport of matter and energy within the system and between the system and its exterior. Further, the system is stabilized against small perturbations by the existence of feedback loops which regulate the rates of flow of the cycles. (Smolin 1997:155-156)

Smolin of course recognizes that although living things are self-organized non-equilibrium systems, information and control are essential to defining a *living system:*

> A a self-organized non-equilibrium system
> *such that*
> B its processes are governed by a program which is stored symbolically
> *and*
> C it can reproduce itself, including the program. (Smolin 1977:156)

I believe that social systems can also be conceptualized in this way. Definitions like this retain the advantages of envisaging social things as organized in systemic fashion, improve on the older organismic analogies by emphasizing that to the extent a social community does represent an entity it is an imperfectly bounded one, mandate the formulation of testable theories of sociocultural causation in the place of such analogies, and allow ethnology to remain conversant with other scientific disciplines, not only the social sciences but also fields as far flung as ecology and cosmology.

As briefly mentioned earlier, a complete explanation of a sociocultural phenomenon should consist of two components: first, the delimiting of a functional system and the determination of system-specific laws accounting for some behaviour in the system, and second, the formulation or application of general theoretical principles accounting for and subsuming local system-specific phenomena. For functional (systemic, adaptive) analysis, the first component receives primary attention, the general laws usually being only tacitly assumed in anthropological studies and their specification can legitimately be attempted independently (Collins 1965:278). Unlike the situation in evolutionary biology for which the discovery of classical Darwinian selection theory provided a general law under which previous teleological explanations of organic phenomena could be subsumed, the general laws of sociocultural causation remain the subject of considerable controversy in anthropology. Within ecological anthropology itself, disagreements as to where (or, indeed, whether) to search for these general laws have led to the emergence of several distinct schools. They include primate ecology, physiological ecology, behavioural or evolutionary ecology, prehistoric ecology, cultural ecology, human ecology, cultural materialism, human materialism, ethnoecology, spiritual ecology, symbolic ecology, historical ecology, environmental anthropology, ecological economics, political ecology, postmodern ecology, radical

ecology, feminist ecology, and green ecology.[30] This is not the place to go into the differences between these schools or the boring and sometimes exciting attacks they exchange. Instead, we need to examine one last exciting attack on ecological methods in anthropology, specifically against the schools of cultural-human ecology and cultural-human materialism to which I feel most attached.

1.2.6 The irreducibility of social and cultural facts

The claim that social facts require a special mode of explanation, one so radically different from those found in the biological or physical sciences, that the latter have nothing substantial to offer the social sciences, or at least nothing to offer anthropology, is an exciting attack related to the critique of functionalist explanation just dealt with. Adherents to this view consider attempts to introduce concepts from the "hard" sciences as so much scientism or reductionism. The demarcation between social science and the natural and physical sciences is often assumed without question, the lines between them delimiting acceptable explanatory modes (e.g., Elster 1983:17, Table 1). However, strict demarcation between the natural and social makes two fallacious assumptions: that humans are detached from nature, and that the social appears only at the level of *Homo sapiens* (Leroi-Gourhan 1964:205-206). As part of the biological world, humans are subject to the same laws as other species (Moran 1982:55; Benoist 1966:6). Despite their disagreements over matters of theory and method among its practitioners, ecological anthropology challenges the strict demarcation between the natural and the social. Consequently, many of its practitioners at least implicitly share a view that general ecological theory can be useful in attempts to answer at least some questions concerning culture, though few go so far as to apply its concepts and principles in explicit explanatory terms (Abruzzi 1993 being a notable exception).

1.3 Hypotheses and research strategy

Having now cleared away some of the main roadblocks to using an ecological anthropological perspective, I can get on with it. The critiques will have been worthwhile – they force one to limit ambitions to what is actually achievable, and the discussion has served to define the terms and design a roadmap for the study. Steward identified three fundamental procedures for cultural ecological investigations, procedures which can provide a basic methodological canvas for the present study:

> First, the interrelationships of exploitative or productive technology and environment must be analyzed... Second, the behaviour patterns involved in the exploitation of a particular area by means of a particular technology must be analyzed... The third procedure is to ascertain the extent to which the behaviour patterns entailed in exploiting the environment affect other aspects of culture (Steward 1955:40-41).

Next it is necessary to define the scale of the study. As I am interested in explaining social stability and change I will not focus on "Madurese culture" or "Madurese society" (though I might lapse into a common anthropological habit by accident). My study is about community development so it is important to focus down at the

[30] Many of their adherents would, of course, find much to criticize in my own present discussion.

local and regional level since "the selective forces which generate community development operate on specific local populations adapting to surrounding regional systems (Abruzzi 1993:11; Ricklefs 1987). Despite the many theories spun around their development, evolution, or "stability and change," cultures and societies are inappropriate units for investigating local community development for they are non-operational and cannot be analysed directly to elucidate evolutionary or developmental process (Abruzzi 1993:11; Vayda and Rappaport 1968). Analysis must concentrate on local communities. As households are the fundamental units for productive, reproductive, economic and social interaction in Madurese society, they (more than family or kinship group) should be the focus of study.

While recognizing the validity of these procedures, Jacques Barrau has placed an additional accent on the historical and ethnographic context of the society (to remain consistent, I would substitute region and community for society):

> […] it will be vital to undertake these analyses in the framework of one or more ecosystems of which the human societies studied are or were a part; in effect, one must also be concerned with past ecosystemic conditions that might have influenced the situation under study. A human society being a part of the ecosystem, one needs to consider the latter's constitution, its functioning, its evolution and the role and place of the society in its midst. This research should always include a precise description of the way in which the society views, understands, organizes and exploits the natural setting within which it operates (Barrau 1975:41).

Indeed, for a proper understanding of contemporary Madurese communities one must carefully examine the historical antecedents, the system within and beyond the local community in which individuals and households have interacted and continue to interact, along with the perceptions, understandings and organizational principles employed by them in relation to their environment. These concerns lead me to the general and specific hypotheses I intend to put to the test in this study.

1.3.1 General hypothesis

Differential adaptation of households in a Northeast Madura village can be accounted for by general ecological theories. Confirmation of this general hypothesis would provide validation for the use of ecological models in anthropology.

1.3.2 Specific hypotheses

It is incorrect to assume that the identification of a limiting factor in one specific ecosystem is equally limiting in another. As the village is laid out over at least two (North, South) and perhaps three (North, Hills, South) agro-climatic zones, it is hypothesized that household adaptation will be different in the north and the south.

Time allocation and the use of time-structured data will provide information about the behaviour of households and individuals that is not obtainable from classical ethnographic methods, with important implications for determining the value of children in the community. They will show high productive workforce participation by women and children.

Peasant households will tend to eschew risky, but potentially high income-earning opportunities in order to avoid falling below a minimum survival level, even when this means continuing low income-earning but relatively low risk economic activities.

The propensity of Madurese on the island of Madura to engage in violent inter-personal attacks is best understood in relation to struggles over material resources.

"The rich get richer, the poor get poorer" as a general trend will find validation in the village, and the reasons will be linked to initial conditions of wealth rather than other personal traits.

1.3.3 The chapters

Chapter Two begins the study with an overview of the Island of Madura, situating it as a part of the East Java province, before describing its physical substrate, farming systems, climate regime and population. This is followed by a review of Madura's history from the earliest records of settlement from Java in the twelfth century up to the present day, focusing when possible on the few sources that describe conditions in the rural areas. The focus then moves to provide similar information on the community that will be studied, Gedang-Gedang.

Chapter Three will present land tenure in the village and differential access to land and other resources. Ethnoscientific taxonomies will be made to show how plants and animals are perceived and exploited. Income-gaining activities in the village will be analysed to determine their returns to labour.

Chapter Four looks at social organization, defining the household and its constituent unit, the conjugal unit, and individual members. Institutions above the household are also described.

Chapter Five will present the household. A system of measuring household dependency will be presented along with the economic and development histories of many of forty-four sample group households. Additional information will be presented on nutrition and exchange.

Chapter Six presents the results of a fertility study of all women having had at least one pregnancy, comparing the results with other studies in Madura and Java to arrive at conclusions about the relationship between economics and reproduction.

CHAPTER TWO
HISTORICAL ECOLOGY OF MADURA AND GEDANG-GEDANG

2.1 Introduction

In adopting an ecological anthropological approach to households and communities in Madura, I intend to use the strengths of this approach—its immediate relevance to wider contemporary issues, and its focus on adaptation, system, and individual and group strategy. I also intend to avoid some pitfalls of some early approaches in ecological anthropology that tended to view communities as bounded systems having little interaction with external forces, or assume that whatever exchange there was with the outside world was unidirectional as if local communities were passive receivers of "change" imposed from the outside. Consequently, this chapter will deal with the wider region before narrowing the scope to the subject community. Discussed in this chapter are the salient environmental and historical factors both external and internal that have configured Madurese household adaptive strategies over time. Later, we will see that the unidirectional view of change misses much of what is essential in the behaviour of local households and communities, be it in the formation of new religious practices, the response to national development trends such as high yielding crops or Planned Parenthood, or other aspects of what is often called modernization or, more recently, globalization. The chapter is organized in two parts. The first part provides a general overview of the island, its environment and settlement patterns, as well as a historical overview. The second part moves the focus to the study village, Gedang-Gedang, looking at the same environment-history interface as in the first part, and explaining how this study was conceived.

2.2 The island of Madura as a region

Geologically speaking a part of Java, administratively part of East Java Province, Madura is nonetheless perceived as an entity quite different from its big neighbour. Its people are distinguished by language, first of all, Madurese being closely related to, yet mutually unintelligible with Javanese. As such it defines a distinct region separate from Java physically and culturally at least in the minds of both Javanese and Madurese, and the separation of the islands and their peoples has been long reinforced if not cultivated by Javanese, Madurese, and Dutch colonialists alike. Defining this region of Madura is the task before us in this chapter.

Located off the northeast coast of Java, and consisting of some eighty islands in the Java Sea and Strait of Madura, the Madurese archipelago is home to the Madurese ethnic group (see Figure 2.1).[31] Within the islands, one finds the most

[31]By far the largest island in the group is Madura proper: 4497 km² or over 80 percent of the archipelago's total land area. Most of the remaining islands belong to the Sumenep administrative district in the east. The largest of these eastern island groups is the Kangean islands (461 km²), followed by Sapudi (130 km², with Pajangan), the Sapeken islands (86 km²), the Raas group (65 km²), Poteran (48 km²), and Masalembu group (35 km^2). Of

homogeneous Madurese settlements in Indonesia. Up to 98 percent of Madura's population of 3 million is ethnic Madurese. Small Chinese, Javanese and Arab communities are located primarily in the main towns. Other ethnic groups are represented in the eastern islands (Kangean, Masalembu, Sapeken), most importantly among them the Makassar and Bugis from Southwestern Sulawesi and the Mandar from Borneo.

Figure 2.1 – Madura as part of Indonesia and East Java province

The island of Madura has the form of a rectangle, if one includes the islands of Poteran, Gili Genting, and smaller islands emerging from the shallow sea off the southeast coast (Verbeek and Fennema 1896:46). At the largest points, the island measures 160 km from west to east, and 38 km from north to south. Madura is part of Java from a geological viewpoint, separated only by the shallow basin of the

the 74 islands belonging to the Sumenep district, 27 are uninhabited and some of the latter only emerge above sea level at low tide (Kantor Statistik Kabupaten Sumenep 1993).

Madura Strait. Southeast Asian landscapes have been drastically altered by sea-level changes (Higham 1989:5-6) and Madura is no exception.[32] Considering that at present the sea is at a high absolute level in terms of Pleistocene fluctuations (Bellwood 1985:21), Madura's current insularity is, historically speaking, quite unusual.[33]

Administratively, the archipelago constitutes a Residency (*keresidenan* Madura) and is part of the province of East Java. It is divided into four districts (*kabupaten*), from west to east: Bangkalan, Sampang, Pamekasan and Sumenep, after the names of their main towns which are are also the four largest towns on the island. Each district is composed of subdistricts (*kecamatan*), further divided into villages (*desa*) and in turn hamlets or neighbourhoods (*kampung*).

Until quite recently, the main access to Madura has been the short ferry linking the Surabaya port of Ujung to Kamal, a small port town situated on the southeast of the island. The eastern islands are reached by boat from Kalianget, near Sumenep on the east of the island. Since 1986, a ferry has also linked Kalianget with Jangker, north of Asembagus in East Java. Traffic on this route has increased steadily, but in terms of frequency (once-daily service in each direction) and volume, it lags far behind the Surabaya-Kamal link. Between Surabaya and Kamal, at least two ferrys, capable of transporting cars, trucks and pedestrians, ply this half-hour, 2.5 km distance each hour in both directions during the day. Two landings at the port of Kamal are equipped to handle the steady traffic in and out.

After almost six years in construction, the longest toll bridge in Indonesia (5440 meters) and the first to span the Madura Strait was opened on 10 June 2009. The Surabaya-Madura Bridge (or Jembatan Suramadu) is expected to increase traffic between Java and Madura and make much of West Madura even more of a suburb of Surabaya than it already is.

By monitoring the comings and goings at the ferry terminal one can obtain a useful first impression of Madura's position with respect to Java. One cannot help noting the many trucks laden with live cattle or agricultural products (primarily maize, cassava, tobacco and fruit) leaving for Surabaya, and the trucks full of consumption goods, construction materials, and, in the dry season, cattle fodder entering the island. College students, government functionaries, office employees, and a variety of traders and workers take the morning ferry to Surabaya on foot or astride motorscooters. They return in the evening to Madura, particularly to Kamal, Bangkalan and other outlying areas which increasingly have evolved into Madurese suburbs of Indonesia's second largest city. A few traders and government workers living in Surabaya go against the majority flow, most of them traders and

[32]Water depths between central Madura (Sampang) and Java (Probolinggo) reach only 52 meters at most. The narrow portion of the channel between Java and West Madura is rarely deeper than 10 meters.

[33]Indeed, the fourteenth century Javanese text *Nāgarakĕrtāgama* (chant 15–2: Pigeaud 1960:I, 12 [Javanese text]; Pigeaud 1960:III, 18 [English translation]) speaks of the two islands forming one until their separation in the Shāka (çaka) year 124:

> Concerning now this island of Madura, this is not at all of the same aspect as the foreign kingdoms,
> because of the fact that it has been one with the Yawa-country, so it is said, at that time in the past:
> "The oceans carry a country" (124 = 202 A.D.), such is their *Shāka*-year, one hears, their moment to become provided with an interstice; (nevertheless) they are one in essence, not far away (from each other).

As Lombard notes, the importance of this stanza lies in the proof it provides "that Javanese and Madurese were already aware that they belonged to the same cultural community" (Lombard 1972:259).

functionaries in government offices in southwestern Madura. Two symbols of Madurese society greet those who disembark: the cement statue of a kerapan bull-racing team and jockey, and the ubiquitous advertizing for Oepet, the low-priced clove cigarette (*krètèk*) brand favored by Madurese villagers.

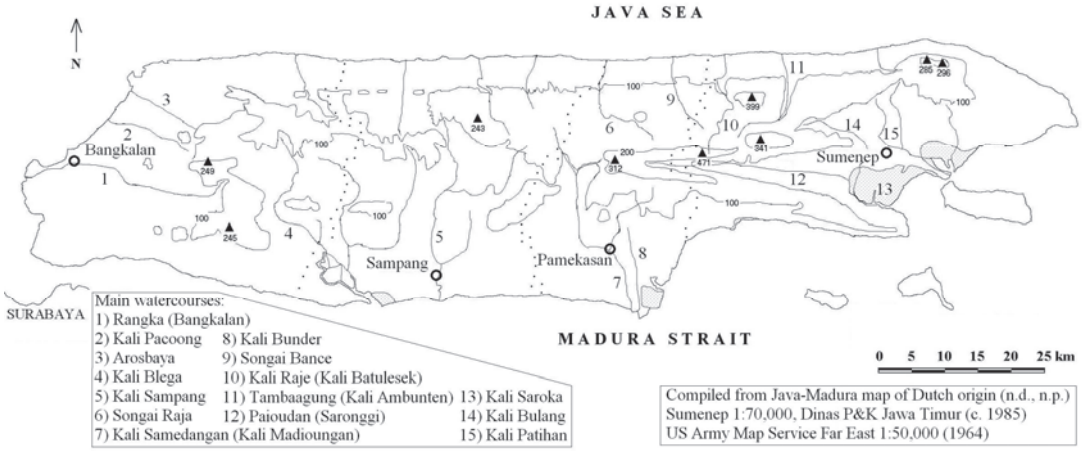
As one leaves the port at Kamal on foot, one passes dozens of vans offering transport to Bangkalan, 15 km north, and points further north and east. The visitor's first impressions of the island may be deceptive, since between Kamal and Bangkalan, and from Bangkalan to the east one passes through some of the island's most extensive rice fields (*sawah*, *saba* in Madurese language). In the *sawah* one will notice water buffalo, a rare site elsewhere on the island. To traverse the island from west on east, the preferred route takes the all-weather road north to Bangkalan, then east through the towns of Tanahmerah and across the Seleret hills through Galis and Blega, before returning to the southern coast after Sampang. The coastal road between Sampang and Pamekasan passes through fishing villages and Camplong, a sandy beachfront location developed with the hope of attracting tourists but unfortunately situated within view of the island's main Pertamina oil storage facilities.

Pamekasan is the island's administrative centre and largest town. A vice-governor of the East Java province seats there. Going east from Pamekasan one rejoins the coast, passing through the busy town of Prenduan, a centre for tobacco trading and fishing (see de Jonge 1984, 1989). The road climbs through the Bluto sub-district, affording a view of the Madura Strait, the southern offshore islands of Gili Genting and Gili Raja, and the mountains of Java in the distance. At night or in the early morning, a spectacle of light sprinkled across the strait comes from a multitude of small boats employing the *ngancet* method of manual line fishing with kerosene lamps, or from fishing platforms. Once over the hill to Saronggi, and before reaching Sumenep, the road crosses a vast swamp used for fish breeding, salt production, and some *sawah*. About twelve kilometres southeast of Sumenep lies Kalianget, the main port at the eastern end of the island. Approximately three hours are needed to travel from Kamal to Sumenep (four hours at best from the centre of Surabaya, three with the new bridge). A north coast road passing through many fishing villages is longer and less well-maintained than the southern route, adding a couple of hours to the length of a cross-island journey.

2.2.1 Environment

Five low-lying fertile alluvial plains are located near each of the four district seats and near the town of Blega in the southern half of the island. These areas are particularly suited for intensive rice cultivation and provided the rice for Madura's five principality seats in former times: Arosbaya-Bangkalan, Blega, Sampang, Pamekasan, and Sumenep. Elsewhere, the topography of the island is hilly, even jagged in parts, though nowhere does it resemble the volcanic highlands of Java. The highest point in Madura, Gunung Tambuku in the centre east, rises only to 471 m. Nevertheless, one is struck by the brilliantly white and vertically-inclined strata of limestone, honed to a knife edge and emerging like the spine of the island as one plys the road north of Pamekasan to the coast. There, and in other areas (such as Batuputih and Bluto in the east), limestone outcrops can prevent any attempts at the kind of intensive agriculture found in the plains. Still, planting sticks or nimble plow cattle can enable cultivation of even small patches of soil in a field of rocks. The only uninhabited and uncultivated land is situated near the summits of the most abrupt and inhospitable outcroppings.

Figure 2.2 – Madura: Topography, hydrology, location of saltpans and district boundaries



The island has numerous watercourses (Figure 2.2), but given the lack of any substantial upland watersheds, their catchment basins are narrow and flow varies depending on the season. The water divide generally situated near the north coast, the longest and most important rivers and streams flow into the Madura Strait. The most important of these have long fed local irrigation works. Developed by Madurese centuries ago, then improved by the Dutch after 1900, they remained limited. In 1961, a study found potential for exploiting underground aquifers (Flathe and Pfeiffer 1961). Since the 1980s, development projects have increased the island's irrigated area through the installation of groundwater pumping stations, but there has been little success identifying suitable sites for these outside of the lowland plains. As soon as one moves upland and away from water sources one finds the dominant farming system of Madura, the *tegal*, or sedentary dry field "crop and fallow" cultivation.

2.2.2. The tegal agro-ecosystem

Crop and fallow agriculture in Java and Madura, when not completely neglected, has often been misunderstood. Much of the confusion dates from Clifford Geertz's brief references to *tegal* cultivation in his often-cited book *Agricultural Involution* (Geertz 1963). Geertz's book contrasted the intensive wet-rice *sawah* cultivation patterns found on Java and Madura (though excluding southwest Java) with the extensive swidden (*ladang*) farming practised in the other islands, considering these to be, if not the only, by far the most important of Indonesia's agro-ecosystems.[34] Through an analysis of these two systems alone, Geertz maintained, one could account for the uneven population distribution in Indonesia, the development of its agricultural economy, and certain key cultural values of the communities and societies that exploited one or the other agro-ecosystem. Crop and fallow on unirrigated plots represented for Geertz a marginal and fairly recent (post-nineteenth century) innovation by farmers who were seeking supplementation for declines in revenues from their intensive small-scale rice-farming. In Geertz's conception, upland crop and fallow cultivation and wet rice farming represented a combined strategy adopted by individual farmers, thus agricultural changes in the uplands

[34]Other prominent writers of the period who recognized only two main agro-ecosystems in Indonesia, the *ladang* and the *sawah*, included Wertheim (1956) and Gourou (1961).

mirrored those in the *sawah*. Like swidden systems, all were characterized by what Geertz termed "involution", a developmental process in which ecological and economic factors were of less importance than social, political and psychological dynamics.

As more recent work (Kuntowijoyo 1980, Palte 1989) has revealed, dry-land agriculture on Java and Madura has been much more widespread than a reading of Geertz would suggest, and today accounts for more than a third of the cultivatable land on Java alone. Moreover, historical changes in upland agriculture have differed markedly from the pattern associated with the lowland *sawah*, the former being much more susceptible to environmental and economic perturbations (Palte 1989). As Pelzer (1958:132) noted over forty years ago, "The steady, continuous use of dry, i.e., unirrigated, land offers one of the most difficult agronomic problems in the humid tropics." In Madura, population growth in the nineteenth century was spurred by the colonization of vast tracts of the uplands where only rain-fed crop and fallow agriculture could be practised. By the middle of the nineteenth century, most of the lands suitable for agriculture had been settled, and by 1873 practically all had been put to the plow (Kuntowijoyo 1980:9, 41).

The end of the land frontier thus came earlier in Madura than in Java, where the expansion of arable land had more or less kept up with population growth until the First World War (Booth 1988:100). This upland movement appears to have been a major factor in the removal of much of Madura's forest cover during that period. The decline in soil fertility which would eventually result from farming forest clearings apparently induced upland farmers to adopt or intensify various techniques in order to adapt to the changing environment. Among the most important of these were multiple cropping, small-holder cattle production, and animal manuring. Simple, small-scale irrigation works were probably developed in some localities at this time to control water flow near the hill sources. Rather than continuing a process of involution, as Geertz maintained, the Madurese uplands represented a complete transformation of the lowland *sawah* environment.[35] For Pierre Gourou (1961), the Madurese transformation of the uplands under difficult conditions provides a striking example of social creativity winning out over environmental limitations.

> To repeat, natural conditions do play a role in such an evolution but not in a decisive fashion. For example, the island of Madura, with a total area of 5,971 square kilometres, had in 1940 an average density of 313 inhabitants per square kilometre. Yet Madura does not benefit from volcanic soils (too often held to be determinate of the high density of some parts of Indonesia), and only 740 square kilometres of the 4,460 cultivated are irrigated. Madura, with its low hills and its soil of medium grade at best, has a remarkably high percentage of the total area in permanent fields, or *tegalan.* The peasants of Madura have set off elabourate techniques of permanent dry agriculture—artificial terracing, rotation, manuring, etc.—which demand much work but which every year produce remunerative crops (remunerative, that is, relative to the economy of the peasant of Madura). The quality of land use in the Asiatic tropics is not fundamentally different from that in the Asiatic

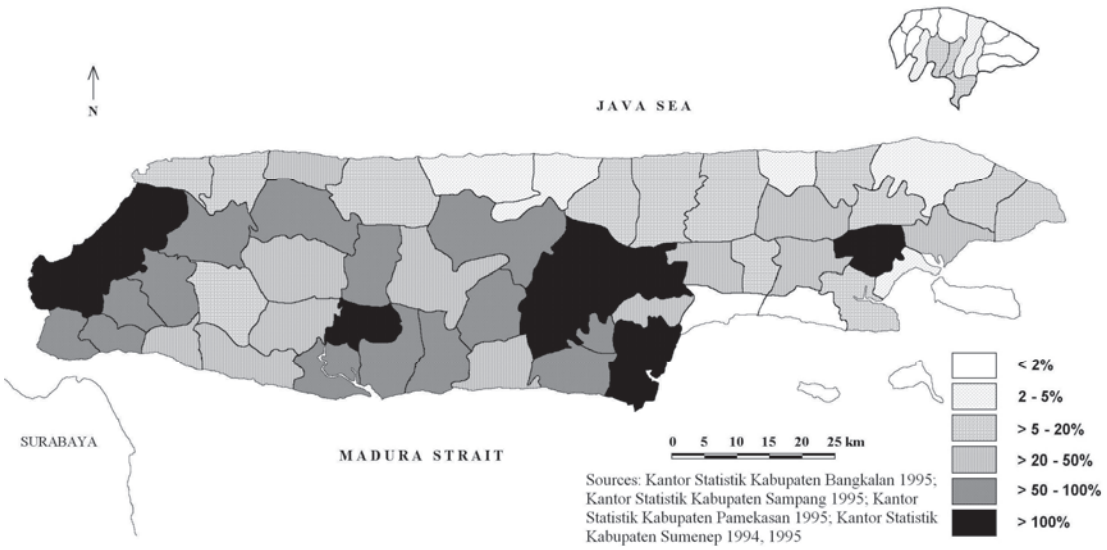
[35]A number of authors have shed considerable doubt on the validity of the involution concept and the sort of "ethical determinism" present in Geertz's work, even when their application is confined to areas of wet-rice agriculture in Java (Alexander & Alexander 1982; Collier 1981; Guermonprez 1978; White 1981, 1982). Geertz saw little hope for agricultural development due to what he saw as Javanese passivity and resistance to change and modernization encapslated in the notion of "shared poverty."

temperate plains; it derives from a civilizational complex and not particularly from tropical conditions.

The major irrigation schemes developed in the lowlands for previously rain-dependent areas between 1969 and 1979 increased the irrigated area by 38.4 percent (Booth 1988:161, Table 5.13). Although nearly 90 percent of Madura's land surface is under cultivation, less than an eighth of the area planted in *padi* and *palawija* (rice and non-rice crops, respectively)[36] in 1986 was devoted to *padi sawah* or rice planted in embanked fields that are flooded for much of the growing season (Biro Pusat Statistik 1986:66). But the area actually occupied by inundated ricepaddies is small in relation to the total area, since this also includes valley ricepaddies and those that are only seasonally inundated by rain (Smith 1992: 302). One study estimated that only 6 percent of Madura's land disposes of a source of irrigation (Groundwater Development Consultants 1986:22).

It is to be expected, therefore, that *palawija*, particularly maize and beans and in places cassava, remain more important than rice for the economy and diet of most households. In only a few subdistricts on the island do we find more land devoted to rice than to maize (see Figure 2.3). Here as well it should be noted that land categorized as ricepaddies are those where rice can be planted at least once during the year; many of these fields can only support one season of rice, followed by a maize crop. According to local conceptions as well as administrative statistics, a field that can grow a rice crop is considered a ricepaddy (*sawah*).

Figure 2.3 – Land planted in rice as a percentage of land planted in maize[37]



One should also note an important staple crop that is not represented on this map, cassava. Cassave is planted throughout these regions, with wide variations in yield. Cassava can be planted as a rotation crop on rice or maize fields, or more often along the edges of fields. In some areas of north-central Sampang, cassava provides the staple during the dry season, replacing even maize.

[36]Only paddy, maize, cassava, sweet potatoes, peanuts and soybeans were taken into account in these figures.

[37]Data is provided per subdistrict. The Batuputih subdistrict has been copied above the island to provide data per village.

2.2.3 Geology and soils

According to Verbeek and Fennema (1896:48), "The geological constitution of Madura is extremely simple, the island constituted only of marl and argillaceous lime, with the exception of the post-tertiary (quartenary and modern) plains." Generally, the centre of Madura is made up of marl and the north and south coasts of limestone. The rivers have removed the limestone and marl in places and replaced them with more recent sediments, but the thickness of these sediments is only significant near the mouths. It is there where the argillaceous lime sediments are horizontal that one finds expansive very slightly inclined plains or plateaus (Verbeek and Fennema 1896:52). Found on these plateaus are yellow or red-brown clays resulting mainly from the disaggregation of limestone or argillaceous lime (the red coming from the iron hydroxide due to the transformation of the magnetic iron ore found almost everywhere). One can easily distinguish these clays produced by erosion and the light or dark grey alluvial deposits of rivers, since nowhere do the latter appear more than 10 m above sea-level.

Marine alluvion, found only along the coast, consists of fine quartz sand mixed with magnetic iron ore and sometimes feldspar, augite and hornblende.[38] All terrain less than 8 to 10 m above sea-level has these recent alluvial or marine deposits (Verbeek and Fennema 1896:52-3). The soft and porous argillaceous limestone is exploited as building material in numerous quarries, like those situated between Kamal and Bangkalan or near Arosbaya in the west and on the northeast coast in Batuputih.

Inshore petroleum deposits were first discovered in East Java in the late nineteenth century. After a long period with little success, exploration moved offshore in the 1970s and large oil and gas fields were discovered near Sumenep district's eastern islands of Kangean, Sapeken and Pangerungan, north of Bali. ARCO exploits this 4500 sq. km. area known as Kangean PSC, one of the most productive and promising in Indonesia, with proven and probable reserves of between 1 and 1.74 trillion cubic feet of gas and 1 million barrels of oil and condensate.[39] Production of gas began in 1993, supplying East Java through a 430 km marine-land pipeline. Recent Japanese investment of $300 million in 2009 is aimed at raising production of oil and gas from 6,300 barrels of oil equivalent per day in 2008 to 60,000 boe/d in 2011. Other gas explorations have been successful in the Madura Strait and Sea of Java north of Madura. Near the coast onshore south of Pamekasan, one can find places where gas seeps out or continually burns. The oil and gas revenues make Sumenep by far the richest of the four districts on the island, and one of the wealthiest districts in East Java province, at least on paper.[40] However, the benefits for mainland Sumenep took a very long time to trickle down, and even in 2009 the recent paving of some interior roads are virtually the only visible signs of government largess Gedang-Gedang villagers can attribute to the oil revenues.[41]

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[38]The only place where marine alluvions rise above several meters high is Slopeng, to the east of Ambunten on the northern coast. Since the early 1980s, the government has hoped that the beach and its dunes might someday become a major tourist attraction.

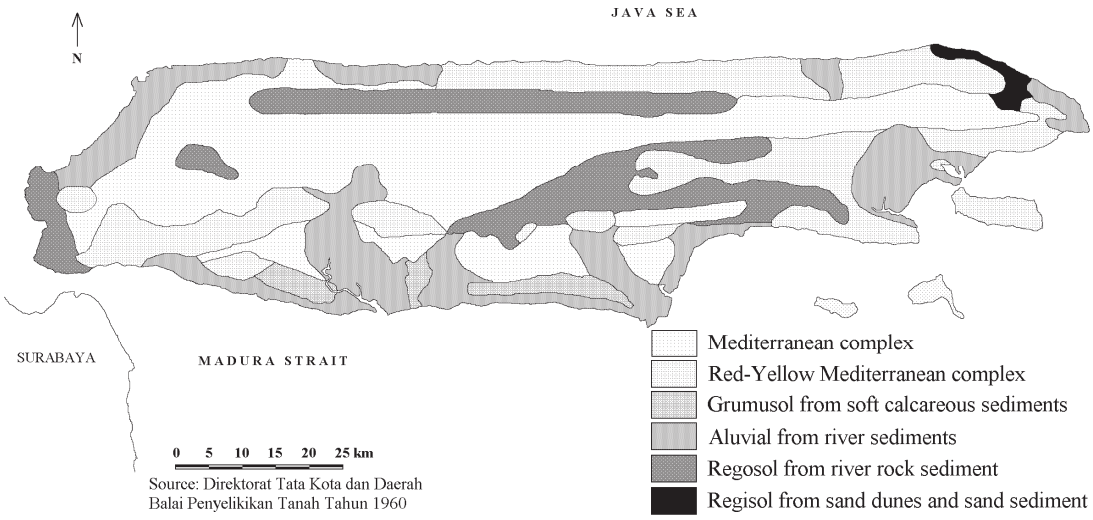
[39]On www.upstreamonline.com\incoming\article128540.ece, filed 2 March 2007 (last accessed 1 Dec 2010).

[40]East Java province is composed of 29 regencies *(kabupaten)* and 9 cities *(kotamadya)*.

[41]This despite the implementation in 2001 of the Law No. 22/1999 on Regional Government (UU PD) and Law No. 25/1999 on the Fiscal Balance between the Central Government and the Regions (UU PKPD), which transformed intergovernmental fiscal relationships and gives a larger share of revenues to resource-rich districts. See Alm and Sri Mulyani, 2002.

The soils found on the island of Madura are low in fertility compared to those found in most parts of Java. Madura lacks the volcanic highlands which have provided fertile slopes and rich alluvium for much of the neighbouring island. Only a small amount of volcanic ash can be detected in Madura's soils, having been blown over during past volcanic activity in Java or Bali. Presented below (Figure 2.4) for general reference is a soil map using the data and soil taxonomy provided by the Balai Penyelidikan Tanah in 1960. Like modern pedologists, the Madurese would distinguish between many more types of soils on the local level than can be represented by a general map.

Figure 2.4 – Types of soils encountered in Madura



In many areas, shallowness of topsoil (the "A horizon") limits the agricultural options available and requires planters to adapt through green and animal manuring and mounding. Agriculture and animal—particularly cattle—husbandry go hand in hand in Madura, each facilitating the other. On Madura, the population density of cattle and the quantities of animal manure applied to fields both rank among the highest in the world. Madura's human population of about three million raises some 600,000 head of cattle, virtually all kept by smallholder households.

2.2.4 Climate and rainfall

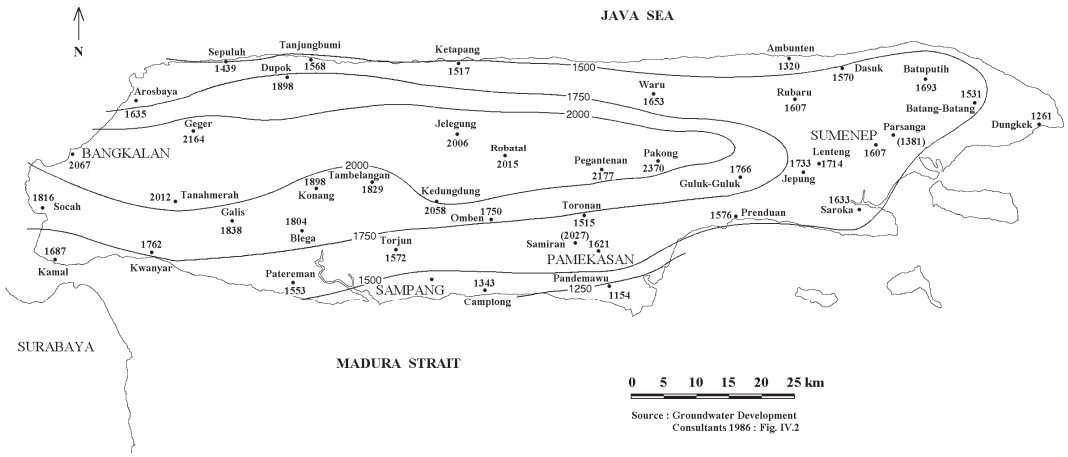
Madura's climate is considered hot and dry by the standards of most Indonesians. The west monsoon (November to April) brings Madura less bountiful and more unpredictable rains than most other parts of the country. The east monsoon (May to October) usually promises several months during which not a drop of rain falls. In 1986, mean temperatures ranged from 27.1°C. to 29.0°C., with 20.4° and 34.4°C recorded as lowest and highest temperatures, while relative humidity ranged from 50 to 98 percent.[42] The area is classified as humid in the west and interior, and subhumid-subdry along the coasts (UNESCO 1979:18), though the duration of the dry season, evapotranspiration rates and the nature of the soil would argue for

[42]Climate data were obtained from the Kalianget Meteorological Station on the eastern coast of the island, the only permanent station using modern equipment (Kantor Statistik Sumenep 1988b:9-10). Temperatures from the interior and western parts of the island would be slightly lower than these figures, while relative humidity in these areas would be higher on average.

putting most of the eastern half of the island in the subhumid-subdry category. On the basis of annual precipitation, severity of the dry season, and land cover, Madura would qualify as a tropical savanna type ecosystem.

Water is at least as important a limiting factor for upland agriculture as is soil quality. As mentioned earlier, proximity to a stream can allow for small, circumscribed irrigation systems in the uplands. The vast majority of upland Madurese, however, farm rain-fed plots. The farming systems available to them will depend much on their location on the island, which determines the amount of annual rainfall they receive and the length of the annual dry season. Annual rainfall declines while average temperature, length and severity of the dry season and overall unpredictability of rains increases as one moves from west to east, or from the interior to the coasts. Variations in the island's pluviosity can be appreciated best with reference to the rainfall isohyets in Figure 2.5.

Figure 2.5 – Average annual precipitation (mm)



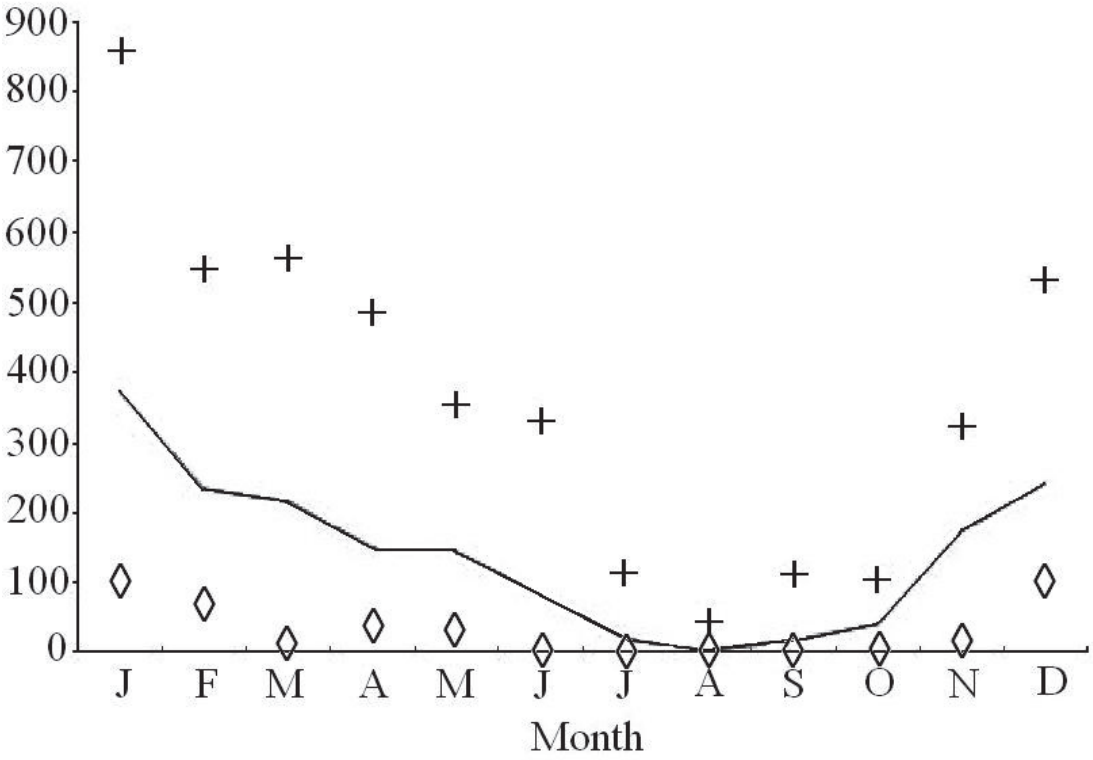
The height of the dry season during which little or no rain falls lasts two or three months in the west but can last four to seven months in the east. The rainfall patterns for the study site in Batuputih subdistrict in Northeastern Madura can serve to illustrate the extent of variation in pluviosity for one local area over time. In Figure 2.5, the average for Batuputih is calculated on the south side of the hill range (the isohyet follows the hill summit line) at Batuputih Laok at the office of the subdistrict administration. Not only does the north receive less rain than the south, but the number of rainy days declines as one moves north and the west monsoon rains following the dry season come later. Uncertain rains, already a problem in the interior, are all the more so in the east and along the coasts.

This unpredictability is graphically represented in Figure 2.6, showing maximum and minimum precipitation for Batuputih Laok for the period from 1976 to 1990 (excluding the period between September 1978 and April 1981, and a few scattered months for which data is not available). The study village of Gedang-Gedang straddles the hills, with its northern border on the Java Sea; therefore this graph presents the conditions commonly found in the more rainy part of the village. When travelling in the village, one frequently encounters rainy conditions in the south, while in the north the skies are clear.

The year 1986 was particularly dry, only receiving half of the average yearly rainfall. Only 171 mm fell between April and July and none whatsoever from August to October. Just as the dry season can stretch on until November or December, so can dry conditions occur in the middle of the rainy season or too few

rainy days disrupt a planting cycle. For each of the months from January to October two or less rainy days were recorded at least once during the data period.

Figure 2.6 – Average (line), minimum (◊) and maximum (+) rainfall in milimetres per month in Batuputih Laok (1976-1990)



Cattle husbandry is highly sensitive to rainfall. In the hilly areas of East Madura the insufficient rains of the dry season prevent groundwater from reaching the root zone to provide for plant transpiration, thus bringing the growth of grasses to a halt for several months. During this period of water stress, peasants must seek at great distance or expense the large quantities of fodder required by their cattle. The intensity of water stress is determined by the relative relationship between evaporative demand and rainfall, moderated by the behaviour of water in the soil profile (UNESCO/UNEP/FAO 1979:57). Crops are of course also affected. Evaporative demand is conditioned by temperature and wind exposure, as well as the needs of the particular species of vegetation. Nutrient status, limited rooting depth, drainage conditions, as well as geomorphic characteristics also determine productivity and the survival of a given species in a given area (Bourlière and Hadley 1970:125, Lathwell and Grove 1986:9-10). Over time, selection processes favor the spread of drought-resistent species in the dryer areas. The key food crop, for example, is a flint variety of maize (*Zea mays indurate*) having exceptional resistance to drought and insect predation. Maize leaves are carefully stored as valuable dry season fodder.

As will be discussed in Chapter Three, the long dry season does have one advantage for farming systems in that it allows for intensive cultivation of high-grade tobacco, provided farmers have access to labour, capital and proximity to a water source for manual watering.

2.2.5 Demography and settlement patterns

The most dramatic selection process, however, has been that undertaken by the Madurese themselves. Through their recourse to forest clearing, fire, selective planting and maintenance, fertility enhancement, and other management techniques, they have changed the face of the island. Virtually no part of Madura has been left untouched. Like much of East Java today, Madura presents a mosaic of cultivated land, fallows, forest remnants, and grass or shrub savanna. The savanna ecosystem shows itself most clearly in the few uncultivated areas or fallows where *lalang* (*alang-alang* or *Imperata cylindrica*) or short shrubs take over. In sandy and saline soils along the coasts, steppe-like succulents and thornwoods vie with various economically-important palms and food crops.

In the upland areas, crops with low water requirements are planted for the most part: flint maize, cassava, and certain bean and tree crops. Less drought-resistant varieties[43] of maize, rice, vegetables and tree crops can be planted in upland zones where micro-climatic and micro-edaphic conditions are favorable, and in much of the lowland plains. One need not travel far in the uplands to find striking variations in plant cover. The diversity of species found in separate agro-ecosystems of a single upland village will be discussed in Chapter Three and lists of plant and animal species are found in Appendix II and III.

The intensity of land use being what it is, grass, shrub and woodlands probably do not account for more than 10 percent of the land surface of the island, and in no area do they extend uninterrupted for more than a square kilometre or two. Most trees are found in small managed gardens near dwellings, under private ownership for their economic value.[44] As in other parts of Asia, the savanna ecosystem is a direct result of short- or long-term degradation of forest formations (UNESCO 1979:22), or in other terms the extension of savanna communities at the expense of forest (Harris, D.R. 1980:24).

The degradation of Madura's forest cover occured during the eighteenth and nineteenth centuries through circumstances that have been the subject of speculation ever since. Protected by the indigeneous rulers, who used them as hunting grounds[45], the forests came under increasing pressure following the Dutch imposition of direct rule in Java in the middle of the nineteenth century. One theory subscribed to by many Madurese today, but lacking much in the way of proof, has it that the Dutch carried out the deforestation of Madura in order to impoverish the islanders forcing them to emigrate to provide cheap labour in Java's large plantations. A more plausible and less Machivellian explanation would see the island's gradual deforestation as the result of pressure on land and fuel supplies

[43]Hybrid varieties, also referred to as "high-yielding" varieties (HYV), are often planted in lowland and selected upland fields where adequate soil, water and fertilizer are provided. Though they have potential for high yields under optimum conditions, they will yield less or will be more vulnerable than traditional varieties to the water- or nutrient-deficient conditions that sometimes occur in upland areas.

[44]For ritual reasons, some areas or particular species are afforded a degree of protection, though in recent years one notes an erosion of respect for these interdictions.

[45]Sixty-nine forest reserves existed in 1855, only 15 of which exceeded 225 ha in size. Six swamp *(rawa)* reserves were identified in Sumenep and one in the town of Bangkalan. Grassland *(oro-oro)* reserves numbered 145, most of them in Sumenep. At that time, wild tigers, deer, crocodiles, and horses could still be found in these small reserves (Kuntowijoyo 1980:28).

from an incrementally expanding population.[46] By 1878, when the first topographical survey of Madura was conducted, 70,000 ha of forest remained (13 percent of the island's land surface), 60,000 ha of which were teak forest. This remaining forest continued to disappear at a rate of 2000 ha per year. By 1910, only 6000 ha of teak forest remained, and its area continued to decline (Mijers [1941] 1982). Large deforested areas of the island were covered with lalang grass, and ravaged by annual flooding. The inhabitants even resorted to cutting fruit trees for firewood (van der Plas 1915). This explains why one often comes across descriptions in the literature of Madura as a stark barren island.

Such descriptions of the island appear exaggerated today. A scheme was proposed to the Governor of East Java in 1939 to reforest over 20,000 ha mainly as protection against erosion but also for production of timber and firewood (Mijers [1939] 1982). The plan ran into difficulties with purchasing land from the population, and was interrupted by the outbreak of World War II, but the post-Independence government continued to encourage and subsidize the replanting of trees. Though only a few small areas of forest remain on government-owned land (*tanah Negara*), and tiny remnants are all one can find of Dutch teak plantations, replanting programs in the villages and along the main roads and demand for the products of household gardens (*pekarangan*) and managed coppices (*alas*) have contributed to a progressive regreening of the island over the last fifty years. The gains are fragile, however. The expansion of tobacco cash-cropping during the dry season in upland areas has encouraged land clearing and put new pressure on water resources.

The particularities of Madura's shoreline and its long, hot dry season have made it one of the most important salt-producing regions of Indonesia. During the height of salt production in the early 1900s, it was estimated that up to several thousand people were completely dependent on salt production for their livelihood and more than 200,000 people derived a seasonal income from it (de Jonge 1993:169). The centre for salt production today is located south and east of the town of Sumenep. Smaller areas in Sampang and Pamekasan district are also exploited (see dotted areas of Figure 2.2, near numbers 5, 7, 13 and 15). Brackishwater fishponds, covering thousands of hectares along the southern coast of Madura, produce milkfish (*Chanos chanos*) and giant prawns (*Penaeus monodon*). Some are converted to the production of salt during the dry season.

The population of Madura in the early 1990s is provided in Table 2.1. The sex ratio favors women, especially when children are left out. One reason for the skewed sex-ratio is likely the longer lifespan of women as suggested by the village-level demographic study presented in Chapter Six. Another reason for this imbalance is that men are more likely to engage in seasonal or permanent migration. Madurese migration to East Java and beyond has been studied elsewhere (Husson 1995, Tirtosudarmo 1985) so need not concern us here. However, historical population trends will be discussed later in this chapter with relation to their economic and social contexts, including the outmigration of men and the loss of many forced workers (*romusha*) during the Second World War. And migration will be taken up in relation to specific questions of cultural process when we consider later the specifics of household mobility and the debates over the Madurese and their supposed violent culture.

[46] Similarly, the widespread deforestation of southern Sumatra in the 1970s and 1980s resulted from the colonialisation of forested land by immigrants (primarily from Java) and by locals, each reacting to household dispersion factors, though in Sumatra the expansion of industrial oil-palm plantations also played an important role (Smith and Bouvier 1993, Smith 1999).

Table 2.1 – Population of Madura in 1994 by district (*kabupaten*)

	Male	Female	Total	Households	House-hold size	Area (km2)	Population per km2
Bangkalan	339097	381014	720111	161860	4.45	1264	570
Sampang	338100	366187	704287	162199	*4.34	1233	571
Pamekasan	304264	329993	634197	143990	4.40	792	800
Sumenep	439922	482281	922203	269247	3.43	1999	461
Islands**	127877	141298	269175	80965	3.32	851	316
Total Madura	1421383	1559475	2980798	737296	4.04	5288	564
Java-Madura	45174000	46096000	91270000	22759000	4.39	132187	755

*1990. **Portion of Sumenep total located in outlying islands. Java-Madura approximate figures for 1985; figures by gender calculated based on sex-ratios provided. Sources: Biro Pusat Statistik 1990, Kantor Statistik Kabupaten Bangkalan 1995, Kantor Statistik Kabupaten Sampang 1995, Kantor Statistik Kabupaten Pamekasan 1995, Kantor Statistik Kabupaten Sumenep 1995.

Certainly the most striking feature of the data in Table 2.1 is the smaller household size found in Sumenep, in comparison with the average household size found in the rest of Madura or in Java. If Javanese household size is compared with the West Madura figures, or even with the island figures, the differences are negligible, and could simply be a product of different sampling methods or definitions of households. However, if Java-Madura is compared with Sumenep, the wide gap calls out for some explanation. The simplistic argument—that Madura's rates are lower because the less fertile island cannot support higher populations as can its neighbour—has been refuted by Gourou (1961), and is unconvincing when it is considered that Madurese population growth, while lower than the Javanese rate in recent years, has been remarkably high during certain periods. From 1850 to 1930, Madura had a higher annual growth rate (2.7 percent) than Java (1.9 percent), even after out-migration to Java was taken into account (Kuntowijoyo 1980:79). In Chapter Six, I will take a close look at fertility behaviour based on a sample of households in a village, Gedang-Gedang, in the Batuputih subdistrict of Sumenep. It will be shown that the demographic transition to lower fertility occurred before World War II, well before the Asian fertility transition, and corresponded not to government injunctions to have less children, but most likely was due to households realizing the benefits of smaller families in a context of land scarcity.

Population growth rates over the last thirty years have been significantly lower in Sumenep in general, and Batuputih and the village of Gedang-Gedang in particular, compared to the Indonesia rate (see Table 2.2).

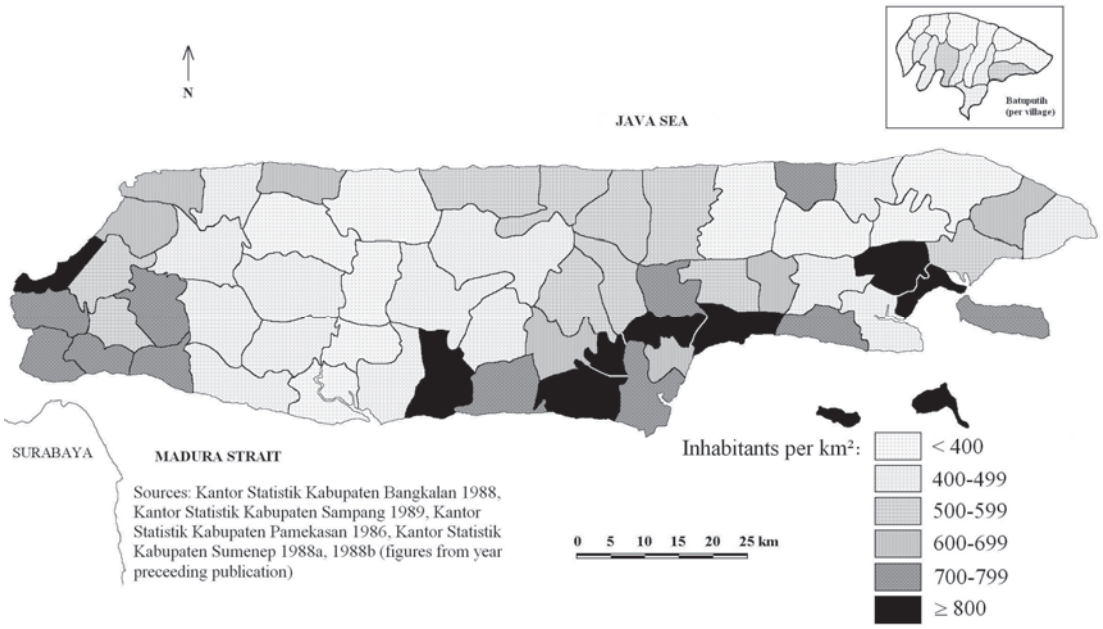
Table 2.2 – Population figures and growth rates for country, district, subdistrict and village studied

	1980	1984	1993	2000	2006	% change	Annual growth rate %
Indonesia	147490298			206264595		39.8	1.9
Sumenep	854925				1069928	25.1	0.9
Batuputih	37709	38397	39109		43696	15.9	0.5
Gedang-Gedang		2584	2630			1.8	0.2

Sources: Kantor Statistik Kabupaten Sumenep 1981, 1985, 1994, 2008; Biro Pusat Statistik 1990.

Figure 2.7 shows the distribution of population densities on the island by subdistrict in graphic form.[47] The most populated areas are those in and around Madura's four main towns where rice production is important, while population is less dense in the dry hilly areas of Sampang, Bangkalan or northeastern Sumenep.[48]

Figure 2.7 – Population density by subdistricts in Madura



The dispersed settlement across Madura's landscape has often been contrasted with the Javanese model of compact villages separate from the fields, and could be a marker of distinctiveness as a region, at least for the rural areas. In fact, four major settlement patterns are found in Madura, and they reflect adaptations to different productive environments. The first and most widespread is in effect the hamlet or dispersed pattern found in upland rural areas where residential units are located amid or close to the *tegal* the unit cultivates. Though several residential units may group together here or there, usually the units are separated from each other by their

[47]For the subdistrict of Batuputih in Northeastern Madura, which will be treated in detail later, the population density by village has also been provided (above right).

[48]In 1993, the subdistrict having the highest population density was Pamekasan (2851/km²). Kokop in Bangkalan had the island's lowest population density (332/km²), though Arjasa, the subdistrict on the largely-forested offshore island of Kangean, had a density of only 164 km².

tegal. The closer together residential units are, the greater the likelihood some kinship link will exist between them. The most common day-to-day interaction occurs between neighbouring residential units, as their members often exchange food or labour or pay social visits. The local community, in which people have frequent face-to-face contact, is usually limited to ten or twenty nearby residential units. The wider community includes the kampung and desa of which it is a part, and with which it interacts on market days, and during social events. In this dispersed settlement pattern, few residential groupings are found.

A second settlement pattern is found in areas where *sawah* wet-rice cultivation is prevalent. Here, the settlement pattern resembles that prevailing in Java, i.e, residence in compact or nucleated villages, with large expanses of *sawah* located adjacent to the village, unsettled save for the occasional bamboo and thatch shelter from the sun. A family's ricefields may sometimes be located a considerable distance from their residence.

A third pattern is found in the coastal fishing villages. Either aligned along a coastal road or grouped into a compact desa, the settlement pattern is governed by the proximity and contours of the shoreline and the diversity of economic activities available. In coastal villages, the range of activities depends on the size and degree of motorization of the boats and the importance of the port. The catch, processing, and distribution of fresh fish are of course the primary activities, employing vast numbers of men and women (Jordaan and Niehof 1980, 1982). Some north coast villages are centres for the export of fruit and other items from Madura to Kalimantan (Indonesian Borneo), or receive lumber coming in the other direction. Fishermen on the south coast often use lamps to attract fish to their boats or fixed platforms (*bagan*) in the Madura Strait. In Madura's fishing villages, intense trading activity is focused on the shore and on the main road, with inbetween tightly-packed dwellings, shops and processing sheds. Residence and economic activity always exist in close proximity.

Where fishing is not the primary household occupation, settlement in rural areas along and near the coasts conforms to the dispersed *tegal* model. Many of the inhabitants of Madura's coastal regions in fact live with their backs to the sea. In the vast coastal areas between the island's prominent fishing villages, agriculture remains the dominant mode of subsistence, though a few people will use unmotorized craft for small-scale proximity fishing or engage in shoreline harvesting to provide their households with seasonal income or nutritional supplements. A few agriculturalists will make substantial investments in fishing, and some fishing households will own agricultural land. The agriculture-fishing dichotomy is not clear-cut in Madura.

The islands of Gili Genting and Gili Radje off the south coast provide a somewhat unique example. Residence of many of the key players in the lumber trade between Sumatra, Jakarta and Kalimantan, and where some construction of large boats occurs, the island is well-off economically in comparison with most of the rest of Madura and is densely populated. Most men are absent from the island during the larger part of the year. Since fishing is relatively unimportant, the dispersed settlement pattern is found, with the women maintaining the *tegal*.

Lastly, one finds an urban settlement pattern of residential blocks, streets and alleys in the four district seats. In the last few decades, new subdivisions have mushroomed to provide middle-class housing for those working in the burgeoning administrative and trade sectors there. In the main subdistrict towns there is also an incentive for houses to be alongside the main asphalt roads. Not more than a few houses deep, these roadfront neighbourhoods are often home to employees of the subdistrict administration, teachers, health workers and security personnel, when

they are not merely commuters from the main district town. Artisans and traders may also elect to set up along the main road for the sake of commodity. Most possess agricultural land of some kind to supplement their income. Historically, this settlement pattern is unusual, as will be explained below, and quite often these houses on the main roads have housegardens that open up to their fields beyond.

Throughout Indonesia, the government has sought to discourage dispersed settlement and encourage regrouping of dwellings along the main roads, the rationale apparently being that local social organisation and control from the power centres are easier to enforce when the population is concentrated in one place. In Madura, these efforts have been consistently resisted. In northeastern Madura, people claim their ancestors purposefully settled areas distant from the main roads in order to make tax collection more difficult. Another reason cited was fear of attack. The roads in the uplands have traditionally been considered dangerous haunts for thieves and bandits[49]. Paradoxically, villagers claim they feel safer in their homesteads and among neighbours, despite the isolation and distance from authorities and services.

Whether the settlement pattern is dispersed in hamlets or nucleated in villages, dwellings may consist of from one individual to several households composed of one or more nuclear families. The settlement unit in the dispersed pattern is called the *tanèan*, a Madurese word meaning the barnyard, farmyard, or courtyard around which the buildings are situated. The word is also used to describe multi-household dwellings in the more compact villages. Dwellings, separate kitchens or cowsheds face north or south around the courtyard, while at the west end there is a prayerhouse (*langghar*). Home-gardens around the *tanèan* provide fruit, vegetables, herbs, firewood and other products for consumption and sale.[50] I mention the *tanèan* briefly here because it is considered a fundamental element of Madurese society and culture. The separation of *tanèan* in dispersed hamlet settlement, itself an adaptation to the *tegal* agro-ecosystem, does seem to symbolize some of the salient traits of Madurese society. The high value placed on self-sufficiency, independence, and personal honour, the relatively weak position of the village head, and the tendency to take matters of justice into one's own hands—all of these Madurese traits that define Madura as a distinct region—can be linked in some way to the particular settlement patterns found on the island. Nevertheless, the relation of the Madurese to their physical environment must be placed within its historical context if we are to begin to understand the complex dynamics of Madurese society. Such is the task before us now.

2.3 History

Although the historical record for Madura is incomparably less detailed than for Java, some elements need to be mentioned here to shed light on present-day conceptions and practices of "Madureseness", of settlement, family, and other lifeways, and to provide necessary background for the subjects treated in the rest of the text.

[49] During our stays and visits, we are invariably cautioned not to go out at night or return home late, advice which the nature of our work prevents us from heeding.

[50] On the economic importance of homegardens in Java see Stoler (1981); Terra (1949, 1950, 1953).

2.3.1 Early history

The Madurese, like most present-day Indonesian peoples, are descendants of Austronesian-speaking populations who expanded into the Indo-Malaysian archipelago several thousand years ago (Bellwood 1985). Foundational myths and oral histories can provide indications on the discovery and ancient settlement of the island, but they pose the usual problems of interpretation and verification. Abdurachman ([1977] 1988:1-4), for example, recounts the tale of the princess Bendoro Gung, daughter of a certain King Sanghyangtunggal, who one day found herself pregnant. Angered that she was unable to account for her condition, the King ordered his minister Pranggulang to kill her. Three failed attempts to slit her throat convinced Pranggulang that her pregnancy was not of her doing. He assumed the identity of Kiyahi Poleng and built Bendoro Gung a raft with which she could flee by sea. She arrived on the shores of the island "Madu oro" (Madura) and gave birth to a son, Raden Sagoro ("King of the Seas"). Thus, they became the first two inhabitants of Madura.

As the fourteenth century Javanese text Nāgarakĕrtāgama demonstrated, Madura and Java were parts of a single cultural unit, even if their physical separation is believed to have occurred in 202 A.D. The move in 929 of the Hindu-Buddhist kingdom to the valley of the River Brantas in East Java would likely have transformed life on Madura by virtue of the island's proximity to the Brantas river outlets on the Madura Strait. During this period, coastal and delta areas were brought under intensive cultivation, and overseas trade missions with the Malay Peninsula, Sumatra, and to the east with the Moluccas (Hall 1968:67) increased traffic around the Madurese Archipelago (Wisseman 1977).

One of the better known leaders of this period, Dharmawangsa, was allegedly responsible for codifying Javanese law and having Sanskrit texts translated into Javanese. Among the latter were parts of the *Mahābhārata*, probably in a Kashmiri or northwest Indian version (Ferrand 1922:44) to which the original Sanskrit verses were interpolated, thus creating the first Javanese language prose literature (Hall 1968:67). To this day, Madurese poetry and masked theatre draw inspiration from the Mahābhārata (Bouvier 1995).

Dharmawangsa's son-in-law and heir, Airlangga, expanded the kingdom and continued the development of Javanese literature. Three religious sects co-existed during the Airlangga reign: Śivaites, Mahāyāna Buddhists, and Rishi, or ascetics. Ancestor worship was important then (Hall 1968:53-55, 70) and its continued practice today in many parts of Madura[51] demonstrates a historical continuum with a pre-Hindu Austronesian past.

At his death in 1049, Airlangga's kingdom seems to have been partitioned between his two sons, with the River Brantas the dividing line in the north, to be reunited near the end of the twelfth century under the western Kadiri or Kediri kingdom, having its capital at present-day Kediri (Cœdès 1948:249; Hall 1968:70-71). Little is known of this kingdom, but the reign of Jayabhaya (1135-1157) produced the Old Javanese *Bhāratayuddha*, an adaptation of the great Pandavas-Kauravas battle from the *Mahābhārata*[52]. Madurese theatre still draws on the story,

[51]Notably the ritual ceremonies and pilgrimages associated with the *bhuju'* sacred tombs, described by Bouvier 1995 and Smith 1998).

[52]Begun in 1157 by the poet Sedah, the *Bhâratayuddha* was completed by Panuluh, who also wrote the *Harivamça*, a collection of legendes pertaining to Vishnu (Cœdès 1948:284).

and rituals (rokat pandhabha) inspired by the tales of the five Pandavas brothers (Pandhaba Lèma) are often conducted during Madurese marriage ceremonies[53].

In economic affairs, inter-island trade continued to develop, particularly with the Moluccas, source of valuable spices (Ternate was a vassal state of Kediri). Arab traders came to the Archipelago, as did Indians from Gujerat who had been converted to Islam by Persians. By the end of the thirteenth century, they would begin proselytizing activities in Indonesia (Hall 1968:71). The West Madura court would adopt Islam as the official religion in 1528.

It would be an error, therefore, to consider Madura an isolated backwater of Java, as is sometimes assumed. The coastal areas were relatively cosmopolitan in comparison with upland Java, since by limiting foreign trade to the port cities and coast, the inland Javanese states protected themselves from penetration of their hinterland by outsiders. As one Dutch "history" written in the early 1800s notes concerning Madura:

> [...] there are evident proofs that the Braminese have here, even as at Java & Bali very early been settled as over the whole Island of Madura a number of images, Caves and other great Ruins of that nation are found — The Madurese are never the less mixed more with Strangers & foreigners than the Javanese which may be ascribed to the Small extend of the Island Surrounded by the Sea and between Commercial Nations many foreigners had thus an opportunity to settle here which was not the case with the Javanese boven landen (:upcountry:) it also appears from their language for tho' it is for the most part Javanese what they speak their prononciation is quite different they have also adopted words & expressions not used at Java (Mackenzie 1811-1813, 16:69-70; original spelling retained).[54]

The Javanese *Pararaton* or "Book of Kings" chronicles the fall of Kediri and its replacement by the Kingdom of Singosari through a succession of palace (kraton) intrigues and murders. It is in the *Pararaton* chronicles of the reign of Kĕrtanāgara, the last King of Singosari, that the first substantial mention of Madura is made, and its attainment of vassalage status confirmed. According to the passage, disgraced by the King of Singasari, KertaNegara, Arya Wiraraja was exiled as governor of Sumenep in Madura.[55]

Ario (Arya) Wiraraja is considered the founder of the Madurese royal house in Sumenep. He is thought to have installed the first Madurese court in the hills north of Sumenep in what is today the Batuputih subdistrict, the precise location of this research. The notion that Batuputih was the site of the first royal settlement has been accepted and passed down by successive generations, though no archaeological work has been done in the area and no traces or ruins of any kind have been uncovered. According to local tradition, buildings during that period were constructed out of perishible materials, bamboo and timber. Even if a palace complex were constructed out of the porous limestone found locally, it might well

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[53]Today, the Madurese *rokat pandhaba* is indicated when one or both marriage partners belong to sibling groups having inauspicious configurations. The list of such combinations is rather encompassing: an only child, a boy and a girl, a child with several siblings of the opposite sex, all children of the same sex. Often carried out at the end of a theatre production with the aid of the members of the troupe, the ritual can involve considerable expense for the marriage party. For this reason, and the fact that a growing number of Islamic groups disapprove of the ritual, the *rokat pandhaba* is practised less and less in Madura. On the *rokat pandhaba,* see Bouvier 1995.

[54] In effect, Madurese has been influenced by other languages in the Java Sea region, mainly Javanese, Malay, Bugis and Banjar.

[55]Lombard 1972:259, 259n3, based on Brandes as cited in Krom 1931.

have disintegrated over the centuries, and been plowed under by farmers down the ages.

Wiraraja's arrival in Sumenep is most often attributed to banishment due to Kĕrtanāgara's suspicions of disloyalty. Berg (1950) rejects this theory, arguing that Banyak Wide was securely within the king's confidence and, given the title Arya Wiraraja, was sent to Madura as Governor to assure the eastern approaches to Java at a time when Kĕrtanāgara was embarking on a policy of expansionism towards the west. Whether or not Berg's overall explanation of Kĕrtanāgara's reign is valid, his hypothesis of Wiraraja's arrival is compelling if one accepts the localization of Batuputih as the first royal court. Indeed, the hills of Batuputih Daya, Batuputih Kènè' and Gedang-Gedang villages afford ideal vantage points for monitoring the eastern approaches to the ports of Surabaya and Tuban, critical during the period in question. It is even possible in places to simultaneously observe ship movements in both the Java Sea and the Madura Strait.

The choice of East Madura for the seat of governance could also have been prompted by a desire to be near the main producing region for what was likely Madura's most important export of the time: salt (Mansurnoor 1990:6). Considering that salt was essential for preserving food for troops on campaign, it would have been a critically strategic resource at a time of heightened military expansion and risk of invasion.

The legend of Wiraraja is maintained in Batuputih oral tradition. Sumber Tumbet, the name of the neighbourhood and Islamic boarding school just east of the subdistrict seat of Batuputih Laok, evokes one such reference. According to the legend, the King of Batuputih, Ario Wiraraja, was unable to find water south of the hills until his horse's hoof struck a spot from which water sprung forth. The place was given the name Sumber Tumbet, meaning "horse hoof spring." Another version maintains that it was the heel of the King that caused water to spout out. Local amateur theatre productions occasionally stage the saga of Ario Wiraraja, among stories of other local heros.

As mentioned earlier, the Nāgarakĕrtāgama refers to Madura as being "one with the Yawa-country." In a passage recounting the reign of Kĕrtanāgara, between verses dated 1280 AD (1202 Śaka) and 1292 AD (1214 Śaka), the submission of Madura is now made more explicit:

> In this manner then the other countries equally were striving for security, entering into the Presence at the Prince's feet.
>
> All that belonged to Pahang[56], that belonged to Malayu equally bowed humbly.
>
> Also what belonged to Gurun[57,] what belonged to Bakulapura[58] looked for support, entering into the Presence.
>
> Not to be mentioned is Sunda and on the other hand Madura, for the whole of the land of Yawa (Java) was submissive, without fault.[59]

Local history dates the establishment of the Sumenep kingdom through the arrival of Wiraraja at 1269 AD. From the Nāgarakĕrtāgama passage above, it can be assumed that Madura was now firmly within the sphere of Javanese influence. Wiraraja soon was to serve as a catalyst for the creation of the successor regime to Singosari, the Majapahit empire. Kĕrtanāgara's death and Singosari's capture at the

[56]In ancient times, Pahang referred to the entire southern part of the Malay Peninsula.

[57]Probably a reference to the Gorong Islands east of Seram in the Moluccas (see Lombard 1990, II: 36, 324n181).

[58]Tanjungpuri, on the southern coast of Borneo.

[59]Chant 42—2, translated from the English: Pigeaud 1960:III, 48. For the original Javanese text, refer to Pigeaud 1960:I, 32.

hands of the Kediri vassal Jayakatwang in 1292, prompted the Crown Prince Vijaya, son-in-law of Kĕrtanāgara, to flee to Madura. Following the advice of Viraraja, he returned to Java to pledge allegiance to Jayakatwang, who awarded him a district governorship in the lower Brantas Valley (Hall 1968:79). When the Mongol armada under the command of Admiral Yi-k'o-mu-su finally landed in Tuban in 1293, Wijaya sought its aid in overthrowing Jayakatwang, then routed the invaders with loyal forces[60] and, assuming the title of Kĕrtarājasa Jayavarddhana, founded the Majapahit dynasty at Mojokerto in his district. It is probable that the loyal forces behind him were made up of Madurese slaves sent by Wiraraja, since the Pararaton mentions "the use of unfree labour in opening up new land" (Pigeaud 1960, IV: 471) for the founding of Majapahit. Sent in 1292, kawula Madura—thought to mean "bondsmen belonging to the governor of Madura (adhipati Sungĕnĕb)" (Pigeaud 1960, IV: 471)—were perhaps first put to use in clearing land for Wijaya's district headquarters[61].

Aside from the uninterrupted list of Wiraraja's successors that can be found at the Sumenep Museum, the historical record of Madura is an almost complete blank from the fourteenth to the sixteenth century. The next substantial reference is that of the Tomé Pires expedition, which visited the island around 1520, only a few years before the West Madurese nobility converted to Islam (Cortesão 1978). The brief description of the expedition shows the Madurese have conscience of their Javanese origin and intermarry with Javanese nobility, that the island exports agricultural products and that its army of 50,000 is feared by the Javanese (Lombard 1972:261). Intermarriage between aristocratic families would continue to be a common practice. Crop exports would continue until the eighteenth or nineteenth century when Madura would become dependent on Java for food, timber and consumption items. Until the twentieth century, the Madurese served as model soldiers in indigeneous and colonial forces (see below).

2.3.2 The arrival of Islam

With the rise of the Muslim sultanates on the north coast of Java (the Pasisir region), and the corresponding decline of Majapahit, the Madurese were increasingly exposed to Islam. Islam's teachings circulated among Madurese and foreign traders, seamen and religious teachers who brushed shoulders in island ports or Islamicized enclaves on the Java Sea. Subsequently, during the sixteenth century, contacts and marriages between Madurese and Islamicised Javanese royalty led to official adoption by the various principalities of the island (see Mansurnoor 1990:8-10). Kiai Pragalba, also known by the name of Pangeran Palakaran after the name of the royal village of the time near Arosbaya, ruled West Madura in the early sixteenth century but was subordinate to the powerful Islamic rulers of the Javanese coast. Though he never formally converted, on his deathbed unable to speak, he is said to have accepted Islam with a nod of his head (in Madurese: *onggu*'). Thereafter he was to be known as Pangeran Onggu' (de Graaf and Pigeaud 1974:172). His male heir, Pangeran Pratano, went to Kudus to study Islam under the great Sunan Kudus. He returned to Madura taking the title Panembahan Lemah Duwur ("Prince of the Land Above") and proclaimed Islam to be the religion of Madura in 1528.

[60]The most plausible accounts of the Mongol-Chinese attack and Wijaya's role are found in Chinese sources compiled by Groeneveldt (1879:146-160).

[61]Modjopait would in any case have been founded as a place of resistance by Vijaya sometime between 1280 at the earliest and 1293, date of the arrival of the Mongol-Chinese expedition (Groeneveldt 1879:158).

The Islamization of the Madurese thus began several decades before the formal adoption by a court figure. The interests of the court and the commoners appear to have converged to facilitate religious change. Like the Pasisir principalities, the Madurese and their rulers depended on interinsular trade. The reputation of the Madurese as a seagoing people, the prominient place of the sea in legends, and simply the sea's proximity from any point on the island provide sufficient indications that inter-island trade constituted the backbone for early Madurese economy and society. Individual traders and the island's leaders recognized the social and economic benefits that could be obtained through cooperation with the new Islamic principalities at a time when the power of Majapahit was waning. The process of conversion of court figures is usually linked to semi-mythical teachers and saints such as Sunan Ampel, Sunan Kudus, Sunan Giri or the court of Demak (Mansurnoor 1990:8-10) when Sultan Trenggana was at his most influential in 1528. Whatever the validity of these accounts, it is fairly certain that these conversions took place without social upheaval. During the heyday of this Pasisir period, in the sixteenth and seventeenth centuries, the Madurese districts were governed by sultans, most likely of mixed javano-madurese blood, and who sometimes played an important role in Javanese political affairs (Pigeaud 1967, I: 136, Bouvier 1995:7-8)

The propagation of Islam among the commoners was probably casual and indirect, based on developing networks of communication through the traditional channels of kinship, local leaders, and cooperative agricultural activities (Mansurnoor 1990:13). As is the case for many rural practitioners today, the early preachers remained closely identifiable with their communities, often continuing to work their own fields. The story of Kyai Raba (Mansurnoor 1990:10-13, Zainalfatah 1951) provides one early example of how non-religious methods—such as improving agricultural productivity—could be instrumental in attracting converts, and in promoting favorable relations with the court hierarchy.

The arrival of Islam did not imply a *tabula rasa,* no more so than the arrival of Hindu-Buddhism necessitated a renunciation of ancestor worship from the Austronesian past. It is characteristic of Madura—and other parts of Indonesia as well—that the diffusion of new doctrines entails the survival or refashioning of more ancient beliefs. Hindu-Buddhist statuary continued to be used in some parts of the island at least until the early nineteenth century, three hundred years after the Madurese nobility had adopted Islam. As for ancestor worship, long recognized as an Austronesian trait (Tylor [1873] 1903, II:114-115) and enshrined by Javanese royal courts, it is perpetuated to this day in the Madurese *bhuju'* (sacred tomb) complex (Smith 1998).

During the second part of the sixteenth century, two courts vied for hegemony over the east of Java: the trading state of Surabaya, which dominated the north coast of Java from the western extremity to Sedayu, just across from the western tip of Madura, and the Islamicised kingdom of Mataram in Central Java, supported by its vast ricefields and high population. By 1624, and despite heroic resistance, Madura was forced to submit to the hegemony of Mataram over the entire coast, one year before Surabaya. Forty thousand Madurese were brought to Java as prisoners (Schrieke 1966a:59-60), including the son of the ruling family who, gaining the favor of Sultan Agung, would be appointed to rule Madura under the suzerainity of Mataram, Pangeran Tjakraningrat and his son Tjakraningrat II. Dutch sources suggest that the Tjakraningrats actually helped Sultan Agung in the war, and the family geneologies do not mention the killing of a Pangeran from their line on orders of Susuhunan Amangkurat, successor of Sultan Agung (Schrieke 1955:142, 148; Sutherland 1974:16).

The memory of this defeat remained bitter for the Madurese, impoverished by war and now by taxation (Schrieke 1966a:76-77). Under Mataram, land was divided into *tanah dhaleman*, reserved for the Panembahan, *tanah percaton*, given to apanage holders, and *tanah perdikan*, land under the control of a religious leader (*kiyaè*) or site of royal cemeteries under the control of the Panembahan. In the *desa dhaleman*, the Panembahan received one third of the harvests from all land. The cultivators paid a supplementary tax of one third on the two thirds of the remaining harvest. In addition, they had to work on the Panembahan's ricefields for which they would share one fifteenth or one sixteenth of the harvest (Brahmantyo 1982:16-17). Forty-five years onwards, the legendary Madurese prince Trunojoyo, son of the Pangeran killed on Amangkurat's orders and sidelined by the Tjakraningrats (Sutherland 1974:16), with the help of Batam, Makassar pirates and Javanese coastal cities, liberated the entire island of Madura and seized the palace of Mataram in 1677. Amangkurat, desperate and dying of exhaustion from his flight to East Java, ordered his son to call for help from the Dutch, based in Batavia (now Jakarta, in West Java) and primary naval power of the Archipelago. Taking advantage of this opportunity, the Dutch attached numerous conditions which severly limited the role that Mataram could play along the coast, virtually transforming it into a sort of vassal of the Dutch East Indies Company (VOC) (Peacock 1973:39-40, de Jonge 1982:40-41). The Dutch then turned to support Tjakraningrat II, who had been cut off from the source of his influence during the 1670s when Trunojoyo had control of the island. The town of Arosbaya was burnt to the ground by the troops of Speelman, and in January 1680 Trunojoyo was killed.

To affirm their independence from Java and from the Madurese princes in the west of the island more intent on preserving ties with Java, the princes of East Madura (Pamekasan and Sumenep)[62] asked the VOC to come take control of the island. This was achieved in 1705 for the eastern part and 1743 for the western part of the island. Thus began the period of indirect rule through the Company, which de Jonge aptly describes as "state formation by contract" (de Jonge 1982), the passage to direct Dutch governance intervening only in the second half of the nineteenth century.

2.3.3 Colonisation, power and structural violence

To understand Madurese economy and society today, it is useful to briefly examine the Dutch colonial period. The intention is to give historical grounding to the questions posed at the outset on the relationship between the *tegal* agroecosystem, household and spatial organisation based on the *tanèan*, and certain well-known traits of Madurese society including independence, self-sufficiency, the sense of honour and the recourse to violence (Smith 1997). Colonialism's impact was different on Madura than on Java, where it critically effected household development and led to Java's population explosion (White 1973).

The earliest contacts with the Dutch occurred well before the war with Mataram, probably in 1599, when the fleet under the command of Jacob van Neck "landed successively in Greater Java, Madura, Amboina and Ternate, and were warmly welcomed everywhere" (Cortesão 1968:280-281, 283-287; cited in de Lima

[62]Intermarriage quite often served to reaffirm the ties between Madurese and Javanese royal families. An example of one such marriage, that of Pakubuwana VII of Surakarta with a daughter of the Tjakradiningrat dynasty in 1835, is analyzed by Pemberton (1994:72-75). Intermarriage also was a tool for reducing the potential danger posed by powerful subordinates (Brahmantyo 1982:12).

1988:121). Writing in 1761, a Dutch functionary evokes the first visit to Arosbaya on the northwest coast of Madura in somewhat different terms, but by then the Madurese had already proven their loyalty and usefulness as a balancing force to the Javanese:

> The Nation is valiant and may be sufficient as a check for the Javanese which difference we have already experienced in the year 1599 when we had put some Europeans on Arosbaya, but were badly received; they have also showed themselfs couragious [sic] in these last and former war and have been of great Service to the Company in particular at the time of the present Princes [...]. (Mackenzie 1811-1813, 79:21).

Trade with the Dutch began shortly after van Neck's visit. From 1648, the Daghregister mentions regular trade between Batavia and the Madurese ports of Arosbaya and Sumenep). We learn that the island is exporting rice, vegetables and condiments (beans, onions and leeks, tamarind), rattan and wickerwork ("empty sacks, mats"), oil and "Javanese garments" likely referring to batik (Lombard 1972:264). Significantly, this is one of the last mentions of rice being exported from Madura, later texts invariably pointing to the island's need to import the staple.

At the outset reluctant to become embroiled in Maduro-Javanese affairs, the Dutch slowly understood the value of having the Madurese on their side as their trading strategy evolved from one based on exploiting factories and trading posts at nerve centres to a wider strategy of territorial control. Another concern was that the East Madurese might ally themselves with rebels from other regions, as they had in the past. Though Madura had much less economic potential than its neighbour Java, the unilateral decision of the Sumenep court in 1683 to recognise Dutch suzerainity, pay tributes to the VOC even before the beginning of indirect rule, and thus create a situation of de facto subordination, gave the VOC the chance to appreciate the economically important products difficult to obtain elsewhere (de Jonge 1982:41). Lastly, indirect governance would allow the Dutch to dispose of an auxiliary military force, perfectly loyal and capable of intervening to support the projection and maintenance of colonial power. This new status not only gave the Madurese principalities new forms of independence and security but also obligations that were increasingly burdensome, contributing to a growing isolation of the island.

From the Dutch point of view, these five to ten page contracts that stipulated the rights and responsibilities of the parties were primarily aimed at assuring the protection of the maritime routes north and south of the island used for their trade with the Mollucas, and provide the Dutch with some products as tribute or for sale far below market value. In exchange, the Madurese princes had the right to administer their territories without frequent consultation with the colonial administration, and unlike most other parts of the Archipelago under Dutch control, to handle most appointments themselves (de Jonge 1982:43-46). Like those of Batam and Cheribon, the Madurese Sultans could brag of this fictitious independence (Furnivall [1944] 1976:34). That this independence was imaginary is revealed in the laws governing the succession of regents. As Schrieke writes:

> Although minors under the tutelage of guardians often succeeded their fathers in the office of regent, the government by no means regarded itself bound to observe the principles of heredity. Thus, in 1770, in the matter of succession on Madura, which island was at the time of the greatest importance politically, it declared that 'there is no right of succession, the Company having a free choice in the matter.' In 1780 it was of the opinion that 'the rule of survivorship is alien, unnecessary, and inappropriate in the regencies'. In the second half of the eighteenth century succession was, for that matter, all too subject to the sale of office, the evil which radically

> undermined the whole Company system. It is said of the regents of the northeast coast of Java at the end of the eighteenth century that they paid the governor for their appointment and that 'it took them many long years before they had repaid the debt so contracted.' (Schrieke [1928] 1966b:208)

The high-level corruption described in this passage and the fundraising it entailed, coupled with colonial tribute demands, would underwrite the establishment of a system that ultimately caused rural impoverishment with far-reaching consequences for Madurese social structures. Not to mention the adding of insult to injury for the northcoast Madurese having to contend with periodic attacks by marauding Iranum slave raiders, attacks that reached a peak in the second half of the eighteenth century (Warren 2003:8-11).

Once a year, the three Madurese Regents would travel to Java to pay their tribute to the Government. Given that the forests of Madura were hardly exploitable for intensive timber production, and by the eighteenth century the Madurese were no longer self sufficient in rice, the Dutch looked to obtain other valuable household-produced products in tribute,[63] such as beans[64], coconut oil, fan palm sugar, cotton thread and other twine, dried meat and fish, and payment in cash (Spanish Dollars[65]). Besides the products provided as gifts, the resale of products purchased at under market prices turned profits on the order of 300-400 percent.[66] The Dutch could demand that cattle be fattened and maintained in the event a government ship came into port. The Company also profited from the sale of seized objects, judicial fines, and less importantly in Madura than in Java, the farming out of rights to road tolls and plantation fees, usually to Chinese (Furnivall 1976:37-38). In Madura, the Dutch retained the right to lease monopolies (*verpachte middelen*) on particularly profitable commodities such as opium or rice alcohol (*arak*). In the early 1800s in Bangkalan, for example, the Dutch farmed out the sale of opium to a Chinese trader for six hundred and eighty Spanish Dollars and a considerable premium on every chest that was imported. Gambling and "dancing girls" provided a further source of revenue (Letter from Major Yule... 1811). Though some of the most profitable sources of revenue were controlled by the colonial power, the regent derived income from other sources, such as import and export duties, salt pans left for his exploitation, bird's nests and marketplaces. Yet, he would turn to the peasantry in order to meet the deliveries imposed by the VOC. During the British interregnum, the Governor-General Raffles made many changes in Java, abolishing the contingencies and forced deliveries and introducing a land tax, but the regime in

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[63]Under the terms of his contract, the regent from Sumenep furnished the following per year in 1811 and 1812 (from *Java Reports* 1815:16-17, 78-79, 194-95):
- Spanish Dollars at 64 stivers apiece: 6562.32.
- 'gamoolie'thread (sold at 2-3/4 rix dollars per *picol* of 60 kg): 100 *picol.* Approximative market value of 100 *picol* (in 1805-1807): 2000 Spanish Dollars.
- 'kaye'thread (sold at 3 rix dollars per *picol*): 100 *picol.* Market value was the same as for gamoolie thread.
- coconut oil (provided free): 17500 *cann*; (sold at 6 stivers per *cann*): 2000 *cann.* Value of 19500 *cann* (in 1810): 3656.16 Spanish Dollars.
- green katjang (provided free): 80 *koyang* of 2000 kg. Value of 80 *koyang* (in 1810): 3200 Spanish Dollars.

[64]The varieties most often cited, green 'katjang'and 'buntjis'were probably the green gram (*Phaseolus aureus* Roxb.) and red beans (*Phaseolus vulgaris* L.), respectively.

[65]At the time, the Spanish dollar was worth five English shillings or a tenth of an American gold eagle (Raffles [1817] 1988, II:Appendix M, pp. cclix-cclx).

[66]*Java Reports* 1815:12-13. The records for Sumenep from 1805-1807 (pp. 78-79) show a 349 percent profit was made on the resale of cotton yarn deliveries.

Madura was maintained, save that the contingencies were now converted into cash (de Jonge 1982:47).

As mentioned earlier, during the period of indirect rule the Madurese political system was left largely untouched. The regent (prince, *panembahan* or sultan) at the top of the local indigenous power structure had only to answer to the Dutch, who usually reserved their interventions for very important matters. The Dutch had no representative in Sumenep until 1744 (Nagtegaal 1995:53). Important decisions were made in the palace by the ruler, his *patih* ('vice regent'), selected members of the royal family, and a few important *mantri* (ministers). The *mantri* were aristocrats who resided in the capital, but they were also the first link to the territorial-based leaders, the *wedana* (district chief), *lurah* (village chief) and other rural leaders. Through them, the *mantri* collected tax, part of which went to the regent, and in times of turmoil he was obliged to provide soldiers for the realm. The Dutch often had to intervene to settle political disputes and palace intrigues among the *mantri* and other elites (Nagtegaal 1995:52-53).

From 1800, according to the *Memories van Overdracht* (formal colonial reports) and other administrative reports, it becomes clear that the tributes only represented a portion of the tax burden shouldered by the peasantry (de Jonge 1982:49-52, 1990:4). As Furnivall (1976:38) writes, "it must be borne in mind that the legitimate dues of the Company formed only a small part of what the people paid; as much, and perhaps more, went into the pockets of the European and native servants of the Company."

All irrigated land (*sawah*) was under the control of the regent. Part was given as salary fields for the regent's lower officials and servants, and part sharecropped out on behalf of the regent. Peasant households held hereditary rights to dry fields (*tegal*) as long as they paid their taxes. The most important of the taxes were a poll tax, the proceeds of which went to the regent himself, and a land tax, much of which was distributed in appanage. The land tax alone took from one fifth to one half of the produce of the first and second season crops and one fourth of the harvest of fruit trees. In time, a growing parasitic class of nobility, appanage-holders, and village chiefs developed, many of whom became used to extravagant lifestyles. The system proliferated in pyramidal fashion in the eighteenth century as tax farmers from the towns delegated their rights to representatives. Nothing prevented the latter from adding taxes of their own or farming out their rights to local tax farmers (de Jonge 1986, 1990:9). In some areas there was a water tax, in others a head-tax on cattle. Villagers also made yearly offerings to guardians of sacred tombs (*bhuju'*) and to religious leaders.

The growing numbers of people who could claim rights to portions of rural production, not to mention a variety of unpaid services from roadwork to fodder collection,[67] was matched by high population growth. During the nineteenth century, Madura's population was multiplied by anywhere from five to eight depending on the sources one consults (Touwen-Bouwsma 1977, Kuntowijoyo 1980:78, de Jonge 1989:21, Raffles 1988(II):285-286, McDonald 1980:85, Booth 1988:29), and this despite massive migration to Java. It is not clear if this population explosion was the result of families investing in children in an attempt to keep production in line with the demands of an increasingly greedy extractive class, as has been proposed for Java under the *Cultuurstelsel*.[68] In any event, and allowing

[67] In the Netherlands East Indies, only in Madura could one find such an extremely specialized labour service system (Vollenhoven 1918-1933, I:556).

[68] The "Cultivation System", most often known under the inexact term "Culture System", was not put in place in Madura. On the relationship between the Cultivation System and population grown in Java, see Harris and Ross 1987:143-148 and White 1973; cf. Geertz

for differences in census coverage over this period, whatever increase there was further intensified pressures on resources. Though forest cover was swept aside to provide land for agriculture, Madura was unable to become self-sufficient in foodstuffs.[69] The scarcity of firewood, at least in the early nineteenth century, was such that residents of Sumenep had to get their fuel from Pamekasan or have it brought over by boat from Java at the risk of encountering pirates that plied the Strait.

The Dutch demanded another form of tribute, both pernicious and regrettable for the image of the ethnic group: voluntary and later obligatory supply of soldiers. The recruits served as intervention forces to put down rebellions in Java and elsewhere. The value of Maduese troops was recognized as early as the eighteenth century, as Lt. Colonel Mackenzie explained in June 1813:

> The Island of Madura is well known to have furnished most of the Recruits whence the late nation army was supplied voluntarily or generally by contact under the influence of the chiefs whose zeal & attachment was thought to be conciliated by the Titles of Sultan & Panambahan by decoration & honours of Knighthood & even by Military Rank to ensure their fedility [sic] and zeal.— The nations of Madura have been esteemed not so endolent as the common Javanese & more fit for Military duties by their enterprize and hardiness; they are generally employed as a[o]ppassers [orderlies] (or Peons) by all the Regents to the East [...]. (Mackenzie 1811-1813, 14:247)

Similarly, a French source from the same period speaks of the advantage of having Madurese on one's side, especially against the Javanese, and of the enmity that exists between these two peoples:

> Madura: When the Company opened its first establishments on the northeast coast, it felt that its tranquillity depended on having nothing to fear from the peoples of Madura Isle. Two princes were then governing this isle: a strong one residing in Bancaltang occupied the entire west part with the title of King of Madura; a second, less rich, residing in Sumanap and governing the East of the island with the small neighbouring islands.
>
> This Isle, which is separated from Java by the Surabaya and the two channels that lead to it, was generally infertile though well populated; poverty pushed its inhabitants to make frequent excursions along the coasts of Java, mainly at harvest time; they brought back rice for their subsistence and all sorts of other plunder; it's no doubt to this regularly organized annual brigandage that one must attribute the enmity so pronounced that exists today between the Maduran and the Javan.
>
> The Company hastened to put an end to such a scourge; it first subjugated the small Prince of the East, and had this region administered on his account; it then forced the King of Madura to sign a treaty the terms of which it dictated. By this treaty the Prince continued to govern his country with the title of Penanbanghan under the direct surveillance of the Company that named and installed him: for his part, he is obligated to furnish the Company the number of recruits requested each year; such that Madura has

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1963:52-82. A possible under-estimation of the pre-System population of Java might weaken somewhat but not lay rest to the argument that "increase in population was a demographic response to demand for labour within the family, created by the need to intensify subsistence production in the face of colonial demands on land, labour, and produce" (White 1973:217).

[69] Much later, when Republican and Dutch blockades cut off food supplies from Java during the Independence struggle, large-scale famine broke out and gave the Dutch a pretext for their reoccupation of the island in 1947 (Touwen-Bouwsma 1995).

> become a breeding-ground for Company soldiers: since this time it has continued to use Madurese in preference to Javanese, because the former were always the better warriors, and because the enmity that exists between these two peoples makes desertion difficult and very rare in the Madurese forces on the Isle of Java; and lastly because these troops get the upper hand over the Javanese. (Decaen 1804:12-13; my translation)

The Dutch first called Madurese troops into action in 1742 for the Kartasura campaign in Java. So frequent was the need for this rapid intervention force that by 1807 the Government was requiring that the Regent of Sumenep provide a standing force of 1084 men to be available for action at any moment, and from 1831 the three Regents of Madura had to furnish men for a permanent army, known as the Barisan ("line"), consisting of infantry, pikemen, artillery and cavalry. Officers were provided by the local aristocracy and training by retired Europeans (Touwen-Bouwsma 1977). The creation of the Barisan did not dispense the Regents from providing soldiers for the regular colonial army on a "voluntary basis" in line with quotas (de Jonge 1982:48). From the eighteenth century on, the regent was responsible for providing soldiers, food and supplies for the Dutch forts. This did not prevent the princes from recruiting additional manpower from the villages to serve as their palace guards and security patrols.

Graphic accounts of the plundered villages along the road to Kartasura ensured that the reputation the Madurese gained for bravery and ruthlessness would not be easily forgotten (Mackenzie 1822).[70] Madurese auxiliaries were to serve the Dutch frequently against opposing armies and rebel groups: during the Third Javanese Civil War (1746-1755), against the East Javanese rebel Surapati in Blambangan (1767), Malang, and Ngantang (1768), in the war against the British in Batavia and Chilinching (1800), in South Celebes (1825), in the Java War of 1825-1830 against Dipanagara, in the Jambi and Palembang War (1833), in the Padri War in West Sumatra ((1835-1837), in Bali (1846-1849), during the expedition against the Chinese in West Borneo (1850-1855), again in Celebes (1859), in Aceh (1873, 1875-1877, 1886), in the Lombok War (1894), and as late as 1923 when they were called to suppress a railway strike in Java. The Barisan were also used to put down rebellions in Madura itself. By collabourating in colonial armies, the Madurese became a despised people in the eyes of many outsiders (de Jonge 1995:21). The experience was also to have ramifications on the economic welfare of the island. Though a job in the Barisan could mean economic and social advancement (Kuntowijoyo 1980:147), how "voluntary" enlistment in it was is open to question (Kuntowijoyo 1980:259), and it appears that despite the attraction of a military career many eligible men avoided conscription by fleeing the island to Java. One report from 1812 (Davy and Goldbach 1812:266) even claimed the island had lost one third of its population since 1806, surely an exaggerated assessment but nevertheless one which suggests both the burden possible conscription placed on the people and the strong economic pull of Java.

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[70]See volume 14 in the Mackenzie *1822 Collection* manuscripts, pp. 77-123. The following are two short extracts (from pp. 107-108, original spelling retained): "[...] both parties were fighting with the Swords; Spears and Daggers, the people of Madoorah was none wound for they were very Clever in fencing. They killed a great number of the Chinese and Javanese armies. When [their leaders] saw their people much ruined they ran away through fear afterwards every one defeated from the action for Cartasoorah." Pp. 113: "Some of the Chineses through fatigue not able to proceed any farther they killed themselves with their own Swords and Some of the Chineses laid themselves down among the dead Corpses through fear."

Madurese migration, whatever the cause, was a subject often treated in colonial writings. Madurese settlements can be found throughout the archipelago, though the most numerous are in Borneo, Jakarta, Sumatra, North Bali, and particularly East Java. The effects of colonialism most certainly accelerated the demographic flows out of Madura (though at the same time forced deliveries and taxation could have served to keep average family size high). In East Java, the Brantas valley received settlers between 1830 and 1870, and the residencies of Besuki and Banyuwangi after that. Streams of immigrants from Madura populated the southern parts of the Eastern Corner in the second half of the nineteenth century and early twentieth century, bringing its population from 150,000 in 1825 and 340,000 in 1860 to 1.5 million in 1920. This area was particularly attractive for corporate plantations after 1870. Large planters could acquire large tracts of land on a long-lease basis for the cultivation of tobacco, coffee and rubber. Once established, the creation of important socio-economic infrastructures in the reclaimed areas was a key impetus to large-scale immigration from Madura and Central Java (Hüsken 1981:14-15).

The decision to migrate is a negotiation between on the one hand the conditions that push people to leave their home villages (for example, infertile soils or oppressive taxation) and the factors of attraction (offers of land or employment). A way to avoid the rather static conception of push-pull migration is to determine how candidates for migration weigh the cost-benefits of their decision.[71] One would expect such decisions to reflect a more or less complicated quotient of the availability of labour to meet household subsistence and maintenance needs as well as the demands of external authorities such as tax farmers, the degree or risk or opportunity associated with military conscription, the opportunities offered by Java's plantations or facilitated by contacts in a potential receiving area. The choices would not be the same for different families or for different parts of the island, and some villages were in a more favorable position than others by virtue of the services they provided the court. In any case, the result was that by the middle of the nineteenth century, the Madurese population in East Java was double that on Madura Island itself (Hageman 1858:324-325).

It did not escape the Dutch (nor the British during the Interregnum) that the exploitation and suffering undergone by the peasantry in Madura went beyond that experienced in most if not all other parts of the archipelago. But their reaction was to place the blame on inefficient management by the indigenous leaders and their associates. One Dutch report from the early nineteenth century characterized the sultan of (West) Madura as a weak, vain, and jealous ruler who placed full confidence in manipulative aides who in managing his interests enriched themselves and oppressed the common people. The Dutch often had to intervene in his case, and it was even proposed that they give the Sultan a yearly pension, take over the Sultan's interests, and farm them out for many times the value of the current tribute and contingencies he provided (Rothenbuhler [n.d.] 1812:218-219). Yet, despite reorganization and the transition to colonial bureaucracy in the late nineteenth century (see Kuntowijoyo 1980), no serious efforts were made until the early twentieth century to enquire into the welfare of the common Madurese. As long as soldiers and contingencies were forthcoming on demand, the colonial authorities saw no need to meddle in the affairs of the three regencies. The economic benefits they could gain by getting more directly involved in the management of the island were simply not enough.

[71]For an example of such a study, among migrants from Java, Bali and Madura in South Sumatra, see Smith and Bouvier 1993.

The maintenance and even proliferation of feudal relations served to further isolate Madura from the economic, social and political forces affecting change in Java (de Jonge 1986, 1995:21, Smith 1997:62), a stark turnaround for an island that in earlier times was more cosmopolitan than much of Java. As de Jonge notes:

> The anachronistic political and economic situation and everything connected with it to an important degree determined the picture that was formed about the Madurese. They were seen as backward and primitive, like people from another world and time. (de Jonge 1995:21)

For most people in Madura, making a living meant farming, fishing and employment in monopoly salt production, and not much else.[72] These had never been easy in the past, and could only become more difficult with the ever-growing class of people who could claim tax payments from them.

Some indication of the frustrations this caused can be found both in the high incidence of palace intrigues among those maneuvering for autonomy or a greater share in the spoils, exemplified by the frequent popular rebellions led by 'bandits', 'saints', or *tappa* (hermits) which began in the hinterlands. The latter were usually crushed in due course, though on rare occasions the rebel leader could seize power in the kraton (Mackenzie 1811-1813, 79:15-26; Nagtegaal 1995:49, 53-55). The levels of violence used to obtain and retain power were notably high for Madura in the seventeenth and eighteenth centuries, and what one now refers to as structural violence[73] was already an established fact of life. Bandits led by charismatic individuals reputed to have magical powers would exercise predation on cattle and possessions in distant villages then return to the protection of their home villages. Occasionally they would be called to help engineer a palace coup in town. The following passage suggests that violence was acccepted as an unfortunate though not wholly unnatural consequence of governance:

> In a sense the requirement that a ruler should maintain harmony was difficult to combine with the requirement that he should be able to conquer and to punish his enemies. The ideal was that the ruler should be able to achieve the latter without the use of excessive force. But, in order to survive, many Madurese rulers had no other recourse than to indulge in severe violence. In the seventeenth and eighteenth centuries conditions in Madura were structurally violent and they resembled those of frontier societies in many ways. All Madurese rulers maintained a private guard which usually consisted in part of foreign mercenaries. In 1683 Pulang Jiwa took control of Sumenep with the help of 100 Makassarese, while between 1730 and 1740 Cakraningrat IV had more than 300 Balinese and 100 Makasarese in his service. These mercenaries were used to exact obedience and to collect taxes from the aristocrats. In doing so they used so much violence that many Madurese fled from the island. The way to convince peasants to choose one's side was often violent too. Suderma, who tried to usurp power in Sumenep in 1702, first offered the peasants small gifts, but when this proved to be insufficient, he had his men burn the peasants' farms. Violence and coercion were so common that in themselves they did not disqualify

[72]Trading remained an important activity, however, along the northern coast and in the main towns. Madura's four main towns remained somewhat cosmopolitan. Much of the trade was controlled by their 'foreign'—i.e. non-Madurese, including Chinese, Malay and Arab—communities, among the largest in Indonesia (Raffles 1817, I:63; II:285-286).

[73]Usually attributed to Johan Galtung and Robert Gilman, the term structural violence refers to "physical and psychological harm that results from exploitive and unjust social, political and economic systems", prime examples of which would be poverty and hunger (Gilman 1983:8).

> someone as a ruler among the persons who were not directly affected by them (Nagtegaal 1995:61-62)

Perhaps the clearest indication of the frustrations of the common people, however, is to be found in the high murder rate noted for the island from at least the nineteenth century. De Jonge cites C.P. Brest van Kempen's account of almost daily "corpses of murdered persons" on the *alun-alun* (town square) between 1847 and 1849, explaining that "[t]he killers just lay their victims down there in order to hinder the investigation and facilitate burial" (de Jonge 1995:19). According to one judge, probably belonging to the travelling courts which began to sit in Madura during this period:

> [It is] horrible how they play with human life there. For all kinds of reasons, not to forget the most futile ones, they indiscriminately chop around. Small insults are met by violence. (Wop 1866:284, cited in de Jonge 1995:19)

This commentary illustrates a common perception of Madurese violence, which persists to this day: a sort of game played over petty affairs or minor insults resulting in an indiscriminant attack. Next to nothing on individual cases exists in the historical record; even the word for the attack, *carok,* is a relatively recent appearance.[74] But if we look at revenge attacks today, we see a very different picture. Contemporary attacks are either spontaneous or methodically planned, but in either case they are clearly targeted at specific individuals deemed to merit punishment for acts which most others in the community would consider extremely wrongful (Smith 1997, 2000). In Madura today, a case may be made that struggles over valued resources are the primary cause of violent conflict, particularly over the wife, considered one's most treasured resource (Smith 1997); one can infer that struggles over valued resources were likely the object of fierce competition in earlier times. At least one noted foreign visitor makes clear reference to killings linked to struggles over resources. During his brief visit to the Madurese port town of Kamal in 1896, Chulalongkorn, King of Siam, learned of a rash of disputes and killings in the west of the island "over access to springs, which belong to the most powerful" (Chulalongkorn [1896] 1993:149):

> Bangkalan is a town that has been without a Sultan for longer than the other towns. The reason is the following: there were violent disputes among the population over springs, which belong to the most powerful. The people were killing each other, because the Madurese enjoy fighting, and they were poor, because they had to remit a part of their profits to the Sultan. A high official and former officer of the Sultan, accompanied by his numerous children, put himself in the service of the Dutch. As soon as the sultanate was abolished, the Dutch attracted him and exchanged formal courtesies.

[74]In an early reference, *carok* is defined by Kiliaan (1904-1905) as "fighting with a sharp weapon" (*atòkar nganggh*ú*j sandjhata tadjhem*). The word is also used to describe a match where the players exchange winning and losing streaks, money which changes hands, and bouts of artistic martial arts (probably *pencak silat*) held at the turn of the century at Marengan, near Sumenep (*carok Marengan*), in which combattants fought with daggers without injuring each other.

2.3.4 Direct rule and the changing structure of governance

The early years of direct government (1885 for Bangkalan) did not bring instant relief from violence or poverty. Not yet able or interested in researching the causes of high levels of violence, the judicial and law enforcement system could hardly claim to understand the violence, and remained ill-equipped to reduce it. The capitulation of the system was complete in areas such as Saronggi (Sumenep) where, if we can go by the childhood memories of elderly informants in the 1980s, combattants would sign up at the police post in order to obtain authorization and officiating at their sickle duels. Historical sources and contemporary research thus can help approach an understanding of what makes Madurese turn violent. In later chapters, we will return to Madurese violence to identify how household exigencies fit into the picture that emerges.

The arrival of direct rule did, however, have profound consequences for the structure of power and privilege in the former Madurese principalities, though in fact the top of the traditional hierarchy had already begun to crumble from within. Having become accustomed to increasingly extravagant and ostentatious lifestyles up until the middle of the nineteenth century, the years remaining until the imposition of direct rule would see them mired in debt to the tax farmers who managed their fields or to Chinese money-lenders. One description of the new situation the aristocracy found itself in is worth citing at length:

> In 1863 the income of the Panembahan of Bangkalan was reportedly around 85 thousand guilders only, while in earlier years it had amounted to 300 to 400 thousand guilders. The reason given for the reduction was that there were too many sentanas [members of the royal family, usually down to the grandchildren] deserving of allowances. As a result, the political power of the Panembahan and the aristocracy was no longer based upon and suported by economic domination. Dutch sources claimed that the Panembahan was respected only because the Dutch supported him. The aristocracy was so politically powerless that they were ignored by the Dutch in political matters. The Dutch considered that Madura was already ripe for direct colonial rule. As the end of native rule approached, the aristocracy was so completely impoverished that some of them had no possessions in their houses, or in some cases even lacked a house to live in. One report noted that a particular Pangeran, a major in the Barisan, was able to receive the report writer only by borrowing chairs and tables to decorate his residence, while the inner house looked empty. The Pangeran always wore his Barisan uniform because he had nothing else to wear. In attending ceremonies, aristocracy of this kind continued to seem real aristocrats; but upon returning home they had to face real life, because the pachters (tax farmers) were waiting to discuss their debts. (Kuntowijoyo 1980:219-220)

The arguments advanced for direct rule before the British interregnum were revived, and the principalities were abolished: Pamekasan, where the masses were said to be living in “near slavery” (de Jonge 1989:77), in 1853, Sumenep in 1883 and West Madura in 1885. Although the sentana received lifetime pensions, many could not free themselves from debt and regain their former social status. Some of the highest aristocrats (*sentana ageng*) could be reclassed in the colonial bureaucracy as regent or vice-regent (*wedana*), since the Dutch took genealogy into consideration in appointments. The ministers (*mantri*), whose position was heritable and who received an appanage village (*percaton desa*) and ricefields (*sawah percaton*) under

the old regime were now given cash salaries and a service allottment (*pancen*)[75] under the colonial administration; they would comprise part of the emerging priyayi class which Dutch rule would create. Also in the state class were a myriad of retainers (*abdi*). They differed from the *mantri* in that they usually did not receive appanage villages, but only appanage ricefields.

Under native rule, the village (*desa*) chief was responsible for organizing tax and tribute collection and corvée labour, and for providing justice, security and welfare. This did not change under direct rule. The Dutch even provided for a village secretary (*carèk*) to register land and taxes (Kuntowijoyo 1980:274). The income they received made them often better off than members of the lower *priyayi* class. They received *sawah* percaton (*sawah* kliwonan), tax collection fees of up to 4 percent of the village take (an equivalent amount was shared among the other desa officials), and one or more aides (*kemit*) depending on the population size of the desa. They also received *pakureksa*, four pieces of land, one in each corner of the desa, as large as a stones-throw of the left hand, which went in part to other desa officials.[76] Some village chiefs in coastal areas received no agricultural land, but were paid by the population through other arrangements (Kuntowijoyo 1980:278-281). In the early twentieth century the *kemit* service was replaced with a cash payment for some time.

Today, the village chief and secretary rely primarily on income from *sawah* or *tegal* percaton (part of which is shared with lesser village officials) and fees for issuing administrative letters. With some exceptions, village chiefs and their secretaries were and still remain among the most respected and socioeconomically advantaged in their villages. In times of economic hardship or political upheaval, however, their position as tax-collectors or redistributors of government aid can make them the object of resentment.

In terms of the lives of Madurese common people, direct rule was to bring fundamental changes, mostly positive. Colonial reorganization reduced the tax burden on farmers by replacing the appanage system with the *landrente* (land tax).[77] Peasants were instantly freed from the control of tax farmers and appanage holders. Land which had been farmed under traditional hereditary rights was accorded legal title. The poll tax was reduced. Compulsory labour at the personal behest of elites was eliminated and the requirement to provide labour for collective projects was greatly reduced (de Jonge 1989:77-78). Land was redistributed in Pamekasan after eliminating non-resident cultivators. Land reform in Sumenep and Bangkalan was

[75] The attribution of stable boys to attend to horses is one example of *pancen.*

[76] Besides the land allotted by the *percaton*, village chiefs had their own inherited land, and also could claim unused land in marginal areas. Anyone had the right to open new land, but as land was scarce what remained was usually on sloping, rocky or unfertile terrain. One could work the land free of tax for three years, but following this period the land would be taxed at one third of the harvest. As this was a high tax rate, those who opened new land often abandoned it after the first three years. In such cases, the village chief could reclaim the land (Kuntowijoyo 1980:329). In 1874, however, the Clearings Ordinance transferred the power to allow new clearings from the village chief to a government official (Furnivall [1944] 1976:179-180).

[77] The rates in Madura, based on the quality of the land, became among the lowest in Java and Madura. In 1864-1866 the annual rate in Pamekasan was *f* 4 per *bau* (or *bouw*, equivalent to 0.8 ha), ranking ninth in Java and Madura. In 1868, this was increased to *f* 6 per *bau*, tbefore being hen reduced in 1870 to *f* 2.65 per *bau* in 1870 or approximately 6.15 percent of the cash value of the harvest, the lowest rate for Java and Madura. The percentage increased between 1890 and 1900, but in cash terms remained on the average *f* 2.44 per *bau.* Tax revenues from land were much less than the revenues from saltpans (Kuntowijoyo 1980:348-349).

more gradual, with non-residents encouraged to live in the desa or leave the land. Low rates of landlessness were maintained: in 1905, it was estimated that landowners comprised 80 percent of the male agricultural labour force in Madura,[78] with many of the 20 percent remaining presumably comprised of unpaid family labour (Booth 1988:86). On the negative side for the peasantry, land was becoming scarcer and prosperity was declining. According to Kuntowijoyo (1980:367-369), although there is no evidence that the transition led to widespread land accumulation, in some years between 1918 and 1930 over 20 percent of land transfers were a result of sale, evidence that the commodity value of land was becoming more important. Further evidence of this commoditization is to be found in the notable trend during these years towards delaying the transfer of land title to descencents. While only one percent of land transfers occurred at the death of the owner in 1918 and 1919, the figures for 1924 and 1930 are 42 percent and 36 percent, respectively.

Also encouraged by the transition was the diversification from subsistence agriculture to the production of other commodities for sale, monetization, and the growing market for consumer goods. New markets arose in the villages, the local traders linked to wholesale dealers (often Chinese or other non-Madurese) in the island's main towns who provided them with secure outlets and cash advances. Madura began to emerge from the relative isolation native indirect rule had imposed on it, and play a greater role in wider economic, social and political movements. Yet, the movement was gradual, since Madurese food production remained limited to providing for local needs, and produce rarely went farther than the local marketplace. Low levels of surplus production in agriculture are also indicated by the absence of the *tebasan* (pre-harvest purchase in the field) system of marketing already common in Java at the beginning of the twentieth century (Kuntowijoyo 1980:371).

The transition to direct rule in Madura coincided with the ascendancy of liberalism in Holland. The completion of the Suez Canal in 1867 and the policies of Dutch liberalism opened up the prospect of increased trade and economic development, free enterprise and a new concern for individual liberties. Some gains in welfare were noted in the early years of liberalism;[79] however, by the end of the nineteenth century the surplus for the Netherlands was gradually turning to deficit, which led to calls to separate metropolitan and colonial finances. In retrospect, the system benefitted primarily the Europeans and Chinese, "whereas the natives, hemmed in ever more narrowly within a contracting economic frontier, saw their own social life disorganized without gaining enfranchisement in any more comprehensive social order" (Furnivall [1944] 1976:223). Though a spent force by 1900, liberalism since 1870 had presided over a much more vast transformation, one in which the balance of economic power no longer lay with Government but with private capital, and "the economic structure was no longer individualist but capitalist" (Furnivall [1944] 1976:225). Total capital investments in the Netherlands Indies would grow steadily until the depression in 1929. By the end of the nineteenth century an undercurrent of moralism was also becoming more visible.

The growing interest taken in the lot of the common people in the colonies was eloquently expressed by Van Hogendorp in 1899 in his article "A Debt of

[78] This may be compared to Java, where the corresponding figures range from 80 percent in Besuki to under 50 percent in the Priangan (Booth 1988:86).

[79] These gains were likely more important for the metropole than for the natives, since between 1867 and 1878 *f* 187 million were sent to the Netherlands (Furnivall [1944] 1976:231).

Honour" (*Een Eereschuld*) and in 1901 in his popular brochure entitled "The Ethical Trend in Colonial Policy:

> "For over a hundred years [...] a ray of ethical sunshine (ethische zonnetje) had been struggling through the clouds of selfishness, and was at length beginning to light up colonial policy. It was long overdue. So far Government had been taking twenty-five per cent from the miserable earnings of the Javan and doing nothing in return, save to push him into the pool of horrors where millions in the West were already struggling neck-deep. Liberalism boasted of leaving people free, but the true grounds of leaving them alone were laziness and a reluctance to spend money. In the name of freedom the planters had seized all the best land; and the measures taken, nominally for the protection of the people, worked, if at all, for the protection of the planter. Pauperized by advances the native was driven into the factories, so that individuals were demoralized and social life disorganized" (paraphrased in Furnivall [1944] 1976:232).

In 1901, the Queen announced to Parliament the intention of the new government to enquire into "the causes of diminishing welfare in Java and Madura." A Commission was constituted in 1902, and in 1904 a bulky questionnaire of "56 folio pages and 700 complicated questions" (Furnivall [1944] 1976:393) was distributed, resulting in 33 volumes of reports published between 1905 and 1914, which provide a glimpse of economic life of Madura in the early twentieth century.

2.3.5 Economic and social development in the twentieth century

The ethical policy of the early 1900s led to an increase in expenditures on education, the beginnings of a vast migration program still existing today to resettle people from the densly-populated islands of Java, Madura and Bali to the lesser-populated outer islands, and the development of irrigation works. The irrigated *sawah* area grew by over 30 percent between 1893 and 1908, though this area was tiny to begin with, permanent irrigation works only in operation on 3.4 percent of the total *sawah* area (Booth 1988:79, Table 3.7). Agricultural extention and credits followed, and during the 1930s the colonial government made extensive interventions in the rice market. These measures allowed for the extension of rice cultivation, but were unable to raise yields. The yields from *padi sawah* oscillated between 10 and 15 quintals per hectare from 1881 to 1965, and only improved well after Independence, following the arrival of the Green Revolution and the expansion of irrigated surfaces in the 1970s, reaching 18.9 qt/ha in 1970, 26.5 in 1971-75 and 36.2 in 1976-80 (Booth 1988:159, Table 5.11).

Although agricultural estates and the growth of smallholder cash cropping stimulated the export market, the "colonial drain" (Golay 1976) meant that export trade could not serve as an engine for growth, and Indonesia, like most other former colonies, was to find itself impoverished and underdeveloped at independence.

The colonial government sought to explain Madura's persistent poverty by the population explosion, migration to Java, or sectoral difficulties such as the collapse of the cattle market (Anonymous 1936), yet the root causes appear to have been more complex, and moreover exogeneous. Madura in 1941 was even more dependent on external imports than in 1900. Instability in the world system during these four decades manifested itself in Madura by the deterioriation of market conditions in the island's sensitive sectors: employment in Java and remittances, cattle exports, fishing, the fruit trade, and commerce by prahu (Endendijk 1978:93).

Meanwhile, Madurese society continued to open up to wider influences, partly as a result of the Dutch ethical policy. The educational reform of 1893 provided for elite and commoner schools in the towns, and the reform of 1907 mandated the creation of schools in the rural areas, though they had to be financed by the village's own means. Education became a major factor in mobility, and was responsible for the emergence of a new class of educated elite: the *priyayi* (Kuntowijoyo 1980:419).

Organized resistance to the economic domination by the native states, the colonial bureaucracy, or private elites was relatively rare until the end of the nineteenth century. During indirect rule, disputes were internal, arising between appanage holders and tax farmers or manifested by attempts of rival pretendants to seize power. Following the imposition of direct rule, the beginnings of a religious revival could be detected, and some concern was voiced lest alliances develop between the aristocracy and religious or *tarèkat* (mystical Sufi inspired) group leaders. Resistance to colonial rule by common people could then coalesce behind individuals thought to have religious or supernatural healing powers.[80] Thus, the Dutch were slow to notice one important new voice: *Sarekat Islam* (SI):

> In 1906 a government survey confidently reported on the impossibility of social movement arising in Madura. This judgement was based on old assumptions about the lack of social solidarity and desa ties and ever-present mutual distrust among the people. Efforts to mobilize the people were doomed to failure, said the Resident of Madura in 1907, objecting even to the holding of meetings (kumpulan) as a means to introduce measures against the fever epidemic. The implication was that the people were reluctant to attend government-initiated kumpulan because such gatherings were usually used to announce new taxation regulations. This kumpulan 'phobia', however, did not apply to the SI movement which dominated the political scene in the decade from 1910 to 1920. (Kuntowijoyo 1980:434)

Begun in Sampang in 1913,[81] the Madurese SI was a broad based organization, its leaders including aristocrats, notables, teachers, traders, and even a few peasants. Religious leaders, the kyais and the *tarèkat guru*[82], "provided the SI with a channel through which to reach the desa people" serving "as political symbols, often with advisory roles, rather than as active leaders" (Kuntowijoyo 1980:435). The founder of the Madura branch, Mas Gondosasmito alias Haji Syadzili went to Surabaya and spent time with the charismatic SI leader Umar Said Tjokroaminoto in order to learn the movement's ideology and organization.

The reasons for the development of political consciousness at this time are many. First, with the end of rule by the king (*rato*), people began to lose some respect for and feelings of loyalty to the royal families as the latter's political and economic positions had eroded. Second, the freedom from many of the oppressive taxes and labour obligations allowed capital and energies to be redirected towards improving religious structures and education in the villages (Mansurnoor 1990: 35). Third, the new channels of information and education were having a growing

[80]Examples of these are the Pak Masan affair in Bangkalan in 1882 (Kuntowijoyo 1980:373-379) and the Prajan episode in Sampang in 1895 (Kuntowijoyo 1980:316-324)

[81]*Serekat Islam* was founded in 1912. Growing out of an Islamic merchant's union created by *santri* batik merchants to block Chinese competition, SI soon attracted a wide following and became Indonesia's first mass organization (Peacock 1973:72-73; see also van Niel 1960:101-159).

[82]Teachers of the *tarekat* mystical tradition. The three known *tarekat* brotherhoods in Madura were the Kadiriyah, the Syathariyah, and the Naqsibandiyah. On origin and role of the *tarekat* in Madura, see van Bruinessen (1995) and Mansurnoor (1990:207-210).

impact on townspeople and villagers alike (notably, Haji Syadzili had been a government schoolteacher). Although the SI would eventually lose influence, other organizations would follow and find supporters among the Madurese. A new era for Madura, in the wider context of Indonesia, had begun. New political and religious networks were developing that would span the Madura Strait. Tjokroaminoto would receive another visitor in Surabaya several years later, a young man who was sent to study at the Dutch Hogere Burger School. The student, who lived in his house and eventually married his daughter, was Soekarno, revolutionary leader and Indonesia's first president.

Madura's relationship with the Dutch was always to be a complicated one, with a generally collabourationist aristocracy unable to prevent frequent expressions of grass-root resistance to predation from above. This tension is expressed to the present day by the frequent rivalry between religious and secular leaders at the village level. It is often said, not without some basis, that Madurese rural folk will follow their *kiyaè* rather than the village head. Rates of participation in cooperative village maintenance work are low compared to Java, though not due to a lack of a sense of social solidarity as sometimes claimed. Rather, the Madurese prefer to exchange work with close family and neighbours and to focus their social allegiances on religious institutions, which receive regular financial support and children to educate.

So far in this chapter we have taken a general look at the environment of Madura and its history more or less up until World War II. Having covered much of what is a part of the collective heritage of the Madurese on the island, this is a convenient time to turn our lens to the smaller scale of a specific Madurese community under study, and to examine more closely those elements of recent history that have most directly affected it.

The survey just presented of the early social and environmental history of Madura suggest that ecology and political economy have played a central, in many cases determining, role in the fashioning of Madurese society. However, we have only begun to analyse the factors related to the most salient features of Madurese society and culture, including the patterns of agricultural production, fertility, settlement, and conflict resolution often contrasted with those common in Javanese society. The in-depth study of a particular community in Madura presented now and in the following chapters, can hopefully provide us with a firmer foundation for evaluating the impacts of environment, economy, social dynamics, and the various interactions among them.

2.4 Gedang-Gedang and its region

The demarcation of a region in Indonesia, and perhaps in many other parts of the world, is as much a social construct as it is a geographical or politico-administrative decision. Just as the specificity of Madura in relation to Java was characterized earlier, the same can be done for East Madura in relation to the rest of the island. Though there is no clear border in moving from west to east on the island of Madura, a gradual transition is evident in climate, in ecology and also in custom. The climate appears warmer, the ecology drier, and the inhabitants less gruff in manner of speaking, or simply as one is encouraged to believe by the residents of Sumenep themselves, more refined. This latter impression is a natural one the senses

provide on first view, but it is also a product of our[83] "preterrain" of Jakarta, Jogyakarta and Surabaya. In each city, officials, academics and acquaintances concerned for our safety warned us of crude (*kasar*), brutal and oftentimes violent people. At the very least, should we insist on living on that island, we should select the district of Sumenep, because the inhabitants there are more refined (*halus*) thanks to their nobility's historical ties to the Solo, Central Javanese court. We are asked to believe that these ancient links have left an indelible trace on each town or village individual, and that any variance from the Madurese default personality can only be the result of diffusion. The preterrain did not end once we were installed in Sumenep, because there we were informed of an even more fundamental demarcation, at least in the eyes of our town dwelling informants: that between the "primitive" Madurese living in the hill villages, and the cultured Madurese influenced by the Central Javanese court of Solo living in the town. We were thus encouraged to remain safely in the Sumenep house we were renting for several months since our arrival. In time we were to find that Madura was a place where extremely diverse nature, lifestyles and dialects could be found in close proximity, on the other side of a hill, a road or an inlet.

Well before arriving in Indonesia, we decided that our fieldwork should take place in the district of Sumenep due to the district's reputation for performing arts, my partner's dissertation subject. I was interested in dryland agriculture and animal husbandry, the links between ecology, economy and society, comparative demography and particularly the intriguing paradox of Sumenep's widespread upland smallholder cow-calf systems in a region without pastures and where long dry seasons brought fodder growth to a virtual halt. Fertility practices for north-central Madura clearly differed from those encountered in Java (Niehof 1985), as did residence and spatial organization, providing additional comparative lenses. Ecological limitations were expected to sharpen the terms of arbitration between household demography, economy and society, permitting the anthropologist to arrive at some conclusions regarding relationships between these different facets of Madurese culture. At least that was the point of departure for fieldwork in August 1985.

2.4.1 A general view of Sumenep

As noted in the last section, Sumenep has the largest population size of the four districts, but the lowest population density and average household size. Its area accounts for 37.8 percent of the total area of Madura, partly due to the inclusion of its many offshore islands (Figure 2.1). Soil fertility and hydrological network are no better than the other districts. Mainland Sumenep is further penalized by low rainfall preventing rice cultivation in most places. Nevertheless, extensive rice fields are found in the valleys and plains served by watercourses: around Ganding and Guluk-Guluk, within the triangle roughly drawn by Lenteng, Saronggi and Gapura, and on the north coast along the river Raje (Batulesek) in Pasongsongan and the Tambaagung in Ambunten. Dispersed but numerically important are the spring- or rain-fed surfaces found in the interior uplands from Rubaru through Manding and Batang-Batang all the way to the eastern tip at Dungkek. As for the other district seats, the town of Sumenep is favourably situated in the lowlands near the passage

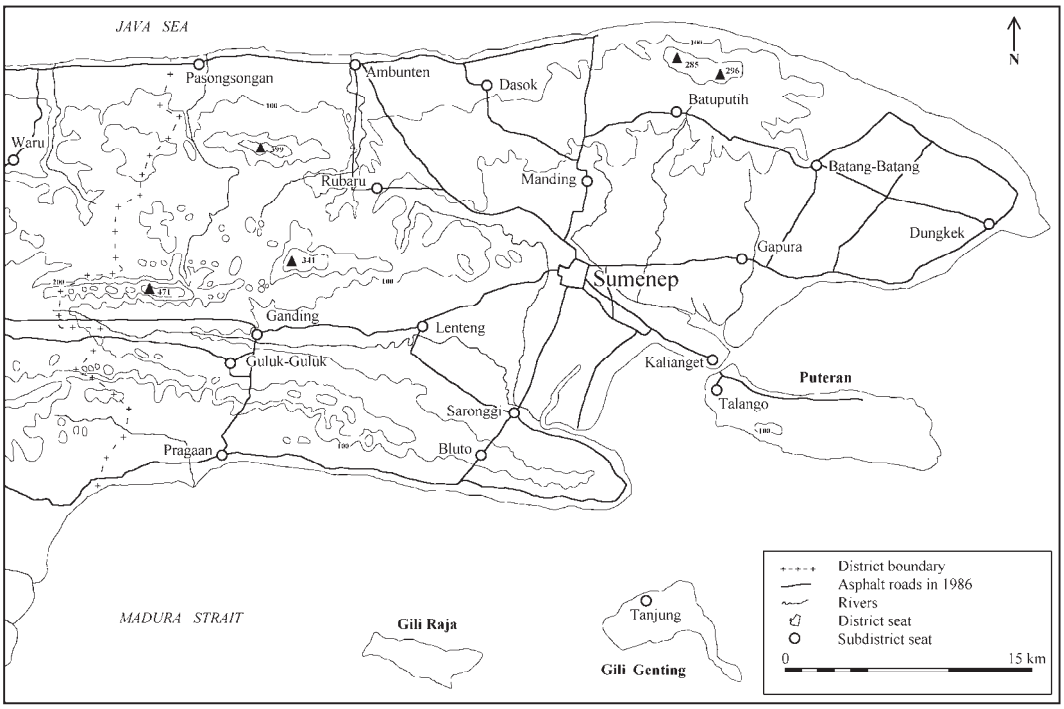
[83] I use the plural because I was accompanied by my wife, Hélène Bouvier, for most of the field visits.

of several large rivers[84], and surrounded by stretches of irrigated ricefields (Figure 2.8).

Everywhere else, cultivation of maize intercropped with various beans and cassava is the norm. Since the 1980s, intensive dry season tobacco cultivation has spread throughout the highlands as well as in the plains, using techniques of manual watering that require proximity to water sources.

Important fishing villages are found on the north coast (Pasongsongan, Ambunten and Slopeng near Dasok, and Legong to the north-east of Batang-Batang). Many of Indonesia's families involved in traditional ship transport between Kalimantan, Jakarta and Sumatra hail from the island of Gili Genting.[85] An important salt factory in Kalianget processes the production from the many saltpans south and southeast of Sumenep.

Figure 2.8 – The district of Sumenep (East Madura) and nearby islands



2.4.2 First impressions of Batuputih

Batuputih had a population of 40,667 in 1996. With 391 per km^2, Batuputih was one of the least densely populated subdistricts in the Sumenep regency (total population in 1996: 937,813). Settlement of homesteads and their adjoining farmlands is dispersed fairly uniformly across the landscape, aside from residential groupings near sources of water, roads and administrative centres, and some areas unsettled due to steep slopes or rock outcrops preventing agriculture.

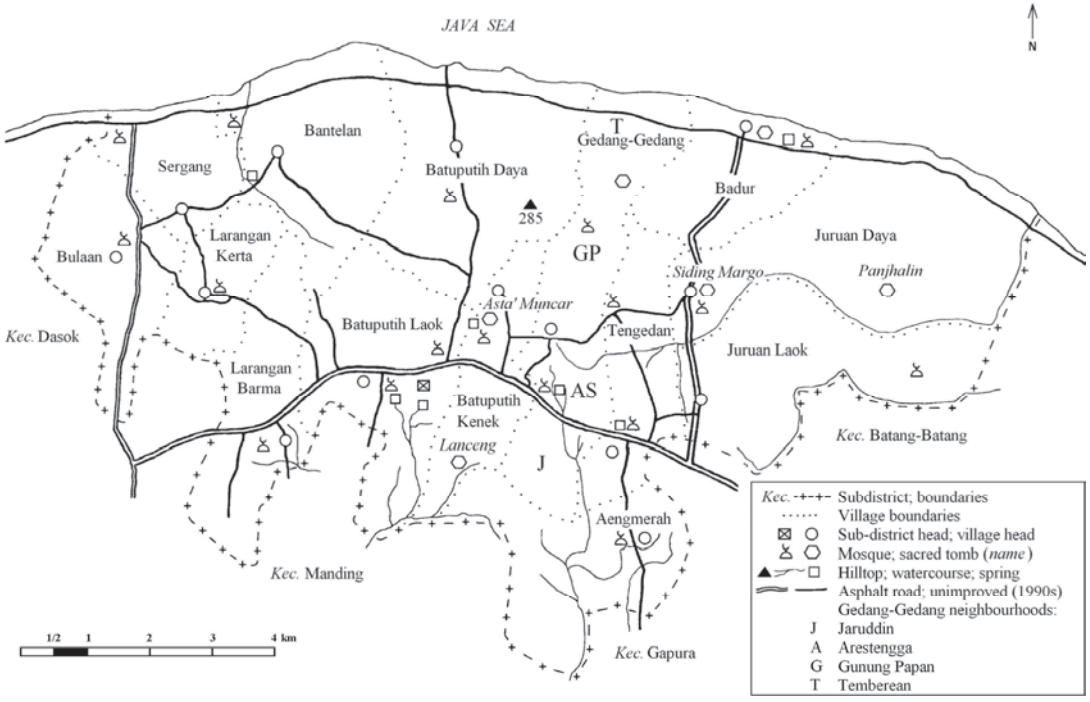
Very soon after our installation in the town of Sumenep[86], we heard descriptions of Batuputih subdistrict that perked our interest. That subdistrict lying

[84]Relatively speaking, of course, as no Madurese watercourses come near to matching the size of those found in Java, Kalimantan and Sumatra.
[85]See Smith and Bouvier, 2006a:151-223.
[86]In 1985 the town of Sumenep and its immediate surroundings had a population of around 60,000.

some 30 minutes by road north of the district seat, according to the local folklore, was where one found the most beautiful cows of the district despite fodder being scarce. Further reminder that we were still in our preterrain, we were informed that the *orèng ghunong* ('people of the hills') of Batuputih have remained traditional, even backward. Whatever scepticism we entertained about the value of such labelling, after weeks of administrative hurdles in large cities and towns were eager to escape "Indonesian national culture" and experience Madurese rural life and discover its specificities. Not to mention to solve the enigma of why barren hills can produce the best cows.

A week before our appointment with the livestock extention officer in Batuputih, we pass through the subdistrict on our way to meet his counterpart in Batang-Batang. This is September, fully in the grips of the dry season. North of Manding, the predominant savanna ecology of the island is evident from the dry gray soil, the shrubs and trees, though all the fields are planted either with tobacco, maize or lalang. On our motorcycle we pass files of people on bicycles or on foot heading for Sumenep to cut grass for their cows, or returning with baskets strapped to the bicycles or balanced on the head. Most are from Dasok. We leave them to take the road north at Baltuting, after the Manding subdistrict seat and market. It was here in 1976-1977 that a Dutch anthropologist made one of the first Madurese field studies since Independence (Leunissen 1982). The vast rice fields we knew to be characteristic of Manding Daya were for the most part lying fallow. At the Manding Daya market, we turn east for Batuputih. As we approach the subdistrict border, the soil turns reddish but the appearance of savanna remains, underlining the difficulties the breeders have finding grass for their animals. Besides the majestic tamarind, ubiquitous along the main roads, we see kapok trees, banana and other trees around the roadside dwellings which become more evident as we near the subdistrict seat of Batuputih Laok (Figure 2.9). The houses usually have brick walls and terra cotta tile roofing. The outbuildings were most often made with split and woven bamboo and a roof of *lalang*. On this road we occasionally pass trucks and vans transporting people and goods to Sumenep or an upland market.

Figure 2.9 – The Batuputih subdistrict



Passing through Batuputih Laok, we see a few old homes with the rooftop decorated in the shape of cow horns (*bengko' bangsal*), the mosque, and some administrative offices among which the district-head's (*camat*) office and residence. This is the first important population grouping close to the road since Manding, aside from the Manding Daya marketplace. It's often said that the upland Madurese traditionally preferred to live well away from the main roads where before would pass thieves and tax collectors.[87] It is more complicated than this, even though these two reasons retain some validity still today.

As for thieves, we received ample warning from our friends in Sumenep. Batuputih was the home base of the most hardened thieves of the district, particularly the villages of Juraun Laok and Juruan Daya, giving rise to the shorthand *mafia Juruan*. One example of their tactics was to tie a rope between two trees on each side of a road to trip up a motorcyclist, a story we could never confirm but that gave us pause as we were dependent on our motorcycle for transport. At one point on our first trip to Batuputih, for about 200 meters near the Labung Dua' market and the village of Gedang-Gedang, a man ran alongside our motorcycle. Though he was simply friendly and curious, the stories we had been receiving were still fresh enough in our mind so that we opted against stopping to better make acquaintance. Farther east, as we traversed the market full of traders and peasants at Kalompang south of Juruan Laok, the impression we made on the crowd was rather one of extreme astonishment, as if we had literally fallen out of the sky. Save for a few amused glances from truck or minibus drivers, used to seeing one of the few tourists finding their way to Sumenep, we would not have imagined we were only few dozen kilometres, less than an hour, from the district seat.

A week later, our first official appointment in Batuputih confirmed this positive and intriguing first impression during a tour of the interior. From the start, the representative of the animal husbandry department, Zaini, was intent on us moving to Batuputih, even offering to leave us his small house in Batuputih Laok. Unlike many "commuter functionaries" who are considered quite foreign whether they are Javanese or Madurese, Zaini (a Madurese), greeted by locals as the *mantri hewan* (livestock extension officer) and appreciated for the treatment he is able to provide sick animals and his excellent contact with the villagers, gave us the impression that an installation in Batuputih could be greatly facilitated.

Our first tour with Zaini took the road north from Batuputih Laok climbing the coastal range through Batuputih Laok before rejoining the coastal road and continuing east to Badur. Unlike the dense maize and rice farmlands of the south of Batuputih, much of the north face of the hills and the coastal strip is covered with rocky limestone outcrop and is classed public domain (*tanah Negara*)[88], which explains the few habitations and plantations. Apart from the desolate beauty of the landscape, and the view of the Java Sea, we could not help notice the proliferation of white limestones, from pebble to melon-size, in every field. Retaining or terrace walls were sometimes built from these stones, though with little apparent diminuation of stones in the adjacent fields. South of the coastal road, on the north flanc of the Batuputih Daya hills (and also further east in spots until Juruan Daya),

[87]Old texts mention frequent pirate attacks on the small islands east of Sumenep. On sparsely populated mainland coasts like Batuputih's this risk must have been taken into account when land was first settled, even if water sources are more readily available near the coast.

[88]Other villages have some land surface classed as *tanah Negara,* to protect a coastal forest (Bantelan), or uplands or coast with little agricultural potential (Sergang, Larangan Berma, Juruan Daya, Batuputih Daya). On these lands, one can still collect grass or leaves for cattle or limestone for construction materials.

one can see vast expanses of limestone outcrop, signs of past upwelling and erosion. Men dig quarries and fashion limestone bricks in the hot sun to build local houses or, more often, to sell by the thousand to trucks coming from Sumenep.[89]

The ecological divide defined by the hills separating the south from the north of Batuputih is also an economic one. Rice cultivation is no longer possible at all in the dry hills and maize harvests are less abundant, if not threatened altogether by the greater uncertainty of rains in the north. Soil fertility is less of an issue than soil availability and depth in the many fields crisscrossed by limestone outcrops. Plowing is slow and labourious in such conditions. In places where only small areas of soil are available amid the rock, manual hoeing and planting using sticks is the only solution.

Cattle husbandry is still practised by all but a few households in the north for agriculture and household savings, but its productivity is less due to the relative scarcity of fodder compared to the south. The paucity of fodder explains the greater presence of goats, led by women and children to clumps of scrub where they will be left tethered to graze for themselves. Although the availability of limestone quarries enables the locals to build solid homes, considered better than those made of *lalang* or pleated bamboo, this cannot mask the greater poverty that exists in the north compared to the south. More children in the north have bloated stomachs or skin ailments.

In Badur, we meet the village head and visit the small spring (*somor Badur*), with the extreme aridity of this coastal area as backdrop. Heading back south over the hills at Juruan Daya, we pay another courtesy visit to the village head there and visit the adjacent sacred tombs (*Asta' Siding Margo*) before passing through central Gedang-Gedang[90] en route to our host's house to discuss the day's events. We rejoined the main road and the small residential and trading centre at Labung Dua', the noise of the pickup trucks and shouts of the minibus drivers looking for fares. The clamour of vehicles contrasts with the calm that appears to reign in the interior. In the year that followed, we would note a rise in decibels with the proliferation of loud-speakers to broadcast music and prayers, and the introduction of electric generators, pumps and machine tools throughout the villages.

In the early visits of the subdistrict, one village stood out: Gedang-Gedang. Distinguished by a long and narrow contour from north to south, it stretches from its northern border on the Java Sea, over the coastal hills to embrace both sides of the main southern road. In this village one finds the typically Madurese farming systems based on maize, beans and cassava, though with significant variations in each of the village's four neighbourhoods. The arid lands of the north and the fragmentation of plantations found in the hills due to the limestone outcrops provide a striking contrast with the relatively lush landscape just north and south of the main road, suitable in places for paddy cultivation. I was aware that the Agro-Economic Survey had for several years been recording wages and prices in Gedang-Gedang, and had gathered some economic statistics from a sample of families. Although it turned out that these studies were cursory and only touched a few families near the main road, they provided some way to situate Gedang-Gedang in relation to other

[89]The limestone bricks are produced using axes, manual saws and, more recently, electric saws powered by portable generators.

[90]Eleven years later, we learned from a man in Gedang-Gedang that on our first day travelling through the village, unbeknownst to us Pak Zaini's spontaneiety and sense of humour spurred him to tell some villagers to run for it because white people were coming. Taken with fright, the poor man immediately fled to the sea shore, and once there asked another villager if they shouldn't find a boat to take to sea.

villages in Indonesia. On a visit to the village head, Pak Zaini anticipated our own reflections by asking the village head if we could stay in his village. He accepted.

We took a few days to consider the offer, but arguments were weighing in Gedang-Gedang's favor. For our two dissertation topics, it seemed the best compromise. Certain cultural practices, such as non-competitive bull racing, cow beauty and agility contests, and some rare forms of performing arts,[91] could only be found in Batuputih or close by. Nevertheless, Gedang-Gedang remained a fairly representative Madurese village in terms of the daily life of its residents. In comparison with other villages in East Madura (or even Madura as a whole) Gedang-Gedang is definitely rural though not completely isolated. Although the villagers cannot be said to be well-off economically, there are few signs of extreme poverty or landlessness (even if the poverty of some families is quite evident). In a single village, one finds represented a large part of the ecological, agricultural, cultural and artistic specificity of Madura.

In 1985, the local office of Education and Culture in Batuputih was fairly unorganized, an advantage for us since in other subdistricts activist functionaries often controlled and "folklorized" (Bouvier 1995) local practices. After a month in the town, we found Batuputih villagers inquisitive of our presence but not overly excited like in some coastal villages. With Pak Zaini's help, we found a small house with plaited bamboo walls in Gedang-Gedang just south of the main road that satisfied our minimum requirements: being attached to a farming *tanèan* with an all-season well and located close to the main road.

At the beginning of our installation, while forging the necessary administrative contacts at the village and subdistrict level, we looked for opportunities to better understand our immediate environment. We took advantage of our "newness" to call on the neighbours and to attend marriages and funerals, prayers and speeches in the mosques or at private homes, and music and theatre performances.

We soon became aware of the importance of exchange and gifts. Arriving at the beginning of the breadfruit (*sokon*) harvest, dozens of neighbours offered us boiled, fried, roasted breadfruit slices, with or without palm sugar sauce. Our manner of reimbursement (which was always required)—taking and offering photographs of the families—had the unintended consequence of producing us even more plates of fruit, as families further afield got word. These early exchanges were our first positive impressions of the village, and they provided us with inside views of numerous households both near and far.

The first discussions with our neighbours concerned language, the names of things in Madurese and our incorrect accents, a source of amusement to this day. We quickly understood the importance of humour in the village society and used it when possible to ease fears or discomfort surrounding our presence. The fears were basically that we were in the village to draw up reports for the Indonesian government concerning, for starters, income tax collection and political views. A few wondered if we were doing groundwork for some lucrative venture or a religious conversion scheme. Their fears were understandable; it had been decades since the departure of the Dutch and Indonesian Independence that no other westerner had set foot in Batuputih, with the exception of one Dutch couple involved in offshore oil exploration who resided temporarily in Badur in the early 1980s. We had to explain that through our study of inoffensive questions such as agriculture, animal husbandry and performing arts we were only interested in

[91]In Batuputih and Batang-Batang, notably, one finds *ojung*, a combat game with ritual connotations, one of the most spectacular Madurese art forms (Bouvier 1990, 1995).

"adding to science" (*namba èlmo*), a concept that had some resonance in Madurese society to the extent that many people sought to understand the meaning of religious texts or find the means of appropriating mystical forces, efforts that are also considered as *namba èlmo.* Then as during successive research tours in Madura, information would always be an object of exchange, information on them for information on us, our villages and the evolution of our daily lives. Insatiably curious of the outside, it was as if these Madurese were looking to regain the cosmopolitanism they enjoyed before history and colonialism imposed a degree of isolation from the outside, at least relative to their Javanese cousins. In 1985 it was not yet fashionable in anthropology to speak of reflexivity and co-production of texts, but something of the sort was definitely going on from the start of our fieldwork.

2.4.3 Local history of Batuputih

The name Batuputih ("white stone") may or may not have existed when Ario Wiraraja founded the Madurese royal house, but there is little doubt that it results from local geology, the white tips of the hills and the innumerable limestones strewn in most fields. Another explanation sometimes proposed is based on the phrase *Raja pakai baju putih* ('the king wears white clothes'), referring to an incident during the war with Bali. Injured in the arm, the king is said to have bled white blood, hence the phrase transformed to become "Batuputih." In the *Babad Sumenep* (1996:55) there is mention of a Prince (*Pangeran*) Batopoteh, son of Pangeran Sedenglangghar and the daughter of Agus Wedi, king of Gresik, on the north coast of Java. Although this explanation is doubtful given the language used, Indonesian (in Madurese, one would use *kalambhi* instead of the Indonesian *baju*, thus *Rato nganggguy kalambhi potè*), it does underscore the importance people in Sumenep attach to mythology and supernaturalism.

Origin myths and toponyms are useful for the suggestions they provide as to the ancient settlement of these regions. The mythical story of "Sumber Tombet", situated between Batuputih Laok and Batuputih Kènè' and mentioned earlier in this chapter, is one example. In these myths, cultivators or gatherers are already present in the area when a prominent individual arrives. Similarly, the narratives on the origin of ancient sacred tombs in Batuputih and elsewhere (Smith 1998: 228) speak of tombs rediscovered in the dense forest, sparsely populated though not devoid of inhabitants. Before the destruction of the forest cover and the expansion of food cropping over virtually the entire island surface in the second half of the nineteenth century, the forests were a place for gathering food, medicine and wood, and for hunting.[92] Place names may also suggest current or ancient presence of water, portals, temples, various species of trees, and other landmarks..

Our understanding of the colonial history of this subdistrict is very limited due to lack of sources. A scouring of published books, journals and reviews available at the KITLV in Leiden did not turn up any references to the subdistrict. Brief mention was found, however, in the manuscripts archived at the British Museum, Indian Office Library and Records, in the Mackenzie Collection, for Gedang-Gedang and other Sumenep villages. In a text dated 13 October 1800, and

[92] One would not expect early settlements to be located in hilltop areas far from dependable sources of water (Smith 1992); nevertheless, legend has it that the first *kraton* in Batuputih was located in Batuputih Daya. It would appear more likely that the incipient court be in Batuputih Laok, near large springs, and from where the supply of hilltop surveillance posts could readily be organized.

translated in English, we learn that Gedang-Gedang and other nearby villages had responsibilities to the royal court in Sumenep:

> Joeroerang. This people subsisting on the cultivation of their lands.
> Tengedan. This people belong to the stores of the Pangerang, and therefore they are free from all duties, and subsist from the fruits of their gardens.
> Gedan Gedan. These inhabitants do not pay any duties, because they are employed for cutting grass.
> Bato Poetie Wettan. These natives subsisting on the cultivation of their jagon [maize] lands.
> Batan Batan. These inhabitants subsisting on the cultivation of their lands.
> Badoor Caulon. This people subsist from their fruit trees.
> Ayer Maaraa. This people having subsistence from the fruits of their garden.
> Laranga Lor. This people likewise subsist from the fruits of their garden. (Mackenzie 1811-1813:v3:150-151; original spelling retained)

This text supports interview data that the current village divisions and their names have long been established, and provides justification for this study's focus on a village unit. Juruan is now cut in two north and south villages, like Larangan, Batuputih is now three villages, but Gedang-Gedang, Tengedan, Badur and Aengmerah retain the same borders.[93]

Similar indications for the other subdistricts of Sumenep show that villages had responsibilities to the court or to appanage holders (a minister, a Chinese tax farmer, an officer, a priest, for example). Some villages furnished men for the entourage of the prince, the resident or the regent, others supplied troops or spies, others sent a given number of villagers to the court to take care of certain defined tasks such as maintaining the tombs, or working in the kitchens, stables or forges. Villages in Dasok, west of Batuputih, took care of droves of wild horses; others took care of swallow nests for the court or aristocrats. The women in some villages weaved cloth, a practice now disappeared.

Gedang-Gedang, like a number of villages in East Madura, was given the task of providing cut fodder for the court livestock. One would assume this work would have been carried out by a team of villagers not far from Sumenep town, where during the long dry season grass would have been more in abundance. The other villages, "subsisting on the cultivation of their lands", would have been obliged to pay a non-negligible percentage of their harvest to the tax collectors. There is no certainty that the Gedang-Gedang farmers were entirely exonerated from tax, given the extent to which the appanage system developed during that period. A report on Sumenep dated 1808[94] writes of the problem of the *negory* (a term referring to the village or subdistrict) that became the fiefdom of one or more ministers and that no longer sent tribute to the Regents. According to the report, demands by the Regents could be so oppressive that they led villagers to seek the protection of a prince or his son, or flee with their families to another island.

Descriptions of small teak plantations of mediocre quality receiving little rain, suggest that if forest cover was greater, it was not dense in nature. Nevertheless, many villagers lived off of their gardens, trees and gathering. Though not mentioned for each village, one can assume that maize was a subsistence crop in

[93]Either some large village divided later as a result of increased population (they are all present on the 1906 maps), or the author of these notes did not find the need to cite every village.

[94]*Letter from A. T. Vermeulen to F. J. Rothenbuhler, dated 15 October 1813* [sic: 1808], in Mackenzie 1811-1813:v3:134-135.

most places; for exchange and taxes one would use beans[95], coconut oil, candlenut oil or castor oil, or products from the economically important Asian palmyra, areca nut palm, tamarind and teak. Subsistence cropping was already extensive in Pamekasan district according to one report estimating 86.6 percent of the residency was fertile land: "7354 antjangs cultivated with rice, maize and manioc and 1135 antjangs of abandoned land, medows, hills and caves."[96] Important exports during this period included linen, tamarind, baskets and earthen pots. The major import was rice. Tobacco, cotton and flax (written cappas like the Madurese *kappas* in the reports) were cultivated despite the unpredictable climate, sometimes too rainy, sometimes too dry.[97] Tobacco was grown primarily for personal consumption, or sold by the poor. In 1808, Pamekasan district had 2431 weaving looms and 2100 spinning wheels (Mackenzie 1811-1813:v3:360), but Sumenep was the real centre of fabric production and the hope was that lower tarrifs could increase Madurese export opportunities:

> The spinning and weaving of cloth is here in a conspicuous situation, and all vessels rounding to the eastern Residencies touched this place for the trade of linnen cloth. The situation of this Residency is very fit for the trade; however the great charges contributed by the same to Government, and which should remarkably encreased [sic] if it was allowed by Your Excellency, that this place may enjoy the privileges, as it has been granted to the Residencies of Grissee, Cheribon and other places.[98]

Many Javanese merchants came to Kalianget with rice to trade for oils and other goods to resell in Panarukan on the other side of the Madura Strait.

While the nationalist awakening of the first decades of the twentieth century resonated in the towns of Bangkalan and Sumenep, its impact in the rural hills of Madura was muted. Elder informants have little recollection of the Dutch, who resided 10 km to the east in Batang-Batang Daya or in Marengan near Sumenep, and only rarely ventured into the Batuputih area, usually to hunt wild boar (*Sus scrofa* L.). Villagers have better recollection of the functionaries of the incipient republican bureaucracy fleeing to the hills, their pursuit and the search for weapons during the Dutch reoccupation of the island in 1947. Hardly anyone recalls the ephemeral Negara Madura, an "independent state" created by the Dutch after the war.[99]

All, however, experienced or at least heard of the terrible suffering during the Japanese occupation, from 1942 to 1945. The attitude is one of ambivalence toward the Japanese themselves. On the one hand, Japanese sometimes came to the area to distribute clothing or food; on the other hand, the Madurese had to build up stores in each village (*lumbung disa*) and periodically give the occupant a large part of their food, livestock and production, leaving them with little to feed and clothe themselves. Villagers began to eat roots and other foods avoided in other

[95]The three main varieties of beans planted in Sumenep, green, white and Chinese beans, probably referred to gram, peanuts and soybeans, respectively.

[96] *Report to W. Daendels*, in Mackenzie 1811-1813:v3:358. The *antjang* was an archaic surface measurement (Mackenzie 1811-1813:v3:352).

[97] The 'gamoolie'and 'kaye'thread required for yearly tribute to the Dutch, would appear to be cotton and linen (flax). Today, only cantala (*Agave cantala* Roxb.; *lanas* or *lanas balandha* in Madurese) is cultivated, particularly in northern Batuputih and other arid zones.

[98] *Letter from A. T. Vermeulen to F. J. Rothenbuhler, dated 15 October 1813* [sic: 1808], in Mackenzie 1811-1813:v3:132.

[99] On this period, see Touwen-Bouwsma 1995. Sjamsoelarieffin (1948) wrote a book advocating allegiance to the Negara Madura.

circumstances[100], and fashioned clothing from burlap sacks, talipot palm fibres or even tree bark. Then there was the forced recruitment of *romusha* for work in Indonesia or throughout occupied Asia. A Dutch civil servant estimated that between 300,000 and 500,000 Madurese perished as a result of hunger, disease, or as *romusha* (Grader 1949:50, cited in Touwen-Bouwsma 1995:73). That represented approximately one fourth of the population of about 1,950,000 counted in the 1930 census. The Japanese required that village and sub-district heads choose those to go and those who could stay. A man from Batuputih Kènè' who was ten years old when the Japanese arrived explained how he was passed over:

> This is how it happened from the beginning. I was sent on foot because there was a sugar distribution; I was told to go there. When I arrived at the village head's house, there were already many people present who wanted "to romusa" me. But the wife of the village head, Bu Mobari, with whom I had a family tie, told them: "Please don't send away my only nephew; look for another person." There were many discussions over who wanted to leave. […] They were assembled and after dawn, around seven o'clock, they ate and then left on foot. […] The next day, the village head asked me: "do you want to feed the horses?" I responded, "Pa', I would like to work, my mother is all alone."

In this way he was employed or adopted (depending on the way one looks at it) by his aunt and the Batuputih Kènè' village head until the death of the couple, an arrangement that probably saved his life. He estimates that about fifty of his close neighbours left, not counting those from neighbourhoods and villages further away. He remembers that people left on their own accord, believing they would be given easy and good paying jobs. None of those he saw leave ever returned. The highest estimate, given by another informant, was about one hundred men per village in Batuputih left as *romusha* and 25 percent returned. I only know of two persons who returned to Gedang-Gedang.[101]

Famine followed the food shortages accompanying the departure of the Japanese, and older villagers recall the Dutch food and clothing distribution designed to regain their support. This period of famine in Batuputih was due the ravages both of the war and of wild boar, and when the latter were finally exterminated around 1950, infestation by field rats. Many villagers fled to Java, to north Banyuwangi district east of Situbondo, sometimes selling all their possessions. About eighty-five families left from Aengmera, and others from Gedang-Gedang and Batuputih Kènè' south of Labungdua'. Seasonal migration to Java for the coffee and sugar harvests also was important through the 1950s, but has all but disappeared today.[102]

The other modern day trauma was the liquidation of leftists following the aborted coup of 30 Septembre 1965. Those who lived near the coast during that period will never forget the sight of bodies floating in the Java Sea. There were

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[100] Among the plants consumed in times of famine: *bhengngok, cong-lacong, lorkong,* (pit of) *pao,* and the starch of the *poco'.* For the common and scientific names of these plants and their uses, see Appendix II.

[101] Dower (1986:327n.39, cited by Rummel 1994:150) notes: "In one estimate, out of over 500,000 Indonesian (Dutch East Indies) forced labourers taken from their homes, only a 'small fraction'returned after the war."

[102] Only fifteen Aengmera men still worked seasonly in Java in 1990, for the maize harvest. At the same time, in the subdistricts of Ganding and Guluk-Guluk (west of Sumenep) one can detect an inversion of the migratory flow with the arrival of Javanese workers in the tobacco fields. They can earn more per day in Madura now than in their home villages in East Java.

arrests in Sumenep town and especially in the port town of Kalianget, but by and large the religious Madurese were unsupportive of the Indonesian Communist Party (PKI). Only one local village chief, in Larangan Barma, was arrested due to his political leanings.

Before 1972, transportation to town was by a *dokar* (horse-pulled wagon) which left for Sumenep every Monday and Thursday by the road through Gading, west of the Batuputih Laok mosque. The trip took three hours, about the same time required to walk to town using shortcuts. Village heads, religious leaders and other notables had their own horses to get around. A motorcycle was put at the disposal of Batuputih officials for the 1971 national elections. The main road through Batuputih was enlarged a bit in 1963, a little more in 1969, before being asphalted in 1972 and improved in 1976. The "Colt Revolution" in transport infrastructure and service named after the popular Daihatsu mini-bus, arrived in Madura as in Java. Between 1970 and 1972, the first motor vehicle tranportation began serving Batuputih.

Before 1970, Batuputih Laok was the central market place for the subdistrict for selling agricultural production and purchasing clothes and food items. Then as today, for minor exchanges in the village one can also purchase or trade with ambulatory traders or home-based traders. Gedang-Gedang and the villages to the east also use the market in Kalompang in the Batang-Batang subdistrict, where palmyra sugar traders are based. People living along the coast often attend market days in Legung, a small fishing village in Batang-Batang. In the beginning of the 1970s, a market developed in Labung Dua'. As for the other markets, this place of exchange had modest beginnings, a few people spreading their wares on the ground in the shade. With time, small bamboo kiosks (*bharung*) were built by those who came regularly. Permanent stores (*toko*) offering a variety of items were built only later. Although Batuputih Laok's market was in existence in 1900, if not much earlier, the first permanent buildings were only built in 1970, when the development of transportation facilitated the arrival of consumption goods. "Progress" was slow, however, as the first trucks bringing bottles of Coca-Cola and other mass consumption items did not arrive until 1981.

Contacts with the town were maintained mostly by functionaries and traders. For others, a trip to Sumenep was only necessary for purchasing tools or special items not available in Batuputih, a hospitalisation, or to buy and sell gold. Almost all daily needs could be satisfied in the local markets. In 1986, I asked 150 individuals in thirty-seven families in Gedang-Gedang if they had been to town or outside Madura before, and was surprised to find that few of the men and none of the women had ever been outside the island, and over thirty percent of the adult women had never been to the town (see Table 2).

Table 2.3 – Travel to Sumenep or outside Madura (sample of families in Gedang-Gedang village in 1986, expressed in percent)

Have been at least once to:	Men		Women	
	Under 20	Over 20	Under 20	Over 20
Sumenep	58.0	92.1	47.6	68.0
Surabaya, Java or outside Madura	5.9	7.9	0	0

After 1986, travel to Sumenep became increasingly common, even banal, due to further improvements in transportation, and particularly because rising incomes from tobacco provided many families with money to spend at the end of the dry season harvest.

2.4.4 Gedang-Gedang local area: settlement and environment

In 1996, I was able to interview a woman living in the tomb complex at Juruan Daya who claimed to be a great-great-great-great-great grandmother born before 1900. She insisted that her daily life had changed very little since her childhood. The population density and forest cover were more or less the same, the farming system in her area of Juruan Daya (intercropped maize, beans and cassava) and animal husbandry had not changed, and the same rites and cultural forms were practised then as now. Younger informants confirmed her impressions, though some suggested that in the 1940s or 1950s a little more forest remained. Significant historical events occurred during the lifetime of this elderly woman—two world wars, Japanese occupation, Independence, the transport revolution and the arrival of modern consumption goods—but from her perspective looking back they did not alter the basic rhythms of daily rural life.[103]

In 1997, Batuputih had a population of 40,764 (Kantor Statistik Kabupaten Sumenep 1998:7). With 391 per km², Batuputih was one of the least densely populated of the 27 sub-districts in the Sumenep regency, which had a total population in 1996 of 937,813 (Kantor Statistik Kabupaten Sumenep 1997a).

Gedang-Gedang village does not keep records for past settlements (only a population estimate of 1100 is noted for 1963). Fortunately, cartography of Gedang-Gedang and other areas of Madura are available to provide a glimpse of historical ecology and settlement dispersion from the beginning of the twentieth century. They give support to the recollections of the elderly woman from Juruan Daya, though when compared with later data, increased population density over time appears. The maps of the Gedang-Gedang region published in 1906 are labled simply "Res. Madoera" with the coordinates (most of Gedang-Gedang is shown in map K.II.) along with a stamp of the head of the colonial archeological service, Topografische Dienst.[104] The maps clearly show the place of buildings, the limits of fields, roads and tracks, springs (bron) and wells (put), but lack keys, captions or other explanations. It is not possible to judge the type or density of tree cover due to the sparing use of symbols for trees (apparently mainly representing palmyra and indescript shrubs). Many fields are shown as uncultivated, the normal state during the dry season, or are perhaps being used for pasture, today a very uncommon practice. The identification of family groupings cannot be done with certainty. One to five buildings or more may be found inside fields defined by hedges or trees, or by lines drawn directly on the maps. Could these be the *tanèan*, with each mark representing a household or a dwelling? Or does each mark indicate a separate building (house, stables, kitchen)? Impossible to determine, but a count gives 83 marks within the approximate village boundaries.

The U.S. Army Map Service compiled maps of Madura in 1964, based on data from 1945 and 1951, themselves based on cartography of the Topografische Dienst, Batavia (unknown date).[105] Counting the structures recorded on this map for

[103] A different sense that immense changes are underway is, however, felt by most young people today, perhaps because they are still living through the changes, particularly in communications.

[104] I was able to photocopy twenty nine of these maps, including several from Batuputih, at the National Library at Salemba, Jakarta.

[105] See sheet 5722 II, Series T725 (Batang-Batang).

the same area above on the 1906 map gives approximately 211 buildings.[106] The same uncertainty holds as to the nature of the structures.

A third sketch (Figure 2.10, see below) locates families in 1980 according to the Indonesian administrative practice of identifying individual family units units led by a family head (*kepala keluarga* or *KK*). Although family members sharing a kitchen should be considered one KK, in practice I found that in most cases where two or more nuclear families were sharing a kitchen they were each considered a separate KK. Thus, the sense of the household as a resource sharing and labour management unit is not accurately captured by the concept of KK, as discussed in the next chapter on household definitions. It is sufficient to note that there are more KK than households in Gedang-Gedang. By combining four rough sketches of each village neighbourhood used for the 1980 census,[107] we have the relative positions of each KK marked by a square. These sketches show approximately 749 KK in the same areas as the other two earlier maps, which if combined with the Jaruddin neighbourhood south of the road would give a number close to the 905 KK found in 2006, including those left out of earlier village censuses.

The three maps suggest that nuclear family and household densities have increased overall during the last century significantly more than the old lady's recollections would indicate, though complete certainty is not possible given the problems of interpreting the data. The data show that settlement densities are somewhat lower in the hills and along the coast than in the southern part of the village, but are not dramatically different. Finally, interviews conducted with village heads indicate that since 1950 village populations have at least doubled.[108]

2.4.5 Water as a limiting factor

A major increase in the number of wells during the twentieth century is another lesson from comparing the 1906 map with a map I drew up of Gedang-Gedang's local environment (Figure 2.11)[109] showing the location of ricepaddies and wells in 1996. As the data from 1996 show, private wells have been dug in many areas, including the uplands, but not all have water all year. Those near the hills run dry during the dry season. Elsewhere, provided the owners and their neighbours do not overuse for tobacco watering, the wells can provide year-round. An increase in private well-digging accompanied the extension of dry season tobacco cultivation in the 1980s and 1990s, and provided a certain measure of comfort to many inhabitants who until then had to transport water over great distances.

Household settlements have densified and also extended to all areas suitable for cultivation, leaving only the rocky outcrops vacant. A household can exist as long as there is a flat area for the buildings, the stables and a courtyard; all the better if there is space for a garden and some fruit trees. Fields are usually adjacent,

[106]Due to the poor resolution of building and other symbols on the 1906 and U.S. Army maps, they are not reproduced here.

[107]No effort was made to draw the neighbourhoods to scale (Figure 2.10). In each neighbourhood map the enumerator simply placed the households in relation to each other, thus the composite map is only an approximation of the actual position of the households.

[108]Gedang-Gedang's population increased from 1100 in 1963 to 2831 in 1996. Aengmerah's went from 900 in 1950 to 3968 in 1997.

[109]I redrew this map for clarity and added current landmarks (see key, Figure 2.11). Foundation map is from US Army Map Service, Far East, sheet 5722 II, Series T725 (Batang-Batang), compiled in 1964 using data revised in 1945.

though inherited or purchased land can be situated at a distance. For practical and security reasons, people avoid setting up a household far from other neighbours. Those dwelling in the hilltop houses facing the Java Sea may have spectacular views, they do not consider themselves particularly fortunate. Their burden is felt every day as they must search far and wide for fodder, and carry water up from the springs located on the seashore.

Figure 2.10 – Approximate location of households in Gedang-Gedang in 1980 (from village census of that year)

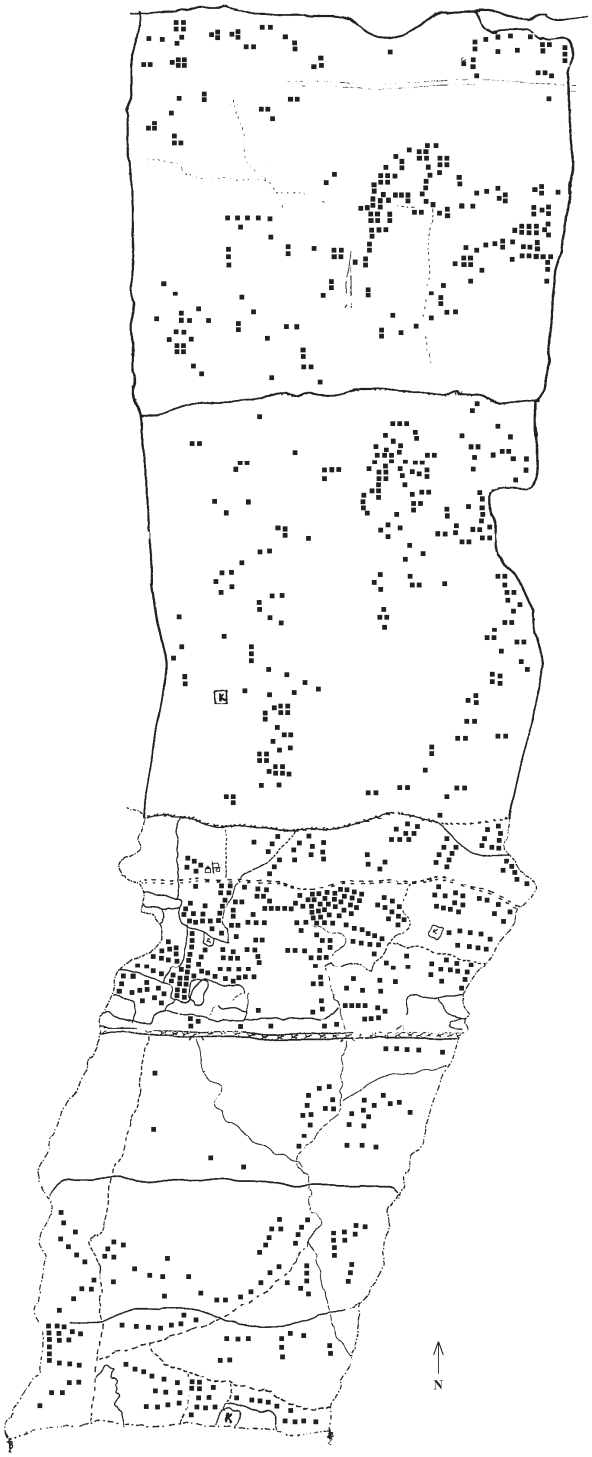


Figure 2.11 – Gedang-Gedang and its local environment in 1996

In effect, a glance at Figure 2.11 shows the extent to which the north is disadvantaged hydrologically compared to the south. Only a few wells and springs serve the coast, and the hill areas of Gedang-Gedang and neighbouring villages are dry. Four wells near the Gunung Papan mosque on the south side of the 296 meter summit can serve nearby families but are far from sufficient for the hundreds of hill families. Most in this area go to Labang Dua' to fetch two jerrycans of drinking water to be carried up by shoulder pole (*pèkol*) or strapped to a bicycle. For some, doing this heavy work for others provides income. Those living on the north side go to the wells near the shore. Several unsuccessful trial borings up to 100 m deep were made in the 1980s and 1990s mid-way between the summit and the shore by Proyek Pembangunan Air Tanah (P2AT), an Indonesian-British groundwater development project that has increased lowland irrigation potential throughout Madura by installing tubewells. A 150 m bore costing Rp 94 million was unsuccessful south of the hills close to the village secretary's residence in north Arestengga.

Regular water crises punctuate village life. The water level in Gedang-Gedang's lake reservoir (*cekdam*), created in 1982-83 and fed by springs, has been a cause for concern since the early 1990s for subdistrict authorities, keen to placate Sumenep district authorities who prioritize the town's upland water sources. Since at least the 1980s, the town of Sumenep has had to manage a limited water supply for its growing population through rolling neighbourhood rationing. Rationing began to be instituted at the Gedang-Gedang *cekdam* in the early 1990s when the rate of offtake during the tobacco season exceeded the rate of recharge from the springs. In the 1990s, homes in the administrative centre of Batuputih Laok were also required to install meters and begin paying for their water for the first time. Besides the obvious revenue generation, a reason given was to protect Sumenep's watersheds. In 1994, overuse of the Tengedan spring, which serves numerous families near the mosque on the main southern road, forced the village head and leaders to agree to alternate days for users from north and south, and contemplate closing the spring at 5 p.m. Intensive cultivation of tobacco and particularly the increased seasonal use of pumps and longer-ranged piping from the *cekdam*, springs and wells was responsible for exacerbating the water shortage from the 1990s forward. It is hardly surprising that the hydrological situation appears to have been significantly better when the 1906 Topografische Dienst maps were drawn up. Compared to the situation today, an examination of available 1906 maps for the Batuputih local area shows wider streambeds south of the main road, particularly downstream from the Tengedan roadside spring[110]. Fed in part by the Tengedan spring, small streams south of the road that until the 1980s flowed year round and provided more than enough water for tobacco cultivation are today virtually dry during the dry season. Only by digging holes in the riverbed the night before can cultivators obtain the next morning a minimum amount for watering a small field (about 25 *pèkol*). The same holing technique is used to find water right next to the Tengedan spring when the cement basin there is empty.

A successful 1982 UNICEF programme has eased the situation somewhat for non-potable water in the hills by aiding the construction of rainwater harvesting and storage systems. Most households far from sources of water have installed similar systems, which are based simply on channelling rainwater from rooftops into

[110] A Dutch accountant writing in the second half of the eighteenth century speaks of Madura in these terms: "The soil is exceedingly fruitful as on the Island Java, the Natives have an abundance of all the necessaries of life; there are fine woods and all kinds of water Springs and Rivers in plenty and gives all the products which grow on the Island Java. The Horses and other Species of animals, Birds, etc. [often found] are the same as in Java but the Cattle at Sumanap is better and more fat than anywhere else" (Van Boeckholt 1814:72-73).

a large reservoir build of limestone bricks and cement.[111] During the rainy season, the water thus harvested is usually sufficient for livestock and washing, though cooking and drinking water must still be carried up. Water continued to be a concern after 2000. In 2002, the Kecamatan Development Program (KDP), a World Bank-assisted government program running since 1998 and covering almost 2000 subdistricts throughout Indonesia began operating in Batuputih. KDP provides block grants to subdistricts to award village-defined projects on a competitive and rotating basis. A former field research assistant and KDP village representative for Juruan Daya explained that for Batuputih as a whole, tubewells are most often proposed, followed by roads. Four of the first five villages awarded in 2002 chose tubewells (*bor*), including Juruan Daya. In 2003, the village representative reported that hundreds of villagers were using the new *bor* near the tomb complex at Asta Siding Margo, coming from up to 2.5 km away, including Gedang-Gedang. A separate government project by early 2009 now sends drinking water from a tubewell in Labung Dua' by underground pipe to pump station near the top of the hill at Gunung Papan. Nonetheless, shortages of drinking water in Gedang-Gedang and Batuputih were reported in the provincial press in 2008 and 2009, one article citing 38 villages in 27 sub-districts of Sumenep experiencing critical shortages. It appears unlikely that KDP will succeed in the north hill areas lacking existing wells, where P2AT failed. The cost of piping and pumping solutions limits the number of areas that can benefit from this solution to domestic water needs. Unlike the many *bor* P2AT installed in lowland areas of the island for household and irrigation purposes, the Batuputih *bor* cannot be used for agriculture, at least not yet. In the discussion of tobacco in Chapter Three I will discuss the techniques used by farmers to manage water and labour, the two most important inputs for this potentially lucrative but risky crop.

In terms of the environment, water is the most important limiting factor for Gedang-Gedang villagers. Little can be done to work around the unavailability of rainwater for crops: groundwater irrigation is only available in places and like piping from afar it is expensive, and spring and well water can only be carried or piped so far or to so many individual farms without risking human exhaustion or natural depletion. Soil fertility is low to medium at best, but in this department, Gedang-Gedang villagers have developed measures to succeed in a limited environment, and retain soil and its fertility through their choice of diverse cultigens, intercropping, crop rotation, water control, terrassing, mulching and applying manure from animal husbandry. The villagers' agroecosystem and farming systems will be explored in more detail in the next chapter along with other aspects of their livelihoods strategies—strategies that have been constantly adapting, like they always have no doubt, in response to both constraints and opportunities.

[111]Some twenty five families per village affected by drought received cement, sand and iron reinforcing rods for the reservoir construction. The other villagers copied the model. A similar aid project in 1979 provided for covered toilets, but few villagers replicated it.

CHAPTER THREE
ORGANIZATION AND EXPLOITATION OF DOMESTICATED NATURE

3.1 Introduction

The natural environment of Madura, from the scorched desolation of its saltpans to the verdant terraces of the interior, is intensively domesticated. Northeast Madura does not depart from this pattern; though its population density is lower than average for the island. Even the limestone hills descending to the north coast are domesticated through lime quarrying, farming and grazing stock where possible. Much of the land cover and many of the species that existed just a few generations ago have not survived to this day. The original forest is all but gone, replaced by plots of farmland with economically useful species of trees and shrubs to mark them off from one other. Tigers, elephants, pigs and other animals that roamed the island are long gone. Birds of many feathers, fallen victim to the market force of urban demand, have been trapped, sold and domesticated. Fewer and fewer fly free. The market has in turn enabled their return to the village in cages, to provide song, investment and prestige.

The ecological and historical changes in Madura and in a northeastern village outlined in the last chapter have left their mark on a rural system of production that can now be examined in more detail, with an aim to gain both an insider's view of the natural environment and an overview of the techniques available for its exploitation. Agricultural production in Batuputih requires access to land, labour, water, draught animals, fertilizer and cash, inputs which are not distributed evenly among households. Describing the modes of land access, distribution and stratification will be our first task in this chapter. For most families, harvests from their fields are insufficient for subsistence; as a result households exploit a wide range of plants and engage in trade, crafts, and many other occupations to make ends meet. Villagers perceive and organize the living resources in particular ways as testimony to their importance on both an economic and conceptual level. Therefore, once a clear idea of what land is available, the chapter will present taxonomies and accounting of the plant and animal resources available to Gedang-Gedang and Batuputih villagers. The lists of important plant and animal species, in appendix, give a measure of the village's biological diversity, and the multiple uses many species provide.

In the second part of this chapter, I will look at the basic livelihoods activities villagers engage in, describing the farming systems and main crops, and all significant off-farm activities. This discussion will proved a comprehensive view of returns to labour based on calculations of time spent, financial outlay and outputs, constraints on access and other factors. This will provide insights on some of the questions posed about peasant production such as the rationale behind planting low-yielding crops when improved varieties are available, the ability of farmers to raise capital in the absence of functioning government or corporate credit institutions, and how to go about measuring labour productivity. Besides being necessary for an understanding of how households make decisions on a wide range of productive

and reproductive issues over time, an understanding of livelihoods options allows me to show in Chapter Four how some individuals can mobilize labour by providing a measure of food, economic or spiritual security, and in so doing elevate their own status.

3.2 Access to land

Batuputih's land is almost all privately owned and has been for as long as people can remember. Ownership of land is passed down from parents to children; usually ownership of some of the parents' land is granted at marriage or soon after. Ownership of land can be transferred by sale or by equivalent exchange (for example, for reasons of convenience following marriage). Land may be rented (*nyèwa*) from a landlord on a seasonal or yearly basis for a fixed sum of money payable at harvest or in advance. The landlord in this case rents out the land (*panyèwa*). One may also sharecrop in (*ngala' derreb*) land belonging to another, sharing the harvest equally in most cases. The landlord in turn sharecrops out (*pangala' derreb*). Seasonal contracts are only for tobacco cash-cropping, and until the end of the 1990s were rare, but since then have become more common and potentially more expensive than in the mid-1990s, when a *lagghu* could be rented a year for as little as Rp 35,000 (tobacco land is rented for ten percent of the yield). Seventy-two out of 905 nuclear family heads (KK) worked land belonging to others in 1996, all but six as sharecroppers (average size of sharecropped land: 1.78 *lagghu*, median 1 *lagghu*). The largest amounts of land sharecropped in were to four overseers who managed the work on plots of 4, 6, 9 and 10 *lagghu* of maize and rice fields belonging to the village head or available to him to use during his time in office. They gave the village head one part to their two from the harvest, the overseer paying the workers and himself out of the larger part.

In theory, land left uncultivated for a period of three years can be taken by the village head and redistributed, though this has not occurred in recent memory. In most villages, small plots of land suitable for rice cultivation and some *tana tegal* are *desa* land referred to as *tanah percaton*, the usufruct of which is granted to the village head and officials in lieu of salary. In Gedang-Gedang, 2.4 hectares of *sawah* and 2.5 hectares of *tegalan* are *tanah percaton.*[112] The five plots involved represent 16 percent of the *sawah* but only 0.3 percent of the *tegalan* in the village. All other land is privately owned, including the land on which the Gedang-Gedang primary school is situated. There is no communal land in Gedang-Gedang.

Other constraints on the use of land include government land and severely degraded land. Some neighbouring villages have land classed *tanah Negara* (under central government control). Most of this land is in the northern part of the subdistrict near or on the coast, is of low fertility or is composed of limestone outcrop. A 450 hectare section of *tanah Negara in* Batuputih Daya includes a strip that follows but does not extend across the borderline with Gedang-Gedang. *Tanah Negara* is administered by the Ministry of Forestry (*Departemen Kehutanan*). Some people have been able to receive authorization to use the land temporarily,[113] and grazing of goats is allowed. The government recognizes and maps other constraints on land use, such as eroded or severely degraded privately-held land. Forty hectares

[112] Due to the very small extent of *sawah* in Gedang-Gedang, additional *tanah percaton* located in the Manding sub-district is attributed to the Gedang-Gedang village *pamong desa.*

[113] For example, some of the extensive small-holder limestone quarries in north Batuputih appear to fall within the *tanah Negara*.

in Badur and 350 in Juruan Daya are considered unfit for cultivation, in addition to 150 taken up by *tanah Negara* in the latter village. None of Gedang-Gedang's land falls into any of these categories, although many plots have steep slope or rocks which make them more suitable for tree crops or limit them to limestone quarrying or grazing.[114]

Although Batuputih is one of the poorest subdistricts in the Sumenep district, land ownership is practically a given for most households. In Gedang-Gedang, all but three households own some land, though many families are land-poor. All those who rented or sharecropped land in 1996 had other land of their own. Batuputih Laok is perhaps an exception, if an estimate of the village head that 10 percent of the households are landless, though this is likely due to the off-farm employment (including government jobs) or sharecropping available in the subdistrict seat.

Determining levels of land ownership was done in three ways. Village land ownership records were copied and entered into spreadsheets. The 1996 census of all households recorded for each plot: size, distance from homestead, soil type, crops planted in each rotation and means of acquisition. Periodically between 1986 and 2009, the same information, and additional economic data was gathered and updated periodically for all households in the sample group of 24 *tanèan.*

The village secretary keeps the land ownership records for the 123 plots of *sawah* and 2289 plots of *tegal* in the village, a manuscript ledger book referred to as *Letter C.* The first line gives the plots of the *tanah percaton;* the following lines the names of every person who owns one or more plots. The data is organized in columns for each numbered plot (*persil*), which is classified either as *sawah* (rice field) class I (easily manageable, flat terrain having excellent irrigation, water retention and drainage characteristics with low susceptibility to erosion and flooding) or II (less optimal conditions compared to I), or as *darat* (dry) class I, II, III or IV. The type of land and its classification determines the tax rate. According to the list as copied in 1996, 952 persons[115] own between 0.03 and 9.374 hectares of land in Gedang-Gedang. Village land classification is summarized in Table 3.1.

Table 3.1 – Summary of Gedang-Gedang land classification

	Sawah		*Tegal*			
	I	II	I	II	III	IV
Hectares	4.287	10.796	26.897	153.719	565.183	115.335
Owners	36	54	61	310	713	137

As shown in Table 3.1, only a tiny fraction of the village land is suitable for rice cultivation. The majority of Gedang-Gedang land falls under Class III, which includes land with serious constraints in terms of slope, low water retention, poor drainage, and susceptibility to erosion. With even more serious constraints of shallow soil, rock outcrop, or other limitations, Class IV land is more demanding to farm and protect from further degradation. No land is under Class V-VIII, land that is not suitable for agriculture due to rocks or other serious constraints, although many fields in the village are severely constrained by limestone outcroppings or shallow soil depth. Paradoxically, land classed low due to poor fertility has in recent years taken on considerable potential value due to the extension of tobacco farming, as will be discussed below. Land classification in Gedang-Gedang, therefore, has less importance for farmers now than it did a decade or two ago.

[114] Figures are estimated from the land status maps in Direcktorat Agraria Propinsi Jawa Timur, 1984.
[115] The line for *tanah percaton* is counted as one person.

The jobs of mapping and measuring the plots and putting owner names on them were carried out in the early 1970s, according to the village secretary. Since then many owners have passed away and many plots have changed hands through inheritance and sale, though these changes are not entered into the *Letter C.* New owners simply pay the yearly tax due on the land using the name of the original owner. Thus, it matters little for the village administration that with each passing day the *Letter C* becomes more outdated. From a research standpoint, it would be instructive to have an updated version to compare with in order to appreciate land consolidation or fragmentation over time.[116] Ownership of Gedang-Gedang village land in 1996 is presented in Table 3.2.

Table 3.2 – Registered ownership of Gedang-Gedang village land in early 1970s by type (*sawah* or dry land/*tegal*) and size

size (ha):	<0.5	0.5-0.99	1.00-1.99	>2.00	(0.01-0.25)	All (ha)
Sawah	95.45%	3.41%	0.00%	1.14%	85,23%	15.083
Owners (N)	84	3	0	1	75	88
Average size	0.125	0.739	-	2.405	0.097	0.171
Tegal	42.58%	27.54%	18.54%	11.33%	22.88%	861.134
Owners	402	260	175	107	216	944
Average size	0.253	0.702	1.368	3.154	0.158	0.912
All land	42.44%	27.31%	19.01%	11.24%	22.90%	876.217
Owners	404	260	181	107	218	952
Average size	0.252	0.706	1.374	3.200	0.159	0.920

For a complete view of consolidation or fragmentation in the village, an analysis of the *Letter C* falls short because Gedang-Gedang's land is freely bought, sold and inherited by persons residing outside the village. The analysis of *Letter C* is also deficient as a measure of the landholdings of those in the register. Although his household's holdings are too recent to be in the *Letter C* under his own name, an example is the principal of the Gedang-Gedang elementary school. Residing in Batuputih Laok, where he owns 2 ha, he has 0.5 ha in Batuputih Kènè' and 3 ha in Gedang-Gedang (1 purchased, 2 inherited by his wife). He hires labourers for most of the work in the household's fields, and sharecrops out the rest. The listings in the *Letter C* do not take into account the land transfers that might have occurred during the transition to intensive tobacco farming that began in the late 1970s. A more useful picture of land access is provided by my 1996 Gedang-Gedang census, where households rather than land become the primary focus, and it is possible to count for each household land owned and sharecropped both inside and outside the village.

All three of the landless households in Gedang-Gedang are composed of elderly individuals, and in the case of two of them are integrated into larger *tanèan*. Though their members cook separately, they receive substantial assistance from their families. For this reason, they are not included in the figures below on landholdings (Table 3.3), which covers the 742 landowning households. With the

[116] There is talk of redoing the Letter C for the entire island, following a recent fire in the Pamekasan *keresidenan* land registration office in which many of the original *Letter C* for the island were destroyed. For some villages that had earlier lost their own copies no land records now exist.

post-fieldwork hindsight that comes from having to fit data into meaningful categories, a more flexible coding scheme allowing for exceptions such as these could have been made that would code them as dependent conjugal groups and integrate them into other households, despite their forming a separate *dhapor*. Taking into account assistance from outside the household was not possible for the large census, but could emerge in the sample group case studies and in specific studies on exchange (see Chapter Five).

Table 3.3 – Land ownership of all Gedang-Gedang households in 1996 (from field village census)

Ownership of land (ha)	<0.5 *	0.5-0.99	1.00-1.99	>2.00	(0.01-0.25)	All
Households (%)	38.95	44.61	14.02	2.43	20.08	
Households (N)	289	331	104	18	149	742
Average (ha)	0.292	0.638	1,259	2.514	0.213	0.636
Average (*lagghu*)	2.337	5.106	10.072	20.111	1.703	5.088
All-Indonesia % (1993)	45.29	20.67	20.90	13.14	n.a.	7.54

* size in hectares derived from respondent's estimates in *lagghu* (see discussion in text).

Madurese measure land in *lagghu*, equivalent to the amount of land one plow team (a man and pair of cows) can prepare in a half-day (4-6 hours). *Lagghu* ("morning", and also "tomorrow") also refers to the best time of day to do such heavy work, avoiding the heat of the afternoon. Farmers agree that the standard *lagghu* is equivalent to one-eighth of a hectare, and subdivide down to the quarter *lagghu.* Though this measure leaves room for inaccuracy,[117] measuring individual plots was not an option for such a large sample, so the reported size in *lagghu* was accepted as a reasonable average measure for comparison.

As can be seen from comparison with the data for Indonesia in Table 3.3, Gedang-Gedang farmers own less land than the average Indonesian (83.56 percent own less than 1 ha, compared to 65.96 percent for Indonesia). The overall pattern of landholding would probably compare more favorably in terms of inequality, however, due to the lack of advanced mechanization (notably tractors) in Batuputih, which places a limit on the size of the largest manageable farm size. The largest household holding reported was 29 *lagghu* and only 15 households (2 percent) reported holdings of over 2 hectares (16 *lagghu*). Tables 3.4 and 3.5 take into account both land owned and sharecropped by Gedang-Gedang households: the first table presents the breakdown in terms of size of land accessed, and the second considers the degree of inequality in land access.

[117] In his study of the Manding Daya community, Leunissen measured some fields and found the *lagghu* to average 1215 m^2, very close to the one-eighth hectare standard, though he noted variations between different types of soils (Leunissen 1982:53-54).

Table 3.4 – Land access for Gedang-Gedang households in 1996 (land owned + 50 percent of land sharecropped)

Access to land (in ha)	<0.5*	0.5-0.99	1.00-1.99	>2.00	(0.01-0.25)	All
Households (%)	38.01	45.15	14.29	2.56	18.33	
Households (N)	282	335	106	19	49	742
Average (ha)	0.297	0.644	1.255	2.487	0.145	0.647
Average (*lagghu*)	2.375	5.155	10.040	19.895	1.163	5.174

* size in hectares derived from respondent's estimates in *lagghu* (see discussion in text).

Landowners, many of whom are not from the village itself, pay a small tax on land and buildings (*PBB*) each year, collected by the village and neighbourhood heads based on the *Letter C*. All pay something, but those with small or poor quality holdings pay very little. In 1987, the rate was at most Rp 1900 for four *lagghu*, including buildings, increased to Rp 3700 in 1988 (equivalent to one or two days of wages in agricultural or other labour). In 1990, income taxes increased up to 50 percent in Sumenep, but farmers in Batuputih were not affected. Income tax is only paid by those with fixed incomes above a certain threshold (over Rp 15.8 million per annum in 2008), which none in the village reach.

Table 3.5 – Stratification of land ownership among Gedang-Gedang households in 1996

Household (HH) segment	No. of HHs	Percent of all land owned + 50% of land rented (742 HH)	Percent of all land owned (742 HH)	Average farm size owned (*lagghu*)
Top 1%	7	4.34	4.41	23.79
Highest 2%	15	8.18	8.74	22.00
Top 10%	74	26.32	27.10	13.64
Lowest 50%	371	26.41	26.37	2.68
Lowest 20%	148	6.60	6.56	1.66
Average	742	-	-	5.09
Median	742	-	-	4.00

The economic findings presented in this chapter are largely based on time allocation data from thirty-six Gedang-Gedang households, the landholdings of which are presented in Table 3.6. In comparing Table 3.6 with Table 3.4 (landholdings of all village households) it can be seen that the randomly-selected sample group lacks households with over two hectares of land (0 percernt compared to 2.6 percent in the village), and only 16 percent of the households in the sample have under a half-hectare of land (compared to 38 percent for the village). However, the most numerous group (holding 0.5-0.99 ha) is accurately represented by the sample (50 percent compared to 45 percent for the village).

Table 3.6 – Land ownership of 36 sample households, Gedang-Gedang, 1986

Sample group landholding (ha)	<0.5 *	0.5-0.99	1.00-1.99	>2.00	(0.01-0.25)	All
Households (%)	16.15	50.41	33.44	-	3.08	
Households (N)	12	18	6	0	4	36
Average (ha)	0.327	0.681	1.354	-	0.188	0.675
Average (*lagghu*)	2.617	5.444	10.833	-	1.500	5.40

* size in hectares derived from respondent's estimates in *lagghu* (see discussion in text).

The amount of land both inside and outside the village that is reportedly owned by Gedang-Gedang residents is equivalent to less than 54 percent of Gedang-Gedang's total available land, including *tanah percaton*. Part of this shortfall is due to the questionnaire's focus on agricultural land. Households were not asked to include the land on which their *tanèan* was situated, though this land is recorded in the *Letter C.* Gedang-Gedang land may be bought and sold freely resulting in many plots being owned by individuals living outside the village. The form of the village in a long strip and its indistinct boundaries serve as no physical or conceptual barrier to inter-village marriages and free-market land transfers, quite the contrary. The amount of land transferred to children who have married and settled outside the village appears to exceed the amount of land from outside the village that has been incorporated into the household through in-marriage. In the survey, one problem that was encountered was to elicit complete information on all the holdings of a new spouse. Insistent questioning sometimes revealed additional plots possessed or worked by the new household member, particularly if the land was situated outside the village. Ownership status in the case of land worked on a harvest sharing basis with parents was sometimes left ambiguous—as when its attribution to one child over another would create family tensions—and remained uncounted by either party. Finally, household members may simply underestimate their landholdings, underestimation being more common than overestimation for landholding.

3.3 Local conceptions of soil, plants and animals

Although most Madurese have little knowledge of the scientific terms and taxonomies, they have profound knowledge of their surroundings and use it to make the daily livelihood choices required of them. At least two dozen types of soil are recognized. Soil is differentiated by colour, water retention, fertility, tendency to stick, size of pebbles or rocks present, or other criteria. Amenability to plowing is habitually more central than fertility for deciding what to plant, perhaps because maize is almost always the foregone conclusion for Gedang-Gedang fields outside of the tobacco season. Seasonal cycles of winds are recognized and named for their signaling of the changing monsoon. As anthropologists have found in many societies, plants and animals are a major subject of ethnoecological knowledge.

In seeking to understand the livelihoods of the people of Gedang-Gedang and their relationship to their environment, one of the steps I deemed unavoidable was to constitute an inventory of local flora and fauna. This involved eliciting lists of plants and animals present complete with detailed information on their uses and cultural representations where appropriate. I sought[118] to use advances in ethno-science (Conklin 1954, Frake 1961), also known as ethnoecology, to elicit ethno-

[118] With the encouragement of Professor Georges Condominas.

botanical and ethnozoological terminologies and taxonomies through systematic formal methods, something that had not, as far as I was aware, been done in Madura.[119]

While suspecting that ethnoscience could provide cultural and ecological insights to complement participant observation and other ethnographic study, I was aware of the limitations of ethnosemantic models and criticism leveled at ethnoecology and ethnoscience. Although animal and plant taxonomies are considered appropriate domains for taxonomic representation as the members share "genetic" relations, there is always the danger that items or domains be forced into taxonomic structures (Weller and Romney 1988:31). The neat taxonomies may simply be artifacts of the controlled elicitation techniques used by the anthropologist rather than reflecting any cognitive organization of the ethnic group (Ingold 2000:161). And I accept the notion that the very fact of writing down a taxonomy and reproducing some of the utilitarian knowledge attached to the plants and animals in Gedang-Gedang in an essay that will be perused by scholars operating in a different cultural context by definition "dislocates" it (Ellen and Harris 2000:4-5). My limited study has no pretention to provide unique Madurese representation of the plant and animal kingdoms or to suggest that all Madurese share the same conceptual schemata. For the classification and sorting of items for each of the two taxonomies, I purposively used only one informant—albeit a man considered among the most knowledgeable of botanical and zoological life-forms in the village. I would expect that were another individual in Madura, or even in Gedang-Gedang, be asked to do the same job, the taxonomies might have come out somewhat differently. If for the sake of brevity I refer to Madurese taxonomy below, it should be understood that the taxonomy only represent one, albeit knowledgeable, informant's ordering. The informant was free from the need to consult with others to arrive at classificatory consensus, or defend his choices. He grouped earthworms under snakes, for example, rather than with worms, suggesting the kind of variation that could be expected in a comparison with other taxonomists.

[119] Roy Jordaan has written on Madurese classification of skin diseases, however (Jordaan 1982, 1985).

Figure 3.1 – Madurese plant taxonomy (partial view), with detail of a section of the Rebbha category (names beginning in uppercase are categories, in lowercase species)

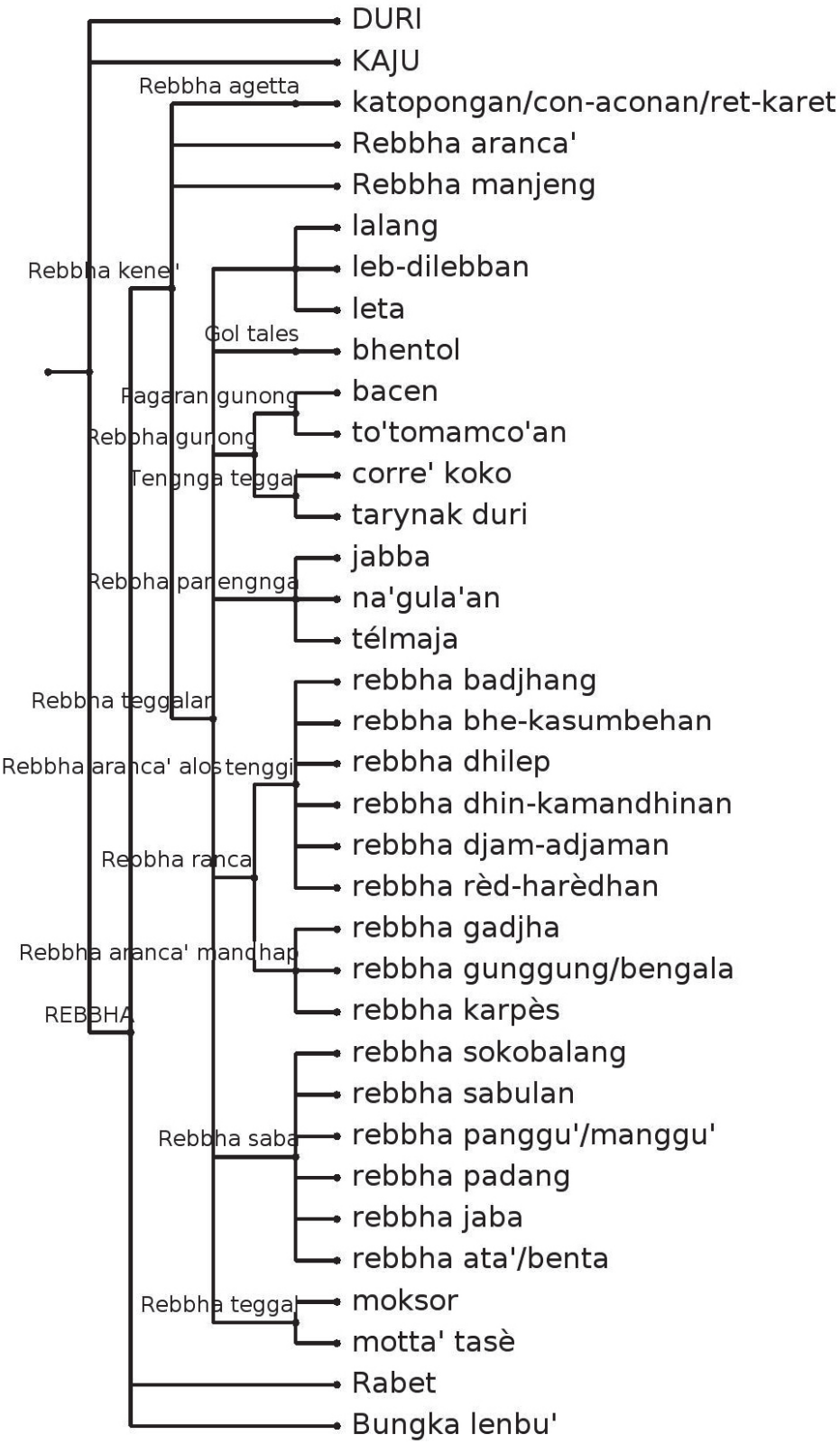
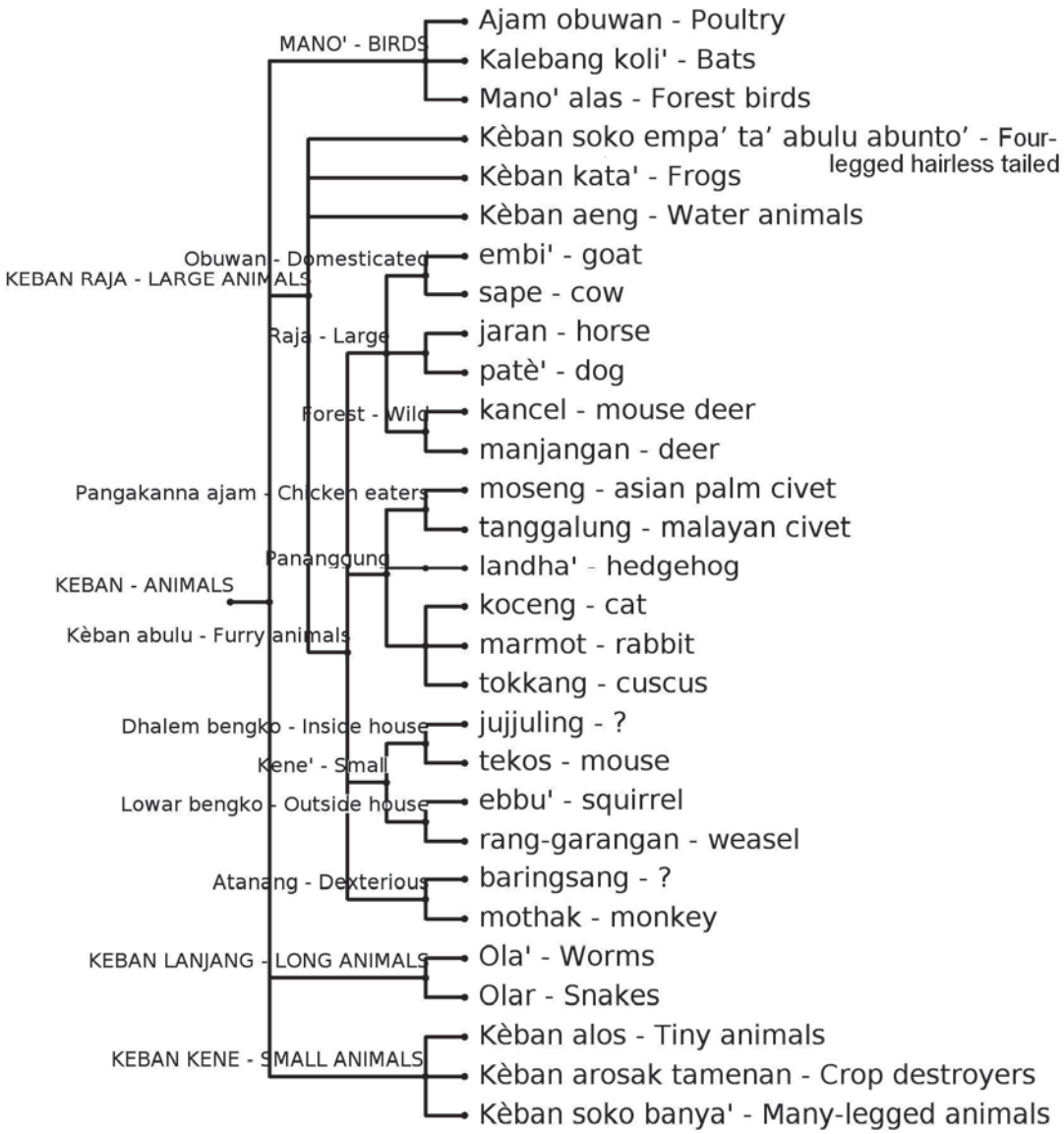


Figure 3.2 – Madurese animal taxonomy (partial view) and English gloss, with detail of a section of the *Kèban abulu* category (names beginning in uppercase are categories, in lowercase species)



Formal elicitation is perhaps most useful as "a skeleton to which only less formal techniques can supply the flesh" (Berreman 1966:351). Working in a poor region, I was particularly sensitive to the criticism that ethnosemantics and ethnoscience were liable to produce knowledge that was irrelevant or "trivial" (Berreman 1966). Decidedly, I wanted no part of an enterprise to produce "static, esoteric, and politically trivial taxonomies" (Harris 1976:339). Thus, I was determined that the taxonomy be a tool and not be an end in itself, and that the collection of terms be complemented by as much comparative and contextual information as was necessary to unravel the complexities of ethnoecological relationships in Gedang-Gedang. As I was to find, the terms, categories and stories relating to animals and plants are of considerable importance to the Madurese, who enjoy engaging in extended discussions which, it turned out, reveal numerous links between ecology and society.

Indeed, one of the early central hypotheses of ethnoscience, as exemplified by the Nida-Conklin hypothesis and Berlin, Breedlove and Raven's (1966) findings

among the Tzeltal, is that lexical differentiation is directly proportional to cultural importance. Berlin, Breedlove and Raven (1973, 1974) also found that folk taxonomies have a limited number of levels, often five, rarely six. D'Andrade (1995) has suggested this is due to the structure of features in taxonomies (each new level adding new features) and the limitations of short-term memory. In any case, the Madurese plant taxonomy pushes this limit, often reaching six and sometimes seven levels. An empirical appreciation of potential over and under-differentiation is not possible at this point, since I have not systematically compared the terminology with Linnaean biological diversity, and indeed the logic of attempting to do so is contested (Ellen and Harris 2000:4-5). The most important animal in Madurese culture and economy, the cow, is not over- or under-differentiated, as only one species is recognized by both Linnaean and Madurese taxonomy; however, differentiation operates on other than the species level based on horn shape, robe and other morphological traits. The latter are often artificially modified by Madurese stockbreeders. One example of over-differentiation which I noticed in the list of species is the *tanoker* (rank no. 22414),[120] classed under "long animals, worms" (2.2) is the pupua stage of the moth *Sesamia inferens* (Wlk.), which itself (*kakaper*, 43511) is classed under "small animals, crop-destroying" (4.3). Under-differentiation is also present in the identification of at least three separate species under the Madurese species *ola' kakapa.* An empirical study is not necessary to conclude that there is a very large degree of under-differentiation to the extent that the Madurese system rarely reaches seven levels, whereas Linnaean classification has recognized at least seven—kingdom, phylum or division, class, order, family, genus and species—and many more when higher (supra-) and lower (sub-, infra-) divisions are considered.

Whether they may be taken as confirmation or refutation of the Nida-Conklin hypothesis, the taxonomic diversity of *Rebbha* (including grasses as well as herbs), the many crop-damaging insects recognized, and the extra-zoological differentiation based on cow morphology serve to demonstrate the practical nature of Madurese classification. The same may be said in general regarding the category naming used throughout. The practical, utilitarian factor in Madurese classification can be illustrated, as has Hunn (1982:831) for the Tzetal data, by considering the disinterest of the Madurese taxonomist in adult Lepidoptera (butterflies and moths), but the great interest in the differentiation of their pupae and juvenile stages. Only the aforementioned adult moth, *kakaper,* or *Sesamia inferens* was considered worth noting, despite the taxonomist being encouraged to add any species that were lacking. The Madurese informant recognized nineteen species of *ola'* (caterpillar or worm) and grouped them into eight terminal categories. Like among the Tzetal, the various species of caterpillars are important for their propensity to destroy crops or cause skin irritation, thus their precise identification is essential (in addition, the Tzetal, though not the Madurese of Gedang-Gedang, consume certain species). Other examples of what appears to be a generally pragmatic approach to classification among the Madurese can be cited—the multiple categories for snakes and birds, either feared for their poison or their squeeze or prized for their skins or songs. On this point, I cannot follow the ethnoscientist Brent Berlin when he characterizes Tzetal classification (and hints that it could represent a folk universal) as "rarely […] based primarily on functional considerations of the organisms involved, such as, for example, their cultural utility. Less than half […] can be shown to have any cultural significance whatsoever" (Berlin 1973:260). The salience of the utilitarian factor in Madurese systematics is just too apparent and can

[120] Numbers in parentheses refer to the complete taxa with categories.

be found in the lists of flora and fauna taxa I present in Appendices B and C. The cultural significance of many of the taxa can be readily appreciated, although one must keep in mind that folk classification is a product of "complex, interacting factors," well summarized by Hays (1982:93): "biological discontinuities in nature, chance historical events, 'utilitarian' human concerns, human cultural concerns in a broader sense, intellectual curiosity, and constraints deriving from the nature of human perception and cognition." Without going too far out on a limb, I think that for Madura we might well borrow Ellen's felicitous remark on Nuaulu (Seram) animal taxonomy: "Practical problems do not exist totally independently of all their representations, and in a very real sense all classifications are, therefore, practical" (Ellen 1993:230).

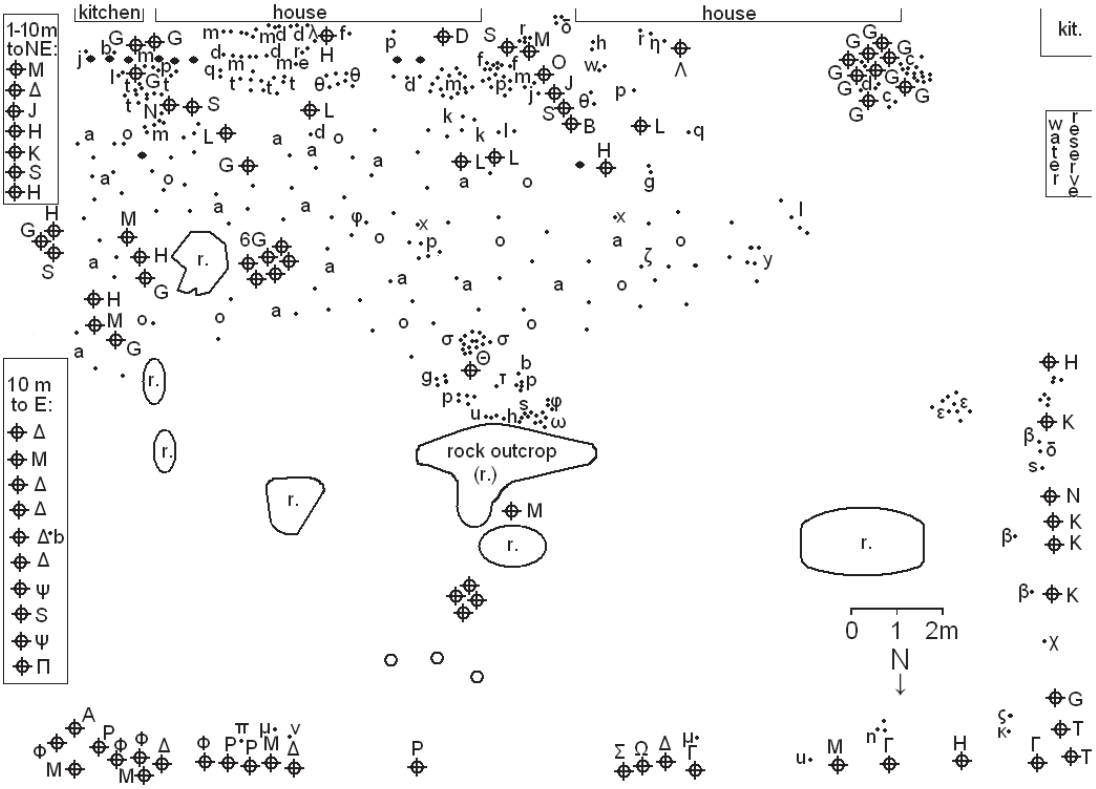
Beyond the general interpretation of the taxonomic exercise, it should be noted that some of the choices made could require more information—justification more IK (indigenous environmental knowledge)—from the taxonomist. The *kaju tobbha (Derris elliptica)* could have been put within the *Rabet* category since it is a liana. *Kolat* (*Polyporus* spp.) would appear to merit a separate category outside of trees, rather than under thorny flowering trees. In the absence of his explanation for these choices, I suggest these grouping were made on the basis of associations, i.e., the derris tends to found climbing on tall trees, while the fungi are often found in association with thorny flowering trees. More detailed study would need to be undertaken with the native taxonomist to fully understand the classificatory processes involved. We might then find that in the fourteen years since the taxonomy was drawn up, the changing context, globalization, memory and new forms of practical engagement with the environment have altered the way the same taxonomist would represent the species now prominent in his life.

Exploitation of the environment is a pragmatic exercise building on histories of trial and error, migration and exchange, and the ethnoecology of human-biota relations are encoded in culture and transmitted. Beliefs, rituals and religion may not be much reflected in the actual taxa, but their impact is far from absent in any discussion of animals and plants. Omens are said to come from the sounds of certain birds, reptiles and insects, and some animal parts are thought useful for traditional medicine, or for seeking power through ritual. It is sometimes suggested that native conceptions prevent "rational" exploitation of economically valuable resources. I could not find many instances where animals or plants were avoided for other than practical health or safety reasons, aside from pigs and dogs, two animals considered unclean for consumption by Muslims. Dogs are rare in Batuputih (I could only find two or three in the sub-district, one of which belonged to the head of police). Wild pigs disappeared in the 1950s, but before then they were consumed in time of war, and could always be sold in Sumenep to members of the Chinese community. In the 1996 questionnaire, I asked about food taboos and found that aside from the pig and the dog, which each have religious justification for their being forbidden food, few species were mentioned. A few people mentioned a family tradition against eating goat, considered a "hot" food that should not be consumed by those suffering from high blood-pressure; this perhaps suggests an origin for their particular family taboo. Interestingly, few villagers claimed they would not eat Great White Shark (*mondhung potè*) because one of their supposed ancestors had tabooed it. Like dogs and pigs in contemporary Madura, this example is takes even further the case of a consumption taboo being observed for an animal that has little chance of ever being offered on a plate. The white shark is the subject of a Madurese folk tale about a man who was sailing to the Banjar coast of Kalimantan when he came across a Great White Shark. The shark told him that in exchange for not harming him, and for leading him safely to shore, he would have to promise not to eat white shark

meat. If he or his descendents ever consumed the flesh, their skin would be severely damaged. To me this sums up the eminently practical nature of Madurese taboos: they are limited to rare, inaccessible, dangerous or prohibitively expensive species for which superior substitutes are readily available.

The word that symbolizes for me Madurese relations with the natural world is diversity. The wide range of plants and animals recognized and utilized by the people in Gedang-Gedang was a constant source of amazement for me. I realized that almost every species had a function, even weeds were of paramount importance (for uses see Appendix II). Figure 3.3 is a sketch I drew up behind a sample *tanèan* to illustrate the diversity of species that can be found in a fallow field.

Figure 3.3 – Plant diversity in a Temberean field 600 m from coast following maize harvest



Key to Figure 3.3 – Plant diversity in a Temberean field (see Appendix II)

Sign	Madurese name	English gloss	Sign	Madurese name	English gloss
•	rebbha	herb (lowercase)	d	kumeng	(unidentified)
⊕	kaju	tree (uppercase)	r	rè-sèrè'an	purslane
G	geddhang	banana	e	reng-perrengan	golden hair grass
K	kapo	kapok	f	rom-jaruman	love grass; snakeweed
N	nyior	coconut	y	nylateng	(unidentified)
S	sèrèkaja	sugar apple	h	mbi-mbi'an	(unidentified)
M	membha	neem tree	w	kol-tongkolan	nodeweed
H	marongghi	horse-radish tree	g	gelenggangsa	(unidentified)
T	tarébung	palmyra palm	x	karajep	commicarpus
D	dhalima	pomegranate	ζ	karokot	lima bean
Γ	coretek	life plant (succulent)	z	mako-makan	(unidentified)
Δ	dhadhap	Indian coral tree	s	ka'-sèka'an	asthma herb

Sign	Madurese name	English gloss	Sign	Madurese name	English gloss
P	pèlèh	khoi	ε	geredung	(unidentified)
Φ	palembhang	wodier	β	bhenoggok	Bengal bean
J	jambu	water apple	δ	cor-cor	(unidentified)
Π	perreng duri	bamboo	s	pas-pasan	ivy gourd
Ψ	baru	mallow	i	lis-bilisan	(unidentified)
Ω	kalak	Chinese tree	n	nior-nioran	palm grass
Σ	kalobur	golden shower tree	u	bacen	lantana sage
A	accem	tamarind	v	cepao	(unidentified)
O	jerruk pecel	lime	σ	to'-oto'an	(unidentified)
B	bintaos	wrightia	λ	rabbet po-seppo	argyreia vine
L	longghaj	acacia	φ	tong-rotong	(unidentified)
Λ	kates	papaya	η	ner-menneran	stonebreaker
Θ	berige	papita	ω	cem-aceman	(unidentified)
●	sabbhrang	cassava	τ	duri tongko'	prickly-pear cactus
A	arta'	green gram	χ	langker	angled loofah
O	oto' karpis	rice bean	ς	ka'semangka'an	tiger's foot morningglory
K	koma'	hyacinth bean	κ	kasembhoegan	skunk vine
C	cabai lèteq	bird chilie	μ	ghaddhoeng	intoxicating yam
B	obi kaburan	air potato	π	tal-ta'alan	(unidentified)
J	kontje	finger-root	m	moksor	water grass
L	lambukeng	(unidentified)	p	katopongan	candle bush
T	tarnya' bine	spinach	q	motta	nut grass
Θ	tarnya' duri	spinach			

3.4 The maize farming system

Maize has for centuries been the most important crop planted by subsistence farmers in Madura. The first introduction of maize to Indonesia might have been through Spanish or Portuguese traders to Menado in North Sulawesi in the twentieth century (Wigboldus 1987). In the early 1800s, Raffles ([1817] 1988:121-2) noted the growing importance of maize in upland Java, and that Madura had long established itself as the major maize producing area of East Java is clear from the statement: "In the more eastern districts, it is procured from the inhabitants of Madura in exchange for rice"(idem, p. 121). He mentioned three varieties found in Java, distinguished by the length of their growing season—seven-month (having large rich grain), three-month and forty-day varieties—considering the latter two inferior types (p. 122). Though Java is usually associated with rice cultivation, many parts of the island are unsuitable for rice farming. East Java, of which Madura is a part, is in fact one of the world's major maize producing regions. According to Montgomery (1981), only three Latin American countries, Mexico, Argentina and Brazil, have larger areas planted to maize; Indonesia now ranks seventh in the world in area and eighth in production (FAO 2003). By 1984, maize was providing the staple and most important source of calories for some 17 million of the 63 million rural people in the main producing provinces of Central and East Java, South Sulawesi and East Nusa Tenggara, with 70 percent of the production used for food for farm families. In Madura and East Nusa Tenggara, yellow maize is preferred, while elsewhere white grain is preferred (Dorosh et al. 1985; Djauhari et al. 1988). As the price of Madura's small yellow maize has risen well beyond the price of imported white corn, since the 1990s people have increasingly turned to consuming *jaghung jabba,*

the white corn considered unpalatable just a few years earlier, in order to sell the local variety, often marketed as bird food. Despite gains in production (increasing 4.7 percent per annum between 1977 and 1985) and in average yields (doubling between 1969 and 1985), Indonesia has had to import maize since 1973 due to the steady growth in household and industrial demand (Sudaryanto et al 1988:1).

3.4.1 Maize and associated crops

In Gedang Gedang maize is the main plant of an intercropped system; only in the last two decades have some farmers begun to monocrop maize. Green gram or mungbean (*arta': Phaseolus aureus* Roxb.), rice beans (*oto' karpis, Phaseolus calcaratus* Roxb.) soybeans (*kadhelli: Glycine max* L.) and cassava (*sabbhrang: Manihot esculenta* C.) are the crops most commonly planted between the rows of maize each season. Usually monocropped, peanuts are occasionally intercropped with maize. In the hills in 1986, one sometimes came across a field planted with alternating rows of maize and tobacco, but this is no longer practised. All Batuputih farmers plant local or traditional varieties of maize.[121] Their yield in grain is low compared to hybrid or high-yielding varieties, but attempts to introduce the latter have proved unsuccessful to date.

The varieties found in Batuputih, all flint (*Zea mays indurata* L.), are called *galtek, kodok* and *kertas.* Flint maize is more resistant to boring by pests and can be stored longer than the larger "dent" type. Many local farmers simply refer to the maize they plant as *jaghung mira* ("red" or "orange maize") or *jaghung kampong/lokal* (local maize) to distinguish it from the large cob maize found in Java and recent improved varieties (*jaghung poté* or "white maize"). The *kertas* variety is new to the area, the first seeds having been brought from Lenteng by an agricultural extention worker in 1982. If planted in pure stands the yields that can be obtained from these varieties are: *galtek,* 900 kg/ha; *kodok,* 1100 kg/ha; and, *kertas,* 1600 kg/ha[122]. Despite the higher potential yield of the *kertas* variety, over the years the *kertas* originally introduced has crossed with *galtek* and *kodok* in adjoining fields, leading to declining yields approaching those of the two local varieties. Maize pollen is produced in abundance, and in windy conditions common to Batuputih, may be blown kilometres away, fertilizing many ears in the process (Schusky 1989: 35). All three varieties are early maturing, and are left in the ground 60-90 days (usually 60-65 days) from sowing to harvest. In case of need, or a dry spell, at least some parts of the field can be harvested after 50 days. The ears are very small, the length of kernel coverage averaging 3-6 cm in length on cobs 2-3 cm in diameter.

Maize can be planted in all parts of Gedang-Gedang, except in sections of the northern hills where limestone outcroppings prevent any cultivation. In many parts of the hills, however, maize is grown in small patches amid outcropped rock. Farmers then make use of a digging stick to poke holes which will receive three seeds each, covering with soil. In less rocky fields, cows are used for the sowing. If the field is not suitable for rice cultivation, the farmer will plant maize twice during the year: *jaghung nimbhara'* ("west monsoon maize") or *gegerojan* ("rainfall maize") grown from October to January and *jaghung panèmoran* ("east monsoon"

[121] For scale drawings of the agricultural implements used in the Batuputih and Manding area, see Leunissen 1982:61-71.

[122] Average yields estimated from partial harvest in farm trials made by the subdistrict agricultural extension worker in 1982-1985. Values used here are *kring panem,* or weight of dry grains immediately after harvest. The maize will lose about 10-15 percent of its weight after drying in the sun and grinding, a yield called *kring giling.*

or "[pre-]dry season maize") grown from February to May. Nowadays, with the growth of potentially lucrative dry season tobacco, rarely will a third crop of maize be planted in June, but in the past some farmers would attempt to get a third crop in before the rains subsided completely at the end of the west monsoon. Less than three percent of the farmers were planting a third maize crop in 1986.

As soon as the first rains hailing the start of the west monsoon period *(mosèm bara')* arrive, usually in October for the south of the village, but sometimes as late as November, farmers begin plowing *(asaka')* their fields. The plowing for the first maize crop is called *asaka' palangan,* for the second *asaka' tolian.* A few farmers in the north plow without planting before the rains arrive in order as they say, "to work the soil, so it becomes fertile and produces big crops," and also no doubt to facilitate the job of plowing when the rains finally arrive. Usually several farmers will get together to plow each others' fields in turn, particularly for the first groundbreaking when the field is covered with weeds and crop stubble left over from the last harvest. If several teams are plowing together, they will follow closely behind one another with their plows cutting furrows a few centimeters apart.

Two plowing patterns or routes *(kadebeng)* are used by the plowing teams. In both cases the furrow *(lolosan)* is continuous. In the first pattern, the plowing is done in long loops. For the second, beginning with a large rectangle, the plowman fills it in to make concentric or spiral rectangles; once he arrives at the centre of the first large rectangle, he moves outward to create a new rectangle and so on until the entire field has been plowed. The number of loops made within a rectangle before moving on to another varies from two to five or more. In a variation on the second pattern to avoid making tight turns with the plow team, the plowman can begin a new rectangle before finishing the last. The centre of the old rectangle will be finished once the new rectangle's outline has been made. The field to be planted is plowed three times, over a day and a half or two depending on the condition of the animals, the number of teams taking part, and the amount of land to be plowed. When planting, plowmen often use a single furrow on the short sides of the loops in order not to disturb rows already sowed. Furrows are rather shallow, rarely more than 5 cm deep. Madurese ploughs are made of oak and teak wood. A landside runner holds an iron plowshare set horizontal to the ground, serving to lift and turns strips of sod on the curved surface of the runner (moldboard).

The household's husband and wife, or the mother and son do the sowing (*namen*). Planting the first maize of the rainy season will be done as soon as possible while the ground is moist. The woman walks behind the plowman as he advances, carrying a recipient containing selected maize seeds and a smaller proportion of the beans to be planted at the same time. With a regular movement of the forearm and hand, she drops the seeds into the furrow; this action is called *nerter.* About three grains are deposited every 20-30 cm in the furrow of one complete loop, then the person sowing sits out in the shade the following loop which serves to close the furrow over the seeds just planted, before returning behind the plowman for the next furrow loop. Spacing is determined by estimation. There is no plowing at right angles to the original furrows to provide markers[123] and string guides are only used sometimes for spacing cassava plants. Where outcroppings do not get in the way, farmers generally adopt a more or less regular cropping distance of 30 x 25 cm between plants. Plants are closer together in fertile soil than in poor soil, and closer if there are less bean or cassava plants intercropped with them. Usually cassava is planted along the edges of the field. The chickens, which

[123] Foster (1967:42) provides a Mexican example of such a spacing technique.

normally roam freely in search of their own food, are tied up in the stable while the planting goes on so they will not eat the seeds.

In difficult years when (like in 1986) the first rains and sowing are followed by an extended dry spell, numerous maize plants if not entire fields fail to sprout and die. The withered plants are replanted by hand once the rains return. While the *jaghung gegerojan* is sometimes difficult to get established, it eventually provides a slightly higher yield than the *jaghung panèmoran.*

About two to three weeks after the sowing, when the plants have reached 20-30 cm in height, the space between each row is plowed to remove weeds. This operation (*nocu*) is usually done once or twice in hot weather so the uprooted weeds will quickly die. One pair of cows and the driver working a half day suffices on one *lagghu*. The work goes very quickly and, the furrows being shallow, does not tire the cows. The precision of a properly trained pair of draught cows is such that they neither trample nor uproot the maize plants. In the hills and along the north coast, *nocu* is replaced or complemented by hand-weeding *(nyoso* or *arao),* or even by men or boys pulling the plow in place of cows. *Nocu* becomes impossible, or too demanding of the cows, in those fields having rock outcrops. About four hours are required to *nocu* 1 *lagghu* of maize, while to hand weed the same area would take a person twelve hours at least. Though weeding can be accomplished by reciprocal labour exchange like most other agricultural tasks in the north, quite often one has to pay to recruit enough labourers for a morning of work that will cost Rp 400 plus one meal per person. Men who plow or weed invariably served a plate of a mixture of maize, cassava, beans and shredded coconut commonly offered workers doing heavy work. Maize requires little maintenance, in principle, but from observations of planters it appears fields in the north receive more attention from their owners; for these farmers without the possibility to plant tobacco, the maize, beans and cassava are what provide the foundation for subsistence.

As long as Madurese have combined stock raising with agriculture, they have relied on cow dung to fertilize their fields. Collected in the stables, it is scattered on the fields several times a year before planting. While the Madurese in Gedang-Gedang continue to use large quantities of dung on their fields, chemical fertilizers were also being applied on many fields and crops by the early 1980s. Increased use of chemical fertilizers (mainly urea) throughout East Java was responsible for yield increases of about five percent per year during the 1970s.[124] Readily available in the area since the late 1970s, farmers in Gedang-Gedang have come to realize the responsiveness of their local maize to urea, as well as certain difficulties posed by such inputs. Though virtually all now apply urea to their maize crop, a few of the poorer farmers have sometimes been unable to come up with the necessary cash to pay for fertilizer inputs at the beginning of the season, and must settle for lower yields at harvest. I will return to the question of cow dung in the section on livestock husbandry.

All of the crops cultivated in Batuputih, except tobacco, depend primarily on rainwater. Although farmers are willing to exert much energy to water tobacco plants regularly (see below the section on tobacco), or carry water from a nearby stream to dampen a dry ricefield, none are willing to expend effort to bring water to support maize and beans planted in a field. The final job remaining before harvest is removing the flowers about 40 days after sowing. The top 50-75 cm is removed, a task taking an hour or two per *lagghu* for one person, or more often quickly by a larger group. The flowers will be much appreciated by the cows.

[124] Montgomery 1981. Farmers in East Java have made use of nitrogen fertilizers to an extent far beyond most other Asian maize farmers.

The maize is almost always harvested together with or a bit earlier than the bean crops. The stalks are cut a few at a time some 20 cm from the ground with sickels. A harvested field becomes covered with dozens of small piles. The piles can be brought straight back to the house for transformation, or the first job of detaching the ears can be done sitting down in the field. The ears are detached from the stems by hand and tossed into baskets to be unloaded in the *langghar*, in the house or in the courtyard. The unladen stems are piled to the side to be dried and used as cow fodder. At home, the farmers separate the largest ears destined for next season's seed grain, from the small and average ones. The envelopes *(kulètna)* of the selected ears are left on, but their stem is cut short with a knife for better drying. As for the other ears destined for consumption or sale, their envelopes are removed. The maize is then dried on the cob two days in the sun, usually spread on a woven mat in the centre of the *tanèan.* The ears of seed grain are dried and stored away in their envelopes, unless the grain is required for the next crop, for example the *jaghung panèmoran*, in which case the large cobs are shelled and the seeds dried two weeks before planting. Before storing, the seed grain will be sifted to remove any defective or undersize kernels. Grain is stored in a large plaited palm container mounted on bamboo legs. Sometimes the four legs are each placed in recipients of oil to deter ants and other pests. The large ears for next season's planting are stored with the grain or put in a basket in the rafters.

Most of the smaller cobs are shelled, save a few that are retained intact for the purposes of offerings. There does not seem to be any hand or mechanical corn husker used in Gedang-Gedang. Shelling maize is therefore done manually using one or both hand to grasp the cob while the thumb or thumbs push off the grains one by one. As the hard kernels are difficult to remove, the job eventually causes sore thumbs, particularly among the young children inevitably called on to help. The grain is dried further in the sun. Broken or damaged grains are fed to the chickens. Whoever is around the house during the many days that maize and other crops dry in the sun must constantly keep an eye on the sky for signs of rain and chase away scavenging chickens. The post-harvest operations for a 1/4 or 1/2 hectare farm will occupy the household over a period of about two weeks.

While the empty shelled cobs usually end up in a fire or thrown onto a dirt path to provide a pecking object for fowl or solidify a patch of mud, the other elements of the maize plant will be carefully utilized. The stems, leaves and envelopes are dried in the *tanèan* or propped up against a fence or building, then put away for future use as cow fodder when grass becomes more difficult to find nearby. Even the roots and stem bottoms render service: left in the fields, they rot and are transformed into humus.

Once the *jaghung gegerojan* has been entirely harvested, along with the bean crops, the field is "opened up" again and plowed. Anywhere from 3 to 15 days are then allowed to pass so stems and crop residues that have been plowed under can decompose and the weeds be eliminated and in this way provide organic matter. The shorter period is sufficient in the hot conditions found in the hills and along the north coast; a bit longer period is required in rainy or humid weather common to Jaruddin and Aresetengga As for its predecessor, the *jaghung panèmoran* requires that the field be plowed once again before planting, and then once at the time of sowing.

Intercropped beans, pulses and cassava

Farmers select several varieties from a number of available beans, all drought-resistant like the traditional maize, to intercrop with the main crop each season. In

the first season, farmers choose between *arta'* (green gram, *Phaseolus aureus*), *oto'* (rice bean, *Phaseolus calcaratus*), or *kedhelli* (soybean, *Glycine max*); for the second planting, *arta', oto', kedhelli,* or *muntjes* (kidney bean, *Phaseolus vulgaris*) are usually chosen. The various beans are sometimes left in the field after the maize is harvested to finish the longer growing cycle and collected when needed to provide additional cow fodder, once the pods are removed for drying. Other pulse crops such as *bhengngok* (Bengal bean, *Stizolobium aterrimum*) and *komak* (hyacinth bean, *Lablab purpureus*) are widely grown as vines on trees or fences. Most important after maize for subsistence, cassava (*sabbhrang, Manihot esculenta* Crantz.) is planted around the plots ("cassava follows the fence") wherever possible, one or more rows deep, placing one 15-20 cm long stem cutting in each pocket. When cassava is planted inside the field itself, three stem cuttings are put together in each pocket, leaving 2.5 m spacing between pockets in each direction. Cassava is planted along with the maize or later once the maize crop is established. It is left in the ground until well into the dry season, requiring plough teams to work around the growing plants, and can be harvested or left to grow depending on household requirements.

3.4.2 Returns from maize intercropping in 1986

A caveat is in order regarding the data on yields. The bulk of the data was gathered from recall from the 36 sample households in the 24 *tanèan,* since it was deemed best to not transform their land into trial plots and regiment their harvest practices in the hope of obtaining more rigorous measurements of yields. This would not have been desirable given the early misunderstandings of my status. As many felt my job was to make reports on the families, I was keen not to press them early on for exhaustive data on their economic returns. A more invasive approach might not have provided better data in any case. Separate fields are not usually harvested all at once, but over several days if not weeks, complicating measurement of total yields. Portions of the harvest may be sold or exchanged in the meantime, sometimes in small amounts taken out of the pile in the corner of the room or the recipient on stilts to trade with an ambulant trader. Therefore, for the sample households, I waited until near the end of the first fieldwork to systematically gather their yield data from recall, and recheck each of their landholdings and livestock figures.

Yield data was also gathered from official sources, but this was less useful for my purposes. The subdistrict statistics on yields of various crops were only used as a rough guide, since it was not possible to determine when and how the measurements were made. More readily useful were indications provided by the agricultural extension officer. I was confident that his measurement were made in Batuputih under controlled conditions on good fields, providing information on the approximate maximum yields possible locally, ranging from 900 kg/ha (for *galtek* variety) to 1600 kg/ha (for *kertas* variety). Finally, I made separate inquiries in opportunistic fashion. In one such case for three plots adjacent to my house, very high yields were claimed. I measured each field, obtaining 1088, 910 and 1077 sq. m., for total of 3037 sq. m. Harvests of each plot were done on separate days, and from recall were estimated as follows: I: 150-200 kg., II: 100-150, and III: 200-250 kg, yields when expressed in per/hectare give: I: 1379-1838, 1099-1648, and 1857-2321, respectively. The fields are ideally situated, flat with good drainage, and the soil is *tana bato'* considered one of the best for maize. The four adult members of this household and the farm labourers they employed put more effort into field maintenance than did most other farmers. These measurements were most useful as guides to "best practices" or checks to make sure that the sample group reported

yields were plausible. In the end I preferred to go with the systematically gathered data from recall to a questionnaire that was the same for each, on the assumption that at least if errors were made in reporting inputs and outputs, at least they would tend to cancel each other out within the large sample group.

That the yields from all the sample households were less than the optimum yields claimed was not surprising, since my sample group occupied not only the best fields, but a collection of above average to below average fields, none of which can be considered optimal, but which together might arguably constitute a representative sample of Batuputih fields from south to north. On this variety of landscapes, slopes and soils, households applied varying amounts of organic and chemical fertilizers, and some households used none of the latter. Nearly all the farmers intercrop maize with beans and sometimes cassava (though usually cassava is on the edge of the field). This lowers the maize yield substantially, but provides other benefits in terms of nutrition and soil fertility, not to mention high quality fodder for cows. An additional reason for the lower than optimal yields is that for the fall maize crop yields were skewed by the delayed rains, particularly in the northern half of the village. In Table 3.7, average yields are presented for maize and beans for each neighbourhood in each of the two seasons.

Table 3.7 – Yields (expressed in kg/ha) for two main intercropped maize/bean crops in 36 Gedang-Gedang sample households in 1986

Neighbourhood:	Jaruddin	Arestengga	Gunung Papan	Temberean	Gedang-Gedang
1st maize *jaghung gegerojan*	485	715	648	679	634
beans	55	55	29	80	53
*households/*lagghu *planted:*	*6/37*	*8/26*	*12/64.5*	*10/55*	*36/182.5*
2nd maize *jaghung panèmoran*	492	922	653	679	676
beans	66	54	28	44	43
households/lagghu planted:	*6/27.5*	*8/26*	*12/66.5*	*10/55*	*36/175*

Considerable variation in yields and fertilizer application is found in Gedang-Gedang. Yields measuring close to zero are often reported in disgust by farmers experiencing a drought during the critical growth periods. When these farmers are encouraged to consider each plot individually, they will usually, though not always, admit that the near-zero yield was for a portion of their holdings, and that overall the yield was a little better. Average yields are pulled down by the poor families who are unable to apply any fertilizer or can only afford to buy a few kilograms of urea per lagghu. Their yields can be as little as one-fifth the yield received by other farmers. Organic fertilizers are only just beginning to make an appearance locally, and are not widely used. The low Jaruddin yields do not seem to be due to fertilizer application, higher than average, but perhaps some of the households there are more focused on tobacco and other local income-earning opportunities. One household planting 1.5 ha in maize (accounting for 32 percent of the neighbourhood total) no household labour available most of the time for maintenance of their large fields because the head was often in Sumenep earning money as a pedicab (*becak*) driver. As the table after the next shows, Jaruddin and Arestengga farmers do not do hand weeding of their maize plants to the extent that they do in the north of the village, a

factor that certainly lowered yields in each neighbourhood. Only one household planted some maize in the third season and obtained a very low yield (26 kg of maize and 1.8 kg of beans for 0.25 ha planted). This and the low yields in the two main seasons lead some observers to conclude that Madurese plant maize primarily as a fodder crop. The role of maize as a fodder crop is indeed manifest, though one cannot discount the value of the harvested maize for household subsistence, even when it amounts to only 200 kg/ha. Typically, the poorest families, who cannot afford chemical inputs, consume more cassava planted around or in their fields, thus ensuring adequate food subsistence.

The productivity of planting traditional varieties of maize cannot be determined solely by comparing local yields with those obtained by "improved" varieties in other agricultural systems. Instead it is necessary to examine the returns to labour actually obtained by farmers, and for this we need an idea of the capital and labour inputs involved. Table 3.8 considers tools, seed, fertilizer and labour inputs first for the village as a whole and broken down by neighbourhood. The net value of the crop represents the gross value of crop minus the value of tool replacement, seed, fertilizer, wages and harvest shares, all expressed in Rupiah. Labour inputs only include wages paid and the value of harvest shares, and do not include the value of meals provided or exchange labour for which the labour provider expects reciprocal labour on his field from the labour recipient in lieu of pecuniary or in-kind compensation. None of the 12 households in Gunung Papan paid cash wages, two out of six did so in Jaruddin, two out of eight did so in Arestengga, and four out of ten did so in Tamberean. The majority of families in the sample, therefore, worked their fields using household labour, and possibly made use of exchange labour. Since exchange labour must by definition be repaid, it is considered a proxy for the household's own labour performed on another day and field and is not included in Table 3.8 to avoid double-counting.

As expected, amount of inputs and yields vary considerably from one household to another, though they do not show up in this aggregate table. The presentation can, however, reveal differences in planting strategies in each neighbourhood. The absence of hiring-in wage labour shows that farmers in Gunung Papan rely on household and exchange labour exclusively. Surprisingly, along with households in Temberean, they receive on average higher yields on their maize crops than do their neighbours in Jaruddin and Arestengga, though the latter fields are more fertile. These two observations are linked. The lack of close access to water in the hill areas has prevented tobacco cultivation, obliging the households there to concentrate on their food crops. Free from the intensive care of tobacco plants, they can engage in activities that improve the fertility and yield of their land, or plant additional plots in food crops. More work in terracing and mulching was noticed in the hills than in the lowlands in the 1980s. I even noticed long term efforts to remove limestone outcroppings from one field in Gunung Papan using sledgehammer and crowbar, a particularly thankless job of reclamation. Without the possibility of high returns from tobacco, hill residents have the time and willingness to devote additional energies to their home gardens and field weeding. The higher maintenance inputs are borne out by the time allocation data on time spent in specific maintenance tasks (Table 3.9).

Table 3.8 – Average per household maize and bean planting, inputs and yields for 36 households, Gedang-Gedang, 1985-1986 (values are in Rupiah, unless otherwise noted)

- 1st maize *jaghung gegerojan*	Gedang-Gedang	Jaruddin	Artestengga	Gunung Papan	Temberean
number of *lagghu* planted	5.07	6.17	3.25	5.38	5.50
tools	4499	7992	4375	3033	4260
seed @175/kg	2826	3649	2026	2897	2885
fertil @135/kg	7205	9068	6265	5850	8467
wages	3411	4950	3275	0	6690
harvest share	1201	5167	1094	292	0
total yield maize (kg)	402	374	290	436	467
total yield beans (kg)	34	42	22	19	55
total value	90783	90829	64286	88697	114458
net value maize+beans 1	71641	60004	47251	76625	92155
amount sold	22829	9753	4420	24923	42890
own consumption	48812	50251	42831	51702	49265
- 2nd maize *jaghung panèmoran*					
number of *lagghu* planted	4.86	4.58	3.25	5.54	5.50
Tools	382	0	1313	271	0
seed @175/kg	2675	2749	2026	2897	2885
fertil @135/kg	6787	6680	6265	5040	9367
Wages	3242	3500	3600	0	6690
harvest share	910	3417	1094	292	0
yield maize (kg)	411	282	375	452	467
yield beans (kg)	26	38	22	19	30
total value	87477	72142	78789	90651	99821
net value maize+beans 2	73481	55796	64492	82152	80878
amount sold	18269	6836	4420	24923	28224
own consumption maize+beans	55212	48960	60072	57229	52655
net value of cassava	16651	3583	3383	22396	28213
net value maize+beans+cassava	90132	59379	67875	104548	109091

Table 3.9 – Average time (minutes/day) spent in specific maintenance tasks, by neighbourhood, Gedang-Gedang, 1986-1987.

Activities:	Jaruddin	Arestengga	Gunung Papan	Temberean
Hoeing and field preparation (except plowing), weeding various crops and weeding/aerating maize	4.54	4.76	16.71	11.70
portion of above specifically for weeding/aerating maize plants	0	0	13.03	10.99
Applying cow dung to fields	2.48	3.17	4.35	2.84

Although the comparison is based on a small number of observations, Table 3.9 demonstrates the higher maintenance inputs in the north. The contrast is even more striking when one considers that Jaruddin and Arestengga data include maintenance activities associated with the tobacco and rice crops, absent in the two northern

neighbourhoods. Tobacco and rice for those who plant it receive all or nearly all the maintenance attention in the southern two neighbourhoods.

Table 3.10 – Time allocation observations and time equivalent for maize and intercrop production and transformation by age and gender group in 36 Gedang-Gedang households, 1986-1987

	age/ gender:	M > 15	F > 15	M 6-15	F 6-15	M 2-5	F 2-5
TA OBSERVATIONS	*6606**	*2412*	*2466*	*1064*	*664*	*(318)*	*(259)*
OWN FIELD:							
field preparation, planting	143	93	29	13	8	0	0
weeding, *nocu*	102	64	29	3	6	0	0
fertilizing, insecticide, dung	41	23	16	1	1	0	0
harvest	121	37	68	7	9	0	0
crop transformation	154	21	116	5	8	2	2
marketing	30	2	23	2	3	0	0
Subtotal	591	240	281	31	35	2	2
EXCHANGE:							
field preparation, planting	24	19	3	2	0	0	0
weeding, *nocu*	5	5	0	0	0	0	0
fertilizer, insecticide, dung	0	0	0	0	0	0	0
harvest	9	4	2	1	2	0	0
crop transformation	3	0	2	0	1	0	0
marketing	0	0	0	0	0	0	0
Subtotal	41	28	7	3	3	0	0
Total	632	268	288	34	38	2	2
TIME (avg mins >6/day)							
OWN FIELD:							
field preparation, planting	54	28	8	9	9	0	0
weeding, *nocu*	36	19	8	2	7	0	0
fertilizer, insecticide, dung	13	7	5	1	1	0	0
harvest	45	11	20	5	10	0	0
crop transformation	52	6	34	3	9	5	6
marketing	12	1	7	1	3	0	0
Subtotal	213	72	82	21	38	5	6
EXCHANGE :							
field preparation, planting	8	6	1	1	0	0	0
weeding, *nocu*	1	1	0	0	0	0	0
fertilizer, insecticide, dung	0	0	0	0	0	0	0
harvest	5	1	1	1	2	0	0
crop transformation	2	0	1	0	1	0	0
marketing	0	0	0	0	0	0	0
Subtotal	16	8	2	2	3	0	0
Total	228	80	84	23	41	5	6
age/gender weighted	241	102	111	13	15	(1)	(1)

* The number of observations for each group is presented in italics. The first figure is the total number of observations excluding the infant and toddler groups (ages 0-5). Totals may not add up exactly due to conservation of decimal places from spreadsheet data.

A means of optimally scheduling labour effort, work exchange cannot be similarly discounted though in calculating labour inputs. Following Table 3.8, the time allocation data will provide a way of estimating total labour inputs (Table 3.10) and returns to labour. The calculation of time spent in separate activities is a function of the number of observations, as follows: time = number of observations x 720 minutes / total number of observations.

Labour productivity is measured by dividing amount produced by unit of time worked (Reyna 1976:193). Sign of neither cultural evolution nor economic efficiency, length of work effort must be calculated for all productive and reproductive activities because only then can it demonstrate variations in the ways societies allocate time between them in specific environments. A corollary is that insufficient knowledge of that specific environment condemns any efforts to sketch out these variations. In calculating productivity or returns to labour in an intercropping system, it makes more sense to consider maize, beans and cassava together as a single crop. This is because the operations are shared between crops, exemplified by the two recipients—one for maize and one for beans—held by the person (usually a woman) dropping seeds into the furrow behind the plow team. Cassava is planted and harvested separately, but takes advantage of a field in most cases already prepared primarily for maize.

There are several ways to calculate the returns from labour for these crops. None are entirely satisfactory. The first is to interview farmers to find out the amount of time they require for each individual task, to arrive at a figure for total labour input. This is then used to derive a per/hour or per/day rate based on the value of the crop(s) minus expenses. The weakness in this approach is that farmers can estimate how much time one or two people take to complete a given task in an ideal sense, but in reality the work effort may not be continuous, and moreover may be shared by additional children or neighbours. A second approach to calculating work effort is made possible by the time allocation data, since the data was coded with sufficient detail to provide daily average work time for each type of activity involved. The strength of this second approach is its ability to provide rigorous measures of the significant contributions of female and child labour both in absolute terms and in comparison to the contributions of men. Controlling for the still commonly found gendered perceptual bias comes at a cost, one which I feel is justifiable: limits in the number of data points in the random spot-check technique mean that analysis must necessarily be based on aggregate data. However, I complemented this data with informal interviews. Discussions with farmers on a weekly basis over a year period were essential for understanding how decisions are made in terms of capital and labour allocation, planting strategies and fertilizer application. By administering the questionnaire at the end of this period, I was in a better position to understand the responses and clarify details and inconsistencies on the spot.

A number of points need to be made in order to interpret the time allocation data presented in Table 3.10. First of all, observations of field preparation, weeding, planting, watering, transformation and sale conducted between 1 May and 1 October in the tobacco-producing households were removed from this data set in order to accurately tally maize and intercrop operations. Second, it is likely that the figures for exchange labour are underestimated, due to the practical impossibility of observing all work done by sample individuals. Exchange labour is particularly susceptible to underestimation because most observations are done at the home, and may miss work done while away. Reports of household members or neighbours present are not always available, resulting in the activity being coded “away” or “unknown.” Third, although the work of adults would appears to be by far the most important component of household labour if one looks at the number of observations at the top of Table 3.10 (in italics), a glance at the same figures expressed in time equivalence shows that the contribution of children is anything but negligible. This is due to the absolute totals taking into account number of observations, which differs for each age and gender group. Fourth, I must explain the inclusion of columns for toddlers aged 2-5, not generally considered part of the

household labour pool. Though the revelation of four cases of "work" is less than earth-shattering, the data are added merely to illustrate how the socialization of household labour begins at an early age. The two cases in which girls were involved were "removing ears from cornstalks" and "threshing beans," while the boys were seen "arranging the drying of crops" and "seeding or pitting crops." Parents actively encourage toddlers to participate in safe group activities such as the above where they can be easily looked after.

It is now possible to arrive at an approximation of returns to labour for maize and intercrops. To reduce the margin of error as much as possible, I maximize the number of observations by using the figures for time and economic returns for the entire sample group (see Appendix I for a description of the sample group and time allocation methodology). This is justifiable because all households in the sample planted maize in 2006. If we use the data from this full year of observation for all sample household members six years of age and older, and we count one person from each age/gender class aged 6 and over, we would find that maize and intercrops including cassava provide an average net return to labour of Rp. 116 per hour, or approximately Rp 932 per 8-hour work day.[125]

But the method of calculation in the last paragraph corresponds to a model household of two parents and two children of each gender aged 6-15. From the data above, children aged 6-15 would be shown to provide 28 percent of the total time spent in maize and intercrop activities in this model household. However, as we might suspect, Gedang-Gedang households do not correspond exactly to the two parents-two children household. Aggregate household composition of the 36 households over the year of observation is as follows: Male adults: 1.28 per household; Female adults: 1.32; Boys 6-15: 0.56; Girls 6-15: 0.36; Toddler boys 2-5: 0.14; Toddler girls 2-5: 0.14; Infant boys: 0.07, Infant girls 0.01. The average family size is not quite 4.00 individuals, but is 3.87 individuals.[126] The solution is to multiply the average time allocated by each age/gender group by the coefficient of size, so that we have an accurate total of the work input per household.

When the time allocation data is correctly age/gender weighted (see last line in Table 3.10) and used as the basis for the calculation, we see that Gedang-Gedang families allocated 241 household minutes per day, resulting in an average net return to labour of Rp. 110 per hour, or approximately Rp 883 per 8-hour work day.[127] This time, we see that children's input to labour is only 11 percent of the total (not 28 percent). The important lesson that can be gained from comparing the "erroneous" with the actual child input is that while children in a model household will provide an important part of household labour—between one-quarter and one-third of all work--the households in the sample, and indeed in Gedang-Gedang generally, do not even reach half this level of child contribution because they are lacking children in comparison to the "model" household (see Chapter Six on fertility patterns).

The returns to labour of Rp 883 are higher than the highest full-day rate in early 1986 for heavy adult agricultural wage labour (hoeing, paid Rp 786 per day,

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[125] The calculation is as follows: Rp 90132+71641 average returns for first and second maize crops = Rp 161,773 / (365 days x 228 household minutes average time per day) = average returns to labour for maize and intercrops and cassava of Rp 1.94/min = Rp 116.48/hr = Rp 931.86/8-hour day. Figures may vary slightly as decimal places were conserved from the spreadsheets.

[126] Children under 6 are left out of the calculation of returns to labour.

[127] The calculation is as follows: Rp 90132+71641 average returns for first and second maize crops = Rp 161,773 / (365 days x 241 household minutes average time per day) = average returns to labour for maize and intercrops and cassava of Rp 1.84/min = Rp 110.35/hr = Rp 882.80/8-hour day. Figures may vary as decimals were carried forward.

though the three basic meals included would even it out). Average per hour returns for adult agricultural workers in 1986 ranged from Rp 49 to 87 per hour (except plowmen with their own cows) before doubling or tripling after the forty-five percent devaluation of the rupiah in September (see below, Table 3.16). Maize and intercrop activities such as weeding, harvesting and transformation of harvests can take advantage of all available household labour. An adjustment might be warranted to take into account the time spent transforming maize crops in the evenings (and thus not captured by the time allocation study), jobs all members including children and neighbours can take part in while socializing. Perhaps this additional work would bring down the returns to labour by about 10 percent.

Even the maize intercropping system is subject to the vagaries of climate and soil. In 1996, one farmer in Jaruddin reported the *jaghung gegerojan* on his fields never provided much bean harvest, only between 1.5 and 3 kg per *lagghu.* That year the first crop provided no beans at all, and his maize only produced 12.5 kg per *lagghu* (100 kg/ha) due to heavy rains just after planting then a dry spell that lasted until harvest. Even if the beans do not provide pods, he reasoned, he will still continue to plant them as a fodder crop. And this may be one of the most important uses of maize, as dry season fodder for cows, a valuable and expensive commodity when scarce.

3.4.3 Maize and intercrops, 1986-2009

It is possible, by taking a few liberties, to compare the returns for labour to maize and intercrops over the 23 year period this fieldwork was ongoing. For this, I assume that the farming systems have changed little in the intervening years, an assumption I make because in 2009 the crops planted have remained the same, with perhaps additional beans being planted to take advantage of prices that have risen more than for maize. Farmers have continued to resist moving to higher yielding varieties, a move that would have no justification now as the price of their flint maize has increased ten-fold, reflecting the growing market for small kernel maize to feed caged birds throughout Indonesia. What have changed are their consumption patterns, as now almost all the local maize is sold, and in turn they buy more rice and the standard large cob dent maize imported from Java for household needs. I also assume, for the benefit of the projection, that the time allocation for the same families remains the same, i.e., that they were all transposed without change in age or composition (which they were most definitely not). The justification for this time-warp is that technology has remained similar, no mechanization has occurred in farming maize and intercrops, and farmers still depend on a similar package of inputs. I further assume that yields have not changed, perhaps an unjustified assumption, but one that will have to do because I did not collect new yield data. I could have updated their land-holdings, but to keep the comparison valid I have elected not to do so.

I have taken the time allocation data as set in stone, and updated all the prices for harvests and inputs for the 36 families. The only price that I could not update was the value of tools, which I therefore calculated using the amount spent in 1986 and multiplying it by a factor of 1270 percent which is the increase in the prices of the basket of 27 items purchased by households and recorded at regular intervals. The prices of other inputs and outputs are based on their respective price increases between 1986 and 2009. Where prices for certain commodities were not available for mid-1986, I used the nearest values, in most cases from early 1987. As I do not have the value of cassava for 2009, and to simplify what turned out to be an

extremely arduous series of calculations, I am only using the first maize crop as the example, possible because inputs and outputs for each season were differentiated in the original study. The time allocation for cassava is minor compared to maize, and I assume that the time spent in planting cassava in the first season will be offset by the time spent harvesting it in the second, justifying a simple halving of the time observations for a year of maize to equal the time spent in the first season (thus, time allocation for the first crop is 241/2=120 household minutes per day). In the first season, there is no income from cassava, so it makes more sense to use the first season for this projection. The results from this model are presented in Table 11.

Table 3.11 – Projection of inputs and outputs for 2009 maize and intercrops for 36 Gedang-Gedang households based on 1986 data with factoring in of intervening price evolution

1st maize *jaghung gegerojan*	1986	2009 household maize sale and consumption as in 1986	2009 household selling 90% of flint, replacing with dent maize
number of *lagghu* planted	5.07*	5.07	5.07
tools	4499	57114	57114
seed @175/kg	2826	35546	35546
fertil @135/kg	7205	144106	144106
wages	3411	108535	108535
harvest share	1201	12529	12529
total yield maize (kg)	402	402	402
total yield beans (kg)	34	34	34
total value	90783	1031402	1031402
net value maize+beans 1	71641	673571	673571
amount sold at 1986 levels (31.87% of net value)	22829	214641	
own consumption at 1986 levels (68.13% of net value)	48812	458929	
(a) amount sold reckoned at 90%			606214
amount consumed reckoned at 10%			67357
(b) replace 21.87% shortfall flint maize with dent maize at 2009 market price (1550/kg)			136135
(c) replace 21.87% shortfall beans at 2009 market price (8875/kg)			65251
net profit after consumption	22829	214641	(a -(b + c)) 404827

*Figures in this table may vary as decimals were carried forward.

In Table 3.11 I have presented two scenarios, one in which consumption patterns remain in 2009 as in 1986, the other, more realistic, where households have switched to selling 90 percent of their flint maize to purchase the cheaper (and less tasty, unfortunately) dent maize. In 2005 and 2009, I learned that few were consuming the flint corn because of the Rp 325 average price difference (in 2009) between the price of dent maize and the price they could obtain for the local variety.

The price differential is sometimes significantly greater depending on the quality of the commodity arriving from Java or from planting elsewhere in Madura. From my observations, the villagers in 2009 still consume about 10 percent of the local maize as a treat or for convenience.

If this projection is correct, net profits after consumption have risen some 1785 percent while, as noted earlier, a basket of commodities purchased by farmers has risen "only" 1270 percent. This could be seen as a welcome, though not phenomenal increase in welfare for the average farmer. If the increase in IR Pelita milled rice over the same period (1471 percent) is used as the yardstick, the farmer's position can still be judged an improvement but not by far. The improvement has not been reached without taking speed bumps along the way, such as spikes in prices for certain commodities, falls for their own crops at times, devaluations, and of course the 1998 monetary crisis. In recent years, needs and desires have changed and many new opportunities to spend money exist, particularly for the schooling children are increasingly insistent for, or consumer goods brought by globalization of which the most ubiquitous symbol is the cell phone now owned by most villagers. To keep ahead of globalization, and still partake, most villagers downgrade the quality of what they consume, from dent maize to second-hand phones to Chinese-built motorcycles.

The returns to labour are calculated using the net values, since household consumption is considered an output to labour just as if it were sold. The value of the first maize and intercrops (Rp 71641) was slightly lower than half of the combined yield of the two seasons, due to the loss of cassava yield, thus the returns to labour for the first maize in 1986 is Rp 98 or Rp 782 per day. In the 2009 projection, it is found that returns have risen to Rp 919 per hour of household work[128] or Rp 7351 per 8-hour day. Here is the most surprising finding: while in 1986 the returns per day were almost exactly the same as for heavy agricultural work, in 2009—despite the almost ten-fold increase—they were now lagging behind agricultural wages by at least a factor of three. The phenomenal rise in wage labour will be covered later in this chapter.

3.5 Rice cultivation

Rice cultivation is relatively unimportant in the village and for most of the households, and was thus not a focus of this study. Few own *sawah,* although occasionally people without it join in operations as part of labour exchange or to obtain a small part of the harvest. Fifteen and a half *lagghu* were planted in 1998 by sample households in Jaruddin and two *lagghu* in Arestengga. Just over half of the Jaruddin area was planted by one household, who hired workers to do much of the work. One Jaruddin family sharecropped in one *lagghu* for which they only earned Rp 2820 after deducting expenses and the harvest share for the owner.

Few will choose to plant maize in a field that can support rice cultivation, since the gains from rice are superior though more labour inputs are required. Most who plant rice do so in the middle of the rainy season, following a maize crop. IR36 is the variety preferred by many farmers in the area because it is fast maturing, normally requiring from under 110 to 130 days (the sample group rice crops appears to be on the fast end). The rice is not photosensitive, thus it depends basically on

[128] The calculation is as follows: Rp 404,827 average hypothetical returns for first maize crop = Rp 404,827 / (365 days x 120 household minutes average time per day) = average returns to labour for maize and intercrops of Rp 9.24/min = Rp 554.56/hr = Rp 4436.46/8-hour day. Figures may vary as decimals were carried forward.

water and climate. Where rains are unpredictable a fast growing variety presents less risk that its growth will be halted by a dry spell, and farmers can be assured of getting in their two food crops each year.

Due to the small area devoted by a few households to rice cultivation, and subsequently the insufficient number of time allocation observations of rice operations on which to base any conclusions, it is not possible to use the time allocation data to calculate returns to labour, even by considering only the data from the families concerned. Instead, the farmers planting rice were interviewed to find out approximately how much time was required for each operation. Despite their being important variations, a summary of the responses can be offered so as to arrive at a ballpark figure of returns from rice farming. For a complete and detailed discussion of rice cultivation techniques and operations on rain-fed fields in a nearby village (Manding Daya, Manding sub-district) see Leunissen (1982).

Field preparation for rain-fed rice is more involved than for maize. The field must be level, and have good water retention and drainage characteristics. Bunds (walls) are required around the field to enable water management, and these require regular maintenance. In 1996, I witnessed an attempt to create a *sawah* from land that had formerly been used for maize, and after five days of plowing and replowing, raking and toiling in mud and water the farmer gave up his plan. In a season, a person-day might be sufficient for the regular maintenance of a pre-existing ricefield. The soil must be among the most fertile soil, a type called ‘black soil’, which is considered best. Some *sawah* have ‘white soil’ with few of the round lime stones found most everywhere else. Any maize stalks remaining in the field are cut short. The *sawah* is plowed thoroughly for from 1 to 3 half-days by a plowing team to push down any roots that remain. The plowing is in mud, so it is much heavier work for the cows and plowman than for a dry maize field. This is followed by the team trailing a harrow. Hoeing is needed in the corners and to even out clumps left by the plow. After the harrowing is done, additional smoothing can be done with hands and feet if needed. A small area in the corner of the field is used for the seedbed. Pre-germinated, the best separate threshed grains from the last rice crop, which were stored on the panicles, are scattered on the bed and the bed covered with water. After 40 days, the seedlings will be pulled out of the seedbed and tied in bunches. The transplanting is then done to the entire field, which has been harrowed and is sufficiently moistened to receive the seedlings. From two to five person days are required to do this on one *lagghu* of *sawah.* The *sawah* must not be allowed to dry out while the plants take root. A few days later shoots that have not survived are replaced. Weeding and fertilizing is done twice after transplanting, about 10 days apart and requiring about two and a half days work in all. Weeding will be unnecessary once the leaves have grown and the plants spread out. Still, from planting until harvest, the field will checked for about an hour a day to make sure the water conditions are satisfactory and that there are no pests. The final stages of growth, the appearance of spikelets, and when the panicle becomes heavy with the grains, indicates harvest is imminent. When the grains turn yellow, the harvest can take place, about 95-110 (average of 100) days after planting in the seedbed. The harvest takes a day if there are ten participants. The stalks are cut with sickles. If the crop is small, it will be taken back to the house and dried to be threshed by taking bunches of panicles and beating on a bed frame to remove the unhusked rice (*la’as*). Most often, the *la’as* is removed in the field using a sheet metal box with an open front where the panicals can be held over a pedal-driven rotary drum with dozens of long wire prongs that remove the *la’as,* channeling it into a pile beneath. The empty stalks are piled up to be used as cow fodder. Farmers

take the rice to the market for machine husking, though before 1980 this was usually done by pounding.

Only two planters sold rice out of the seven households planting in 1996, the former selling 446 out of 1200 kg, the latter 20 out of 100kg (see Table 3.12). For most households, aside from next years seed, all is consumed by the household and some perhaps given to neighbours who participated in the work without pay, or kept for an occasion when rice is needed for offerings at a *bhuju'* or for a life cycle event. A day's work can be compensated by giving two *ghantang* of *la'as* for an adult or one for a child. Neighbours who receive rice usually have rice fields of their own and will give the same payment when the work is done on their field, making this a simple case of work exchange. Patrons also frequently provide rice to their clients when they do work without pay on his field. Families without rice fields have various reasons for joining in a harvest or helping with the transplanting or weeding even if they obtain neither rice nor salary, probably the most obvious one that participating in what is generally a congenial work party will show good-will to the rice farmer that will most certainly be returned in some future transaction.

Table 3.12 – Inputs and outputs for rice cultivation in Gedang-Gedang in 1986 (largest, smallest and average fields)

	Largest planter	Smallest planter	Village average
lagghu planted	8,00	0,50	2,50
tools	0	0	14289
seed	11700	1950	5057
fertilizer @135/kg	13500	1350	6085
Insecticide	0	0	643
wages	106350	2900	22221
harvest share	0	0	8807
yield (in kg)	1200	100	340
total value	390000	32500	110500
net val rice	258450	26300	66258
amount sold	145000	6500	21643
returns to labour / hour	295	313	147

Returns to labour assuming 27 person-days per *lagghu* give a return to labour averaging around Rp 1173 per 8-hour day or Rp 147 per hour. This is above the returns for agricultural wage labour, but low average yields (136 kg/*lagghu* or 1088 kg/ha) for some planters (1 *lagghu* only yielded 30 kg) brought down the average returns. The largest and smallest fields gave much better returns through better yields and use of household labour.

As with the replacement of flint maize with dent maize intended to maximize earnings, villagers who produce or simply consume rice now seek for their own consumption to purchase cheaper import rice or receive rice for the poor (*braskin*) the government allocates for the poor.[129]

[129] In 2006 in Gedang-Gedang, 179 households classed as poor (*miskin*) received an allocation of *braskin.* The criteria changed in 2007 and 2008, when 374 were eligible.

3.6 Tobacco

Intensive tobacco cultivation began in Batuputih in 1975, in Gedang-Gedang in 1977, and by the middle of the 1980s was planted on most fields in the southern part of Gedang-Gedang during the dry season, from May to August or September. The tobacco planted in Madura is a Virginia variety known as Jepong Kecil or Jepong Kuning that in Batuputih allows for a first harvest after 85 to 92 days and is relatively resistant to dry conditions. Once shredded in strips and sun-dried it is called Madurese *rajangan*, the prime tobacco for Indonesian clove cigarettes. The first seeds were brought to the village by representatives from the tobacco companies. In the past, people from Batuputih went to Ambunten, to the west, to work watering tobacco plants. It was there that they learned the techniques necessary for cultivation and processing, and the Gedang-Gedang farmers learned in turn from them.

People had long planted a few tobacco plants near their house, watering them with whatever used water was available. Proximity to dependable sources of water is the determining factor for choosing sites for intensive cultivation. Sites near the streams, the *cekdam* and the springs were the first to be planted. Wells can be used so long as they are not subject to depletion. Men and women would use a *pèkol* (two semicircular water containers balanced on a shoulder bar) to transport water from the source to water each plant individually. In the 1980s, cheap thin plastic hose about 6 cm in diameter sold by the roll were increasingly used to move water from the source to the field, collecting in a basin dug in the ground that was sometimes cemented or simply lined with plastic sheeting. At the source, a funnel-shaped container was set up high enough in such a way as to channel water taken from the spring or well through the hose to the basin in the field, which could be hundreds of meters away. In the 1990s, electric or gasoline powered pumps began to appear in the village capable of sending water from the check dam or from some wells even greater distances to even larger large basins.

Tobacco is always planted in monoculture. It is possible to rent land just for the tobacco season by paying the owner ten percent of the profit after expenses. There is no sharecropping. Preparation of land for tobacco requires that earlier plants be harvested entirely. The field is plowed in four passages in alternate directions. On the last passage, the furrows are spaced about a meter apart to allow for the building of a raised mound (*bidingan*) between the furrows the length of the plot. The plowing completed, men build the mounds using right-angle hand shovels (*abulut bidingan*), and sometimes run a line of string the length to make sure the mounds are straight. They shovel soil and rocks from the furrow until they have a long planting platform about 10 cm from the bottom of the furrow. When all of the *bidingan* are created, shallow pockets are dug two across where the plants will be. A tiny amount of grey urea fertilizer is placed in each pocket, and water is fetched to water the fertilizer and pocket a bit. All of the work up to this point is done by males of at least fifteen or sixteen years of age. The ground is ready to receive the plants.

The young plants are purchased in the market rolled in banana leaf bundles. A few villagers specialize in growing the seedlings in specially-prepared seedbeds raised up to 50 cm high in the best soil. The seed envelopes with the seeds inside are planted in the bed. As the seedlings sprout and emerge, they are protected from the sun using leucaena leaves. Banana leaf rolls containing dozens of seedlings each are opened and one by one they are inserted in the *bidingan* pockets, taking care to move the large stones to the side of the pocket. If the seedling is small, two or even three plants may be put in one pocket. After a few weeks, the smaller plant or plants will be removed and placed in a spare pocket in a less optimal site such as under a

tree. Each pocket is watered a second time. Watching the watering of one plant after another is almost like watching a folk dance: the farmer must put his foot under the pouring water each time so as not to damage the young plants. In the early stages, the plants need to be watered between one and three times daily. Only a heavy rainfall can replace this watering. The second month, the watering can be reduced to once a day, and in the third month once every two days suffices. White urea is mixed sometimes in the water during the first few days. Some farmers place teak leaves in such a way that the plants are protected from the hot afternoon sun. Uprooted weeds can be placed around the stalks to keep the moisture level high. Despite the care given, many plants die in the first days and must be replaced. The seedlings may have been too young, or more often they fall victim to the hot direct sunlight or too little watering. This is a problem for families without the money to pay workers or lacking household and exchange labour for watering. A hot first day can leave half of the field's plants dead and in need of replanting the next day. The planting is usually a joyful, social activity in which neighbours and children participate. The technical skill used in the planting is thus sometimes unequal, leading some farmers to prefer to plant their tobacco themselves.

Two weeks after planting, weeding and loosening of the soil around the plants is done with a sickle or a pointed stick or iron bar. Weeds are removed and large stones are placed around the pocket and small ones under the plant leaves to provide support. This work is sometimes repeated once. Cow manure and later a half or full spoon of urea is applied to the pocket. A product, simply called *karbon*, is mixed in with the watering that repels caterpillars by its odor. Three to four and a half weeks after planting, the furrows are dug out again and the *bidingan* is raised up around the pockets, sometimes rearranging rocks around the plants with a hoe and laying weeds near them to retain moisture. Fine dirt and pebbles from the furrow is placed at the base of the stalks to add some earth atop the plant roots. Around this time, the farmers also begin to treat the plants with pesticide (*nyhendrin*, after the name of a popular pesticide Hendrin). The main pests are tobacco thrips (*Thrips parvispinus*), green semi-looper, and the tobacco caterpillar. The latter two are usually crushed between the fingers. Hendrin is applied using a baton with thin strips of leaves tied to the end dipped in the solution and shaken onto each side of each tobacco leaf. This job should be repeated several times, but the frequency depends on available labour. In later years, a backpack unit with a pump arrived and was used for spraying the plants.

Watering is stopped completely near the end of the growth period to hasten plant maturity. Planters are often nervous during the final days that someone will come steal their crop, and at nighttime they make checks of their fields. In 1996, I learned that one acquaintance had lost 3000 plants to an enemy and was going to the ritual specialist (*dukon*) to find out who it was or take countermeasures. I heard that an enemy can ruin a crop by going through the field with a barbed whip that effectively makes the crop unsellable. Despite the loss of the one acquaintance, from what I could learn the danger of theft or other malevolence is very slight.

Although heavy rainfall is welcome at the start of the tobacco season, once the plants are established and particularly when nearing harvest, rain can ruin a harvest by encouraging the proliferation of shallow root systems spreading away from the plants and ultimately poor quality in the final product. The unpredictability of rain constitutes the greatest risk in tobacco farming. Soil fertility is the least important factor. In fact, the tobacco industry needs Madurese tobacco for its blends because the soil is right, and in recent years has been paying premium prices for tobacco grown on infertile land. The highest prices for tobacco in Madura are now obtained in two places, the Perancak hills in the Pasonsongan sub-district and

Batuputih. Tobacco is left in the ground after the first leaves are removed and secondary and tertiary leaves are obtained in the following weeks. The first are the best and most expensive. If the first leaves go for Rp 4500, the second will fetch around Rp 2500 and the third only Rp 1300-1400. Leaf must be thick, with good golden colour (not too much green) and fine branching. The economic inputs and outputs for tobacco cultivation are presented in Table 3.13.

Table 3.13 – Inputs and outputs (in Rupiah) for the eleven Gedang-Gedang households planting tobacco in 1986

	Gedang-Gedang	Jaruddin	Artestengga
area planted (in *lagghu)**	1.92	2.27	1.50
tools	1455	500	2600
seedlings @1.5 each	3145	3267	3000
fertilizer @135/kg	8129	8123	8136
insecticide	4159	3958	4400
wages@1000/day	30545	28750	32700
work meals @150	11032	13275	8340
harvest share	5545	500	11600
yield per *lagghu*	81781	89099	68511
total value	156871	201958	102767
net value	92861	143586	31991
amount sold	154386	199125	100700
auto consumption	2485	2833	2067

* Except for this line, all table values are expressed in Rupiah.

To calculate returns to labour, I again use time allocation data, this time only from the families planting tobacco and for them only observations made between 1 May and 1 October 1986 (Table 3.14).

Table 3.14 – Time allocation observations and time equivalent by activity type for households planting tobacco between 1 May and 1 October 1986

	age >5/gender	M > 15	F > 15	M 6-15	F 6-15
TA OBSERVATIONS	*1026*	*360*	*412*	*116*	*138*
work on own field	86	46	21	8	11
exchange work on another's field	37	29	1	4	3
transformation + sale	12	7	3	1	1
Total	135	82	25	13	15
TIME (avg. mins/day)					
work on own field	236	92	37	50	57
exchange work on another's field	100	58	2	25	16
transformation + sale	31	14	5	6	5
Total	367	164	44	81	78
age/gender weighted	382	230	72	37	43

This is to avoid counting operations not connected to the tobacco season or done by those not planting the crop. As for the maize and intercrops, I have weighted the

data to reflect the composition of the households engaged in tobacco cultivation themselves. We can observe that the aggregate household size of the 11 households engaged in tobacco cultivation is larger when compared to the average for all 39 households cultivating maize, as follows: Male adults: 1.40 per household; Female adults: 1.64; Boys 6-15: 0.45; Girls 6-15: 0.55; Toddler boys 2-5: 0.27; Toddler girls 2-5: 0.00; Infant boys: 0.00, Infant girls 0.03. The average family size is significantly larger, 4.35 compared to 3.87 individuals for the village as a whole. The dependency ratio is slightly smaller though not significantly so (51.9 compared to 57.4).[130]

Given the variations in net returns in Jaruddin and Arestengga and between households, the returns for labour are calculated based on the average for all planters in 1986. For an average net value of Rp 92861 an average of 382 household hours of work were required. This does not include any work for wages done by outsiders, the cost of which has already been deducted from the net value. The average returns to household labour thus work out to Rp 40/hour or only Rp 320/8-hour day. Recalling that the time allocation data was collected between 0600 and 1800, I believe these figures need to be adjusted downwards by about 10 percent to take into account the occasional nighttime work by a few families that was not captured in the data, particularly field preparation and weeding done soon after planting, and in the transformation stage for those families involved in shredding. I would estimate that the returns are closer to Rp 36 or Rp 288, respectively. This is about three times lower than the returns for labour for the two maize, bean and cassava crops put together, not a very good return for a cash crop. Moreover, if there can be a "representative" year for tobacco, perhaps that was 1986: while not a great year pricewise, the crop received average prices and was not unmarketable due to rain.

While 1986 was an average season for some, it proved to be a disappointing season for others who had to deal with the fickle market. Some received what they considered high prices for their crop (Rp 3500/kg was the highest), but others with the misfortune of having their crop ready but few buyers in the market had to settle for prices as low as Rp 1000 per kilo. Much depends on the timing of the tobacco warehouse opening dates in August and September. If their quota is reached, a variable which depends on stock left over from the year before and the marketing strategies of the individual brands, options for sale are reduced, few local traders, small (*blidja*) and large (*blidja raje, juragan*) are interested in risking their money taking on product they cannot sell to the warehouses. Sometimes, mistakes are made. In 2005-2007, twenty *blidja* attached to a *juragan* in Labung Dua' went bankrupt, as did many in 1987-1989. None did in 2008. Warehouses change their receiving policy and prices during the season, based on their assessment of product quality. The risk involved in tobacco planting can be appreciated by looking at the prices paid for Gedang-Gedang tobacco over the years (Table 3.15). The table includes approximate wage rates for heavy work such as tobacco field preparation and watering for comparison.

[130] Children under 6 are left out of the calculation of returns to labour.

Table 3.15 – Tobacco prices and agricultural wage rates in Gedang-Gedang for available years

Year	Prices, including local and temporal variations (all values in rupiah/kg)	Day rate for farm work*
<1986	the tobacco harvest was poor in two out of the previous seven years	
1985	crop rained out, 1000-1500 if marketable; worst year ever some say	673
1986	average of 2500 (considered a "normal year" average); better for 3000, max 3500; still many with untimely harvests had to sell all at 1000, lower leaves 700	786
1987	some reported a good harvest, but prices only 700-3200; worker's wages double	1500
1988	crop ruined due to late rains	1452
1989	crop ruined due to late rains	1500
1990	some have crop ruined by steady rains, others able to get 3500-5500. Warehouses criticized for price manipulation because of fluctuation: e.g., prices in Aug. 3500, Sept. 4500-5500, Oct. 2000-3000	1518
1992	poor average price of 3,200	1750
1993	satisfactory average price of 6,500	2500
1995	very good year, price around 10,000, though water situation became critical as season progressed	3500
1996	6000-10,000, considered "satisfactory" at current wage rates; water quantity still critical and southern households begin to blame their dry wells on excessive pumping from the *cekdam*	3667
1997	recalled as "average"	7000
1998	disastrous harvest in the south part of Gedang-Gedang: 1500-2000; rain washes out some crops entirely. Temberean coastal farmers attempt tobacco for the first time and have a good crop, unaffected by late rains: 5000	
1999	excellent: 25-30,000 throughout the village	10000
2000	excellent: 25-27,000 throughout the village	10000
2001	excellent: 29-30,000 stable prices throughout season and village	
2002	early sales excellent: 35,000; then price drops to 20,000 and falls 2000 a day reaching a low of 5000. Fluctuations attributed to warehouse price manipulation	
2003	first fifteen days 30,000 then falling to 15,000, 10,000 and at the end 5000	
2004	20-25,000 at the outset then falling after 17 August to 17,000 and finally 15,000	
2005	prices low for what was considered good quality product: 10-12,000, with much tobacco left unsold due to warehouse rejection or early closure	20000
2006	crop largely ruined due to rains: 7-12,000	
2007	disastrous crop ruined by rains: 5-9000 for a few, for most impossible to sell	
2008	excellent early prices: up to 35,000 (30,000 average); but late harvest tobacco could only fetch 9000	25000 (in 2009)

* Rates paid for field preparation and water for tobacco are often about one-third higher than the rates noted here for hoeing and heavy agricultural work done outside the tobacco season.

1998 was a dark year in Batuputih following the fall of Suharto and the monetary crisis, with rice prices reaching up to five times the 2006 price. The poor tobacco prices were no compensation for the sharp rises in prices and many families went into debt. A few suicides were reported in the sub-district in connection with the poor crop, high food prices and mounting debt. Farmers reason at the beginning of the season that the risk is worth it if they can double their investment, but they go into the season with little way to estimate the risk involved. The increasing dependence on wage labour for preparing fields and watering the plants adds additional risk if the crop does not fetch high prices. One planter in 1986 even lost a small amount of money despite receiving satisfactory prices for her crop because as a trader she could not do the work herself and had to depend on wage labourers.

It begs the question: why do people plant tobacco, given the risks involved? In part, the answer must be similar to the reasons for playing a lottery. Farmers reason that if they can afford to lose what they put into it, what other options are out there for making huge profits? What other way is there to escape from the poverty trap in one fell swoop? Few other alternatives exist for earning a large sum of cash in a season. People who have the household labour on hand can do much of the work themselves, thus limiting the cash outlay for hired labour. Besides looking for fodder for the cows and water, which are time-consuming in the dry season, the fields are empty and many planting, so the incentive is there to do something with one's time. And what will one think if it is a spectacular year, like the three in a row from 1999-2001? Memories of those years—when the profits refurbish homes, purchase motorbikes or cows, and repay debts—haunt those who decide to forgo planting.

Hiring oneself out to do the field preparation and watering of tobacco plants can provide very good returns for two or three months, mostly for men who have the necessary force to do heavy work every day. Rates are equal or up to thirty percent higher than the going rate for hoeing. Since the 1990s expansion in all parts of the village south of the hills, and with Temberean planting beginning in 1999, farmers have been seeking out labourers in Batang-Batang sub-district who are idle during the dry season. A Temberean man told me in 2009 that in the last few years the planters along the coast have had hundreds of Batang-Batang individuals, and often couples living-in and sleeping on the porches. The women cook and help with the tobacco watering, the household essentially relocating west for the season in Batuputih. Cash cropping appears to have been responsible for a gendered divergence in wages paid for some kinds of work. Whereas before the early 1990s men and women were paid essentially the same wage for weeding, now men are paid significantly more.

Tobacco processing is done at night and must be done quickly to preserve the quality of the final product. It provides very high returns for the participants, particularly the shredders (*tokang masat).* When the farmers pick the leaves, they separate the bottom leaves and dry them in the field to be sold separately. The other leaves are provided by farmer or by a middleman to the processing team. The leaves are placed vertically (or standing up on the stem) on the porch of the house for four days. On the day preceding the shredding, small piles of leaves are made, and these are rolled in bundles (*ghulung*) and attached by men and women. The *tokang masat,* always a man, is paid on the basis of the *ghulung* shredded, or the *bal* of wrapped shredded tobacco ready for market, clearing Rp 10,000 for fourteen hours work (4 p.m. to 6 a.m.) shredding three *bal* (Rp 714/hr). Those who make the *ghulung* (who are often household labour) receive Rp 5 per *ghulung* and can do 50 per hour (Rp 250/hr).

The shredded tobacco is gathered and laid out on bamboo drying platforms made from bamboo lattice (*lantak*) placed on the ground by a *tokang lantak*. He usually works in a team of four taking five hours to process 1000 *ghulung*, giving a return to each of Rp 250/hr. Powdered sugar is sprinkled on the freshly cut tobacco to improve the aroma. The tobacco is left on the *lantak* to dry for two days, bringing it inside at night to avoid dew, redisposing the tobacco in a pile then back on the *lantak*. The afternoon of the second day of drying the tobacco is collected by the *blidja* (trader in contact with the farmers) who may also be the *pemasat,* and sent to the *blidja raje* or *juragan* (a local middleman who provides capital to the *blidja*) who will arrange transport and sale to the tobacco warehouses (*gudang*) or to wholesalers located in Sumenep or Pamekasan. Before, the traders were all coming from outside the sub-district to negotiate sales while the crop was still standing in the field (such a trader is called a *tukang tebas*). They came from Lenteng, Ganding and Bluto sub-districts and sent the product to warehouses in Lenteng or Prenduan which in turn sent to the main warehouse at the time in Pamekasan district. Now all the *tukang tebas* and *dhagang* (traders who purchase processed shredded tobacco) are Batuputih locals. For the small-scale local traders (*blidja*) and *blidja raje,* building the networks required for direct access to the companies took about ten years. They also needed to develop the "nose" for assessing samples of tobacco (*poster*) given by the farmers to the *blidja* before purchase to enable the *blidja raje* or his contact next up the ladder to set the price. Beginning in 1985, the big traders in Batuputih could start selling directly to the warehouses and private wholesalers. The warehouses are run by the buyers from the big tobacco companies selling premium brands, Gudang Garam, Djarum, Sampoerna. As soon as the first harvests are ready, they are buying unless the quality is off. It is when the prices start to fall off that the private wholesalers start buying for their customers, bulk tobacco sellers and the lesser tobacco companies such as Oepet. Beginning in 1985, two locals traders, one in Labung Dua' and one in Batuputih Laok, received Rp 20 million each from Gudang Garam to buy tobacco locally, on an exclusivity basis one or sometimes two truckloads a day. Once Gudang Garam closes, they can sell elsewhere. By 1990, no more traders from outside the sub-district were coming to buy Batuputih tobacco.

The *blidja raje* usually receive the tobacco in a *bal,* leaves simply wrapped in a woven palm frond sitting mat by the *blidja kènè'* unless the latter has his own team to cut the farmers tobacco (in which case he can make additional profit by proper estimation of the cut tobacco yield from the leaves). Farmers can only sell the shredded tobacco themselves by the kilo if they have a means to cut it, so mostly it is only when the *blidja kènè'* plant some tobacco themselves that this occurs. *Blidja raja* have their own large shredding operations to deal with the leaf tobacco the *blidja* bring from the fields, composed of five or six shredders and many workers rolling, laying out and packing tobacco in palm frond mats for transport. People come from all around, even from the hills where tobacco cannot be planted, to do the relatively well-paid work available from August into October.

Frequently, tobacco shredding is carried out as a specialized household operation. Two households in the sample group did tobacco processing in 1986. The most successful household netted Rp 1,050,000 during the month of operation in 1986, many times the Rp 78,000 they netted from their own tobacco crop. The other household only netted 20,500 from its tobacco crop, but made almost Rp 200,000 from processing. The son and mother from this household were still taking part in processing operations in 2009, the son as a *tokang masat,* following the death of the household head. Tobacco processing is not for all households, because it requires capital on hand to pay the *tokang masat,* highly skilled workers who will make from

six to ten times the going day rate for agricultural work, to pay other assistants if they are not part of the household, and to purchase the tobacco from the farmers. A team typically is composed of three *tokang masat* and six to eight others doing the rolling and laying out, depending on which job is most urgent to avoid bottlenecks. The most successful operation used three household members for the month working at least 12 hours a day for about 25 days, resulting in a return to labour of up to Rp 1167 per hour or Rp 9333 per 8-hour day for the participants. Though this household could only get these exceptional earnings for one month, they represented 37 percent of their total household income in 1996. Despite the high returns, there is little risk: risk can be mitigated by passing it on to the farmer. The price for the farmer's crop is set while the leaves are still on the plants. If the price falls before the leaves are picked, the buyer can adjust the price he pays the farmer downwards. This does not seem to apply if the market price increases. Although the risk is carried by the farmer, over the five years the *pamasat* households have been in operation the same farmers have provided their crops, suggesting that the security of a stable buyer is of value to them.

Tobacco has on the whole improved the economic condition of Gedang-Gedang in the 25 years I have been visiting, judging by improvements in housing and wage employment. Yet, this has come at a cost. Water resources are stretched to the limit, and provide a tinder box on which conflicts can be sparked. The risk of losing everything and incurring massive debts is always lurking behind the hope of breaking out of the poverty trap. Some actors in this business take more risks than others, and some can pass off the risk onto others' shoulders. In a 1986 notebook, I recorded some impressions that I had watching one family (not part of the household sample) deal with torrential rains in the middle of the season, with the fear that their crop would be ruined along with their investment in hired labour (the crop eventually was sold for a satisfactory, though below average price):

> Up until 20 June, Pak A. has put in Rp 212,000 for wages alone (and he also calculates up to 27 June that he has spent Rp 300,000 total). Last year, he served as an intermediary for the Pamekasan traders selling Rp 1.5 million worth of local tobacco in four deals. He reckons that if the tobacco is bad this year, but buyers still exist, the tobacco of one neighbour will go for 50,000, another 25,000 and his own 75-100,000. If there are no buyers, the crop is cut and thrown into the river. The cows can't eat it. It cannot be smoked (*bhau,* 'it stinks'). The tobacco planted in May is probably ruined, even if there is no more rain, seeing how already the leaves are falling off, they are so heavy with water, instead of pointing towards the sky like they should. The women seem to be less concerned, even laughing at their husbands' disarray. Perhaps they do not feel the responsibility as much? In years when the tobacco is growing fine, I suppose the men will feel pride and dominance. Though the women work the fields as much as the men, it seems, they have less stake in the outcome of this crop, and avoid worrying about how it will turn out, though they will get much of the credit by avoiding the blame. A. says when the tobacco fails, some men go crazy. When the early tobacco is of poor quality, the buyers from the factories don't come open their counters until the tobacco planted later comes to maturity. During and after the big storm today, people ran into the fields to dig channels to evacuate the water. Sometimes, this meant inundating a lower field belonging to someone else. We saw when the wife and daughter-in-law were sent to clear water from the *bidingan* in their upper northeast field. They did so by channeling water to a low corner edge of the field. With some additional hoeing, a breach was made in the perimeter bund of the

field, allowing the water to cascade down onto a field below. The two women seemed to have had no scruples in drowning the lower field and its tobacco plants under an avalanche of water. The sight of the poor field sent the daughter-in-law into fits of giggling.

3.7 Agricultural wage labour

The Centre for Agro-Agricultural Research (PPAE) in Bogor, West Java, had been following wages and prices in Gedang-Gedang and another village in West Madura as part of a sample of Java-Madura villages. I was able to obtain the data until 1992 when the study ended, and the village secretary agreed to collect the data as he had before each time I returned to the field. Though incomplete, it provides a record of general trends in agricultural wages from 1983 to 2009. The available data on end of year or last available wages, it can be seen that wages have increased greatly since 1983, and at times sharply in response to devaluations in the rupiah to the dollar rate (Table 3.16).

Returns to labour for all tasks have correspondingly risen over time, but are of little value without factoring in inflation in essential commodities over the same time. A useful benchmark is the price of hulled rice, which all households purchase, except the very few households who are able to produce enough rice themselves. Since the 1990s, consumption of rice has increased along with dent corn from Java, replacing consumption of the small flint corn the villagers grow since the latter can now fetch high prices for caged bird feed. In the 1980s and before, poor families subsisted on their maize and cassava, buying rice only on special occasions or in small quantities to mix with the maize. Rice prices have fluctuated based on commodity prices and changing government policies on price support or the relaxation of bans on the import of inexpensive rice. Although rice provides the most logical and often used benchmark, it should be noted that the inflation affecting other goods and services is often greater than for rice.[131]

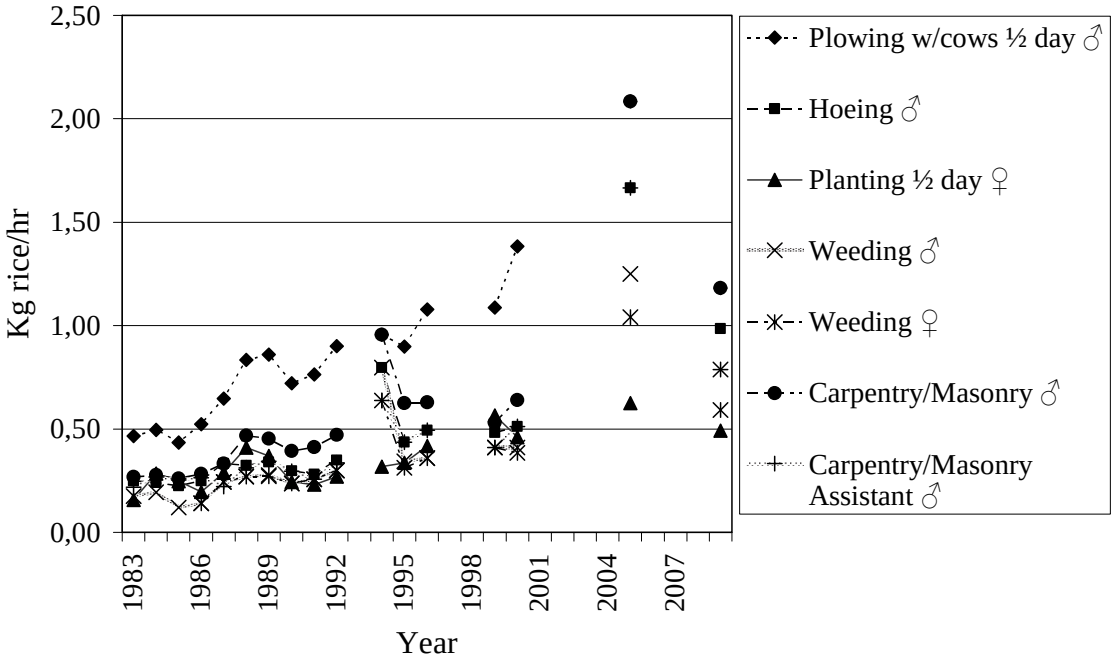
[131] The price of hulled Pelita IR rice rose 1471 percent between 1986 and 2009 (though until 2005 had only risen 686 percent). For comparison, a basket of twenty-seven commodities commonly purchased by farmers rose 1270 percent from 1986 to 2009).

Table 3.16 – Wage rates for agricultural tasks in Gedang-Gedang and US dollar to rupiah rates from 1983 to 2009

	Plowing (own team)	Hoeing men	Planting women	Weeding men	Weeding women	Carpenter/ Mason	Carpenter/ Mason Assistant	USD rate
1983	739	711	250	500		767	622	970
1984	746	650	429	525		750	725	
1985	718	673	409	357		773	750	1 134
1986	914	786	343	443	443	893	1000	1 664
1987	1619	1500	719	1102	1102	1500	1000	
1988	2085	1452	1025	1215	1215	2104	1404	
1989	2109	1500	904	1220	1202	2000	1520	
1990	2035	1518	688	1206	1206	2000	1500	1 867
1991	2482	1643	750	1500	1500	2411	1500	
1992	2500	1750	750	1500	1500	2357	1679	
1993								2 110
1994	3000	2500	1000	2500	2000	3000	2000	2 200
1995	4000	3500	1500	2750	2500	5000	3500	2 307
1996	4444	3667	1722	2667	2667	4667	3667	2 348
1997		7000						5 447
1998								7 900
1999	12500	10000	6500	8500	8500	11000	8500	7 050
2000	15000	10000	5000	8000	7500	12500	10000	9 725
2001								10 505
2002								8 920
2003								8 465
2004								9 355
2005	25000	20000	7500	15000	12500	25000	20000	9 830
2006								9 020
2007								9 419
2008								10 950
2009	30000	25000	12500	20000	15000	30000	20000	9 400

Notes: Rates are for end of year or last known. Plowing, carpentry and masonry were only done by men. If plowman is provided cows he receives two-fifths the wage noted. Planting work lasts five hours and worker receives two meals, other work lasts nine hours with three meals.

Figure 3.4 – Wage rates expressed in terms of kilograms of Pelita IR rice per hour in Gedang-Gedang, 1983 to 2009



From Figure 3.4, it can be seen that in terms of rice, a gradual but steady improvement in purchasing power was achieved as wage rates increased. Wages for some jobs increased faster than others and a gender dichotomy that did not exist for weeding has emerged since 2000, with men now being paid more than women for weeding. Heavy hoeing, plowing and weeding by men have increased faster than planting food crops by women. The reason for this is the increasing demand since the mid-1980s for hoeing and weeding to prepare land for tobacco cash-cropping. From 1985 to 1995, much land that was covered in Imperata grass was reclaimed for tobacco. Increased area under tobacco required workers for watering further away from water source. The increase in the availability of these heavy jobs caused a premium to be put on attracting males. Carpentry rates have also increased greatly to keep pace with the growth in home construction made possible by good tobacco harvests, again benefitting males who have this skill.[132] Following the monetary crisis of 2008, rice prices shot upwards causing a slip back in the progression of real wages, which in 2009 were not much increased in relation to 2000, yet still double or triple what they were in 1985 when the study began. While food security has improved as a result of the rise in wages, the increase in farm and off-farm labour demand and job availability has amplified these gains, and households with personnel in the favorable age/gender categories to take advantage of these gains (for example, young males during the tobacco season) have profited the most. On the contrary, the very households that lack such personnel for farming and home improvement have borne the brunt of rising costs of labour.

Men can earn wages in Sumenep driving pedicabs (*becak,* a bicycle with a seat in front for passengers). *Becak* are used by people as transport to move around town or to transport goods from the market. Stores often use *becak* for the same purpose. The fares are negotiated between the passenger or client and the driver. Some *becak* drivers enter into exclusivity contracts with clients, to take them or

[132] Carpenters can also make furniture at home for sale, with similar returns to labour, and utilize spare time while staying at the house for other tasks.

their children to work and school and fetch them. Such contracts always provide less income for the same distance, but the security of having regular fares leads many drivers to accept such contracts. One man in Jaruddin went to Sumenep three times a month for three days each time. He could earn from Rp 10,000 on a slow day to Rp 15,000 on a busy day. His expenses were the Colt minibus to Sumenep (Rp 800 round trip), a Rp 500 rental fee per 24-hours (Rp 1500 for three days) and an oil lamp he had to rent for Rp 500. The *becak* drivers spend the nights in their pedicab if there are no fares, but basically their workday can last for up to 18 hours. The returns vary greatly depending on the season and the strength and bargaining talents of the driver. During the tobacco season, it was possible for an energetic driver to earn Rp 10,000 for a day/night (18 hour) stint, but others could only earn Rp 3500 during that time. Outside of this high season, which only lasts about three months, incomes were as low as Rp 2250-3500. The returns to labour therefore range from Rp 73 to 504 per hour. Those who cannot make that much give up after a few days, like one of the sample household heads who, before he started a tobacco shredding operation, tried *becak* for a month. He could only make Rp 1000-2000 a (long) day but found it too exhausting, not worth it when he had to spend Rp 500 a day for meals. Someone who can stay in Sumenep and work for 100 days a year (like one of the men in the sample did the year before our study) can, however, amass a tidy sum very difficult to put together in the village. Even when the earnings are low per hour, they add up during the long 18-hour workdays. Usually drawn from the poorer families in the village, *becak* work is a solution for young hard-working men who want to break out of the poverty trap, or move up economically, and are able to leave their families and farms for periods of time.

Men can work as porters in various occupations and places. Usually the work is done by young men. Gedang-Gedang's uneven distribution of wells and springs means some households are prepared to pay for water brought to them. Four sample individuals earned an average of Rp 34,500 as water porters (kole aèng), carrying as *pikol* or using jerrycans attached to a bicycle. The pay depends on the distance, which can be up to three kilometres or more when wells are empty in the dry season. A two jerry-cans *pèkol* drawn from the Labung Dua' spring will earn 250 a trip and 3 trips are all one can do in a day. The heavy work nets between Rp 750-1000 for an eight hour day (Rp 94-125/hr). With an investment of Rp 30,000 in 1986, a used bicycle could almost double the earnings.

If they are prepared to stay in Sumenep for long stints, men can earn Rp 2000-3000 per day carrying goods in the market or for a store. In the market, one is paid at most Rp 200 to unload a truck, or Rp 150 to bring a market shopper's purchases to an awaiting *becak.* Rp 300/hr is the average return, without meals. The same work in the village at Labang Dua' working for a toko will be paid Rp 1250/day. Slightly higher returns can be made along the north coast in Temberu where timber is unloaded from ships sailing in from Kalimantan (Borneo), and Pasean where timber, fish or market portage is required.

Women, usually single or divorced, can work as maids (*pembantu*) for Sumenep families. Few from Gedang-Gedang do this work, which for live-ins (as almost all were) entails 16-hour days and in 1986 was paid Rp 30,000 per month (Rp 63/hr). For women who do not need to visit their village often (often allowed only once or twice a year), this job, because all expenses are included (food, medical, etc.) enables saving over the long term for old age or for children's studies or other needs.

3.8 Garden crops

The home garden (*pekarangan*) is a more or less defined area of garden near the houses where useful trees, shrubs and vegetables are grown with the intent of providing not only for consumption needs but also a substantial percentage of household income through sale.

Most of the vegetables grown in the garden are for household consumption. A small amount of fruit is for household consumption, especially if there are children. Income from gardens was estimated by the 36 sample households based on their recall of sales of garden production during 1986. The number of large plants and trees was recorded for each household and the amount sold in rupiah. Household consumption was not valued for all of these crops, though for the smaller beans and peanuts, I asked for a valuation of the entire crop, and then the amount sold, both in rupiah. Although the gardens were not measured, and the figures cannot serve as a measure of garden productivity, they give an indication of garden holdings and income over consumption. In Table 3.17 I present the production and sales in the sample of 36 families in 1986.[133]

Time allocation data (Table 3.18) can then be used to measure the value of labour in gardening, which should be taken in this case to produce both cash from sale and nutritional supplementation for the families. The entire time allocation sample can be used to calculate the returns to labour since all have some yield from their gardens, and all but one family were able to sell at least some garden production during the year.

[133] Number of units (tree, plant) is noted on the first line with the name of the item. For Bengal bean, hyacinth bean, red kidney bean, goa bean and peanut, the total value of the previous year's crop is given on the first line, with the value of all sales during that year on the line following. For firewood or cut wood there is only one line as no data was collected on number of trees possessed, only the cash earned from sale during the previous year. For all other crops, the first line gives the number of items in all the sample households, the number of households possessing the crop and their average holding.

Table 3.17 – Garden crops possessed by 36 Gedang-Gedang households (hhs), and amount sold over household consumption in the year 1986

	Qty possessed (units, value); Rp amount sold by all hhs	Households *possessing*; hhs with sales	Avg. (units, value) *possessed*; Rp rec'd by hhs with sales
wood sales	Rp 55000	3	Rp 18333
bananas - *gheddang*	*222*	*23*	*10*
sales	Rp 121500	14	Rp 8679
mango - *pao*	*39*	*18*	*2*
sales	Rp 247000	12	Rp 20583
bamboo – *perreng*	*780*	*20*	*39*
sales	Rp 1700	1	Rp 1700
jackfruit – *nangka*	*14*	*9*	*2*
sales	0	0	0
papaya – *kates*	*65*	*17*	*4*
sales	Rp 1405	2	Rp 703
coconut – *nior*	*63*	*12*	*5*
sales	Rp 18750	3	Rp 6250
Asian palmyra - *tarèbung*	*75*	*18*	*4*
sales	Rp 447000	5	Rp 89400
kapok - *kapo'*	*40*	*19*	*2*
sales	Rp 22000	1	Rp 22000
cantala - *lanas*	*2281*	*15*	*152*
sales	Rp 359000	13	Rp 27615
orange or citrus - *jeruk*	*25*	*8*	*3*
sales	Rp 253000	3	Rp 84333
sugar apple -*sèrèkaja*	*1287*	*23*	*56*
sales	Rp 89000	5	Rp 17800
bottle gourd - *labu*	*87*	*15*	*6*
sales	0	0	0
angled loofah - *langker*	*61*	*16*	*4*
sales	Rp 1000	1	Rp 1000
cucumber - *tèmon*	*104*	*4*	*26*
sales	Rp 20000	1	Rp 20000
breadnut – *kolor*	12	7	2
sales	*0*	*0*	*0*
Bengal bean - *bhengngok*	*219932*	*32*	*6873*
sales @ 175/kg	Rp 214594	29	Rp 7400
hyacinth bean - *koma'*	*160083*	*22*	*7277*
sales @ 200/kg	Rp 104200	13	Rp 8015
red kidney bean - *muntjes*	*98103*	*19*	*5163*
sales @ 160/kg	Rp 67273	8	Rp 8409
goa bean - *kaceper*	*16437*	*16*	*1027*
sales @ 100/kg	Rp 12850	7	Rp 1836
peanut - *oto' dhabu'*	*124925*	*4*	*31231*
sales @ 1000/kg	Rp 99925	4	Rp 24981
chili - *cabai*	*440*	*24*	*18*
sales	Rp 16500	5	Rp 3300
breadfruit - *sokon*	*4*	*3*	*1*
sales	Rp 100500	2	Rp 50250
tamarind – *accem*	*2*	*1*	*2*
sales	Rp 10000	1	Rp 10000
areca nut – *penang*	*5*	*1*	*5*
sales	Rp 3000	1	Rp 3000
Total garden sales	Rp 2,265,197		Rp 62,922

Table 3.18 – Time allocation observations and time equivalent by garden activity type for 36 Gedang-Gedang households in 1986

	age/gender:	M > 15	F > 15	M 6-15	F 6-15
TA OBSERVATIONS	*6606**	*2412*	*2466*	*1064*	*664*
planting, maintaining garden	11	5	5	0	1
harvesting from garden	87	46	35	4	2
transformation, sale	18	7	10	1	0
Total	116	58	50	5	3
TIME					
planting, maintaining garden	4	1	1	0	1
harvesting from garden	29	14	10	3	2
transformation, sale	6	2	3	1	0
Total	39	17	15	3	3
age/gender weighted	44	22	19	2	1

* The number of observations for each group is presented in italics. The first figure is the total number of observations. The calculation of time spent in separate activities is a function of the number of observations, as follows: time = number of observations x 720 minutes / total number of observations. Totals may not add up exactly due to conservation of decimal places.

Using the time allocation data and applying the full sample age/gender weighting we find that Gedang-Gedang families allocated 44 household minutes per day, resulting in an average net return to labour of Rp. 233 per hour, or approximately Rp 1861 per 8-hour work day.[134] More than twice the best hourly rate for heavy agricultural wage employment, this is essentially a return to labour for adult labour, since the input of children for garden work is very limited. Watching over the drying of crops and processing activities would add a little to their contribution, but perhaps the greatest contribution children provide is looking over their brothers and sisters, when they have them, in order to free up the parents for productive work in the garden. Much garden work is counted in seconds and minutes rather than hours, and is easily missed (such as throwing dishwater on the plants or taking a cutting from the horse-radish tree (Madura's most common vegetable accompaniment) to go with the evening meal. Even considering some underreporting, and the large proportion of garden work that generates no cash because it is for household use, garden work is highly profitable compared to staples cultivation and, in all but the best years, tobacco. On the downside, access to gardens is quite variable (Table 3.19) and the gestation period is long for tree crops. Some income is good, but earned in a dangerous (coconut or Asian palmyra harvesting) or arduous (obtaining fibre from cantala plant) manner.

[134] The calculation is as follows: Rp 62,922 average returns from garden crops, peanuts and beans outside of maize and intercrops / (365 days x 44 household minutes average time per day) = average returns of Rp 3.88/min = Rp 232.59/hr = Rp 1860.72/8-hour day. Figures may vary as decimals were carried forward.

Table 3.19 – Household garden production sale by amount in Gedang-Gedang in 1986

Sales of garden crops	Households	Percent	Average sale
<10000	14	39	4528
10000-29999	7	19	23211
30000-59999	7	19	44521
60000-100000	4	11	69958
>100000	4	11	361963

Examples of the long gestation period for most tree crops explain why villagers have not simply converted to agroforestry in Gedang-Gedang. Take Asian palmyra, for instance, from which palm sugar can be made. The trees become productive by five years after their planting. Steady production is not guaranteed, so the trees are seen as an additional source of income or source of household sugar. The palm provides liquid for nine months out of the year; the tree does not produce during the west monsoon (the middle of the dry season). During the season, the tree must be climbed every day to collect the liquid flowing from the efflorescence and caught in a palmyra frond basket (*timbhe*). The trees are not tapped if it rains, because bees are attracted to the efflorescence then, and at times the trees must be left to rest for periods before recommencing tapping. During the season (east monsoon, or dry season) men (only) climb each tree twice daily to recuperate the liquid (*la'ang*) in the *timbhe* attached to the tree with underneath a woven palm frond netting to support it, requiring about two hours a day for four to six trees. If the florescence is dry, a small portion of the end is scraped off to restart the flow, using a tiny sickle costing Rp 1500 for the gesture known as *ketok*. If one doesn't own one's trees, but "sharecrops" them (*gili arè*), the liquid is given to the owner one day; the climber keeps it the second. One household in Temberean possessed 11 trees that were sharecropped out, netting Rp 250,000 for both the owner and the sharecropper over the year. Another household in Jaruddin owned 10 trees, which they sharecropped out entirely, in effect selling the *la'ang* and making Rp 150,000 during the year. When there is enough *la'ang*, about every three days for one tree, the liquid is boiled down in a metal wok over a wood fire to obtain solid blocks of a brown sugar, work done by women. Enough wood is needed for two hours of cooking that will yield three kg of sugar one hour cooking yields one kg). Looking for firewood, done by men and women, can take from one to three hours in the households that process sugar. A kilogram or more of sugar can be obtained per day with about five hours of work morning and evening, depending on the number of trees tapped. The average tree appears to produce enough for 75 kg per year, with reports of yields varying widely from 33 to 150 kg per year.

Up to one heavy *pèkol* containing 50 kg of palm sugar is brought to market at one time, though I usually saw small amounts being sold (one kilogram disk, or *katè'*, could be sold for Rp 300 in 1986). The main markets for palm sugar are at Kalompang or Legung in Batang-Batang. From 2 to 4 hours must thus be added for the marketing of sugar, but this is done on a shopping day when supplies may be brought back. The total work involved for 2 kg is approximately 6 hours, netting Rp 600, for a Rp 100/hour return. Sharecroppers earn half that amount.

Coconut trees begin producing before their fifth year and can give fruit for 30 years after that. A tree gives from two to five seasons of production per year, yielding approximately 30 coconuts per season. Sharecropping does not exist, but an owner of trees can ask someone to harvest his coconuts, receiving 1 coconut per tree climbed. If climbing the tree requires 1 hour of work, the returns were Rp 125/hr. Only three

households had minor sales over consumption since grated coconut is used in many local dishes.

Cantala (*lanas*) is a succulent similar to pineapple but lacking the edible fruit. It grows in the hill area, requires little maintenance, and the leaves yield a sisal-like fibre that is valued at Rp 525/kilo. The leaves must be pulled through a metal fork that shears off the skin, leaving the fibre. The fibre must then be cleaned, washed and dried. Extracting the fibre from the leaves is difficult work and can be painful to the hands, requiring frequent rests. A single person working from 6 a.m. to 8 p.m. can obtain 4 kg. If one does not own the plants, sharecropping is possible. The owner will go to market with the worker to share the profits equally. Counting two additional hours for marketing time, the returns to labour are Rp 131/hr or Rp 65/hr for the sharecropper. For the poorest households, cantala processing can be one of their most important sources of income.

Fruit trees can provide significant income for their owners, but household consumption cuts into the earnings. Banana trees (*gheddang*), by definition common in Gedang-Gedang, are possessed by about two-thirds of households. Only about half of them can sell over consumption, an average of three bunches per year. Households often give bananas as gifts or have banana on hand for guests who arrive at the *tanèan.* The mango trees in Gedang-Gedang produce small fruits that fetch poor prices anywhere except if shipped to Kalimantan (Borneo) by boat from Temberu. Sometimes a good well laden tree can be sold for Rp 20,000 to a buyer from Temberu. Most often fruits are sold in small quantities in the market and used ripe for fruit or unripe as a condiment to be added to a rice and peanut sauce dish (*rujak*).

Sugar apple (*sèrèkaja*) grows in dry rocky areas north of the hills, and likewise is mostly given as gifts or to children, as it is inexpensive, perishable and difficult to transport. But some production makes it to market and provides a welcome supplement to the budgets of five sample households. Important earnings can be had by those fortunate enough to have citrus, mango, or breadfruit trees. Produce may be brought to market as it ripens or an entire tree may be sold before harvest. Usually those owning kapok, areca nut, bamboo and nearly all vegetable crops do not produce enough to sell beyond their own household requirements and after giving some away to family or neighbours.

Beans are grown next to the house on vacant fields or as climbers on trees. The returns are small from what is sold, but the beans are important as dietary supplement with maize and the legume forage matter is good for the cows. Peanuts can provide high earnings but only four households produced peanuts on vacant maize fields in Temberean, earning an average of Rp 25,000, with returns to labour likely a little superior to maize. A fifth planter’s crop died in 1986, so some risk is involved. The hyacinth bean does well on some fields, yielding up to 50 kg per *lagghu* with just a half litre of seed, and is less risky.

3.9 Cows and bulls

Almost all villagers in Gedang-Gedang, like Madurese in other parts of the island, breed cows, goats, and chickens. Many variables must be taken into account to determine the returns to labour for animal husbandry, given the multiple uses of the main breed, cows, and the vagaries of their feeding and marketing. The smaller animals are not intensively raised by any of the sample households, but several dozen households in the sub-district had egg-laying operations with hundreds of hens in specially-built coops. By 2009, a neighbour of ours in Jaruddin was doing a

bustling trade in eggs this way. Cows and bulls are what really count, however, in Gedang-Gedang as in the rest of Madura.

The Madura bovine breed is believed to have been around for as long as 1500 years, around the time when Indian traders are thought to have brought Zebu bovines of the Sinhala or Ceylonese variety to the region. One theory is that Maduras resulted from cross breeding between these Zebu and indigenous banteng (*Bos javanicus*) which, at the time, were flourishing in Java and Bali. Another possibility is that indigenous Javanese cows (thought to have originated from ancient cross breeding between *Bos taurus* and *Bos indicus*) were crossed with *Bos javanicus* and then later with the arriving Zebus (Kok 1921; Payne and Rollinson 1976; Sommerfeld 1923). Both of these theories can find support in the genetic study (Popescu and Smith 1988) which concludes that this fertile hybrid must have resulted from a cross between a male *Bos indicus* and a female *Bos taurus* or *Bos javanicus*.

Given the insularity of Madura, the Dutch were able to prohibit bovine imports, enabling the development of a homogeneous stabilized crossbreed variety particularly well adapted to the conditions reigning on the greater part of the island. The 600,000 or more Madura cows (and, to a lesser extent, buffalo and other domestic ruminants) are an essential element in the traditional Madurese agricultural system as it exists today, being a part of most peasant households. Growing human and cow populations on the island have for many years served to influence changes in the fundamental characteristics of peasant agricultural strategies. The breed is known for its very high heat tolerance (Atmadilaga 1959), feed efficiency, parasite resistance, and even intelligence. Of capital importance during the long dry season when grasses are scarce, the animals are able to survive on very small rations. The dry season diet may cause them to lose weight and appear rather emaciated, but they can rapidly regain their condition in time for the plowing at the beginning of the rainy season. They are also able to maintain body condition on low quality forages. Over time, through both conscious and unconscious selection, farmers have improved on these characteristics and their distribution in the herd. Moreover, as the Madurese and their animals interacted together in their common environment, we can say that they both underwent reciprocal changes, not unlike the ecological process known as co-evolution (E. Odum 1971:273-274), with the important dissimilarity that while humans selected cows for their survivability and culturally-determined qualities (thus acting directly on the gene-pool), cows primarily encouraged the development in Madurese society of various cultural practices and traits necessary for efficient long-term bovine management. The cultural phenomena encouraged by this special form of bovine-human mutualism or obligate symbiosis (E. Odum 1971:228-233, 242-245) will be outlined here.[135]

The overwhelming majority of farm households possesses or guards cows (*sapè*), usually 1-3 head per nuclear family. The system of guarding cows owned by others (*maowan*), or "cow sharecropping" is one used by those lacking the means of owning their own cows but having the available family labour for their maintenance. The owner provides the cow and the "sharecropper" must provide for their care, feeding and housing. Depending on the sex and type of bovine the contract varies but usually the guardian receives one-half of the offspring of cows or, in the case of bulls or the resumption of possession by the owner, a share of the value added to the animal since the beginning of the contract, one-third or most

[135] Another way of expressing the role of livestock is to act as an "energy gate" (Margalef 1968:9 passim) at two important articulation points: between the environment and the animal, and between the animal and human predator. In effect, livestock transform plants of little or no use to humans into concentrated accessible forms of energy.

often one-half. East Madura specializes in cow-calf operations, with males generally being sold soon after birth. Cows and calves are preferred over bulls because they consume less fodder and females are easier to plow with. Sold after weaning, the bulls move west on the island to be fattened in Sampang and Bangkalan where fodder is more abundant, before being shipped to the abattoirs of Surabaya and enter the Indonesian beef industry. A look at bovine numbers and sex ratios demonstrates this (Table 3.20).

Table 3.20 – Human and cow population in the Madura archipelago by district in 1983

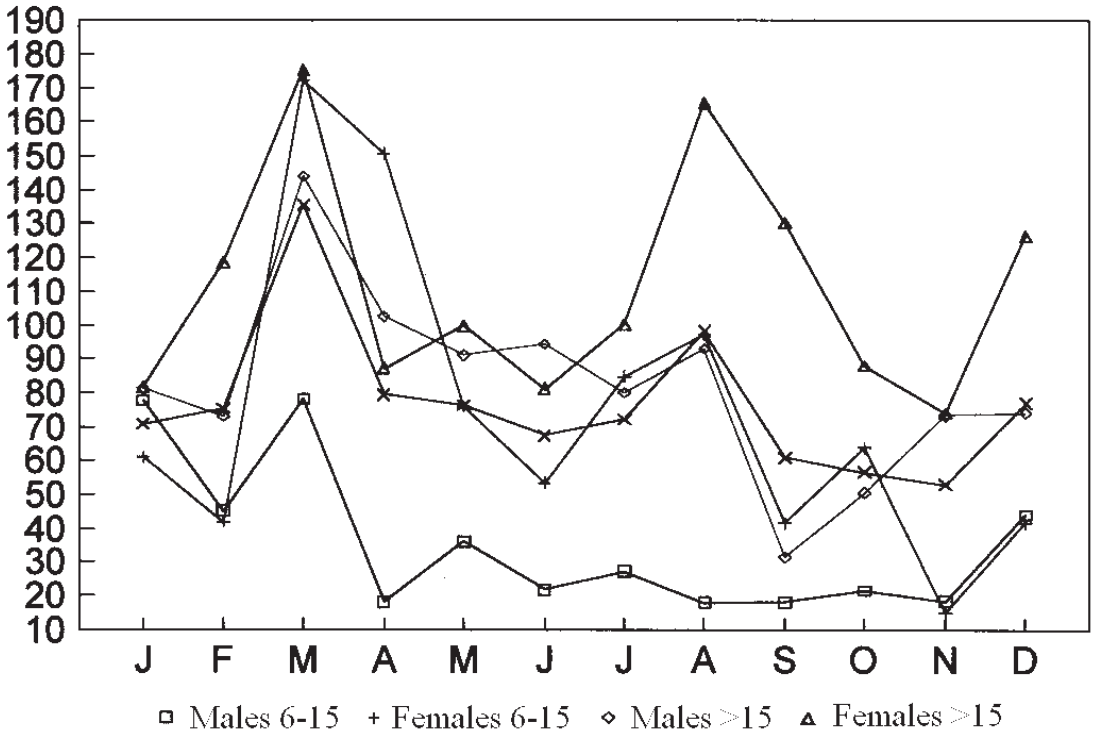
	Cow population			Ratio bovine F:M	Human population	Ratio human: bovine	Ratio Ha.: Bovine
District:	Male	Female	Total				
Bangkalan	58253	127097	185250	2.2:1	693744	3.7:1	0.63
Sampang	55609	110230	165839	2.0:1	607358	3.7:1	0.66
Pamekasan	29852	75337	105189	2.5:1	548298	5.2:1	0.71
Sumenep	51382	251962	303344	4.9:1	868392	2.9:1	0.49
Total	195096	564626	759722	2.9:1	2717792	3.6:1	0.59

Caring for cows is one of the household's most important daily chores. This includes supplying forage and water (done by men and women), and washing and grooming (done by men). The most important activity in terms of time spent is clearly the collection of fodder. As mentioned above, there is virtually no permanent pasture land and few plots left in prolonged fallow on the island of Madura. Thus, green fodder for cows must be found on the narrow bands separating plots, along the shoulders of roads and paths, or in the few areas where cultivation of food crops is problematic, as in the rocky outcrop areas near the coast coast. Their diet is supplemented by leaves and the carefully collected, dried and stored crop residues. Only when the fields are fallow for a few months out of the year can cows be seen grazing on their own. They are then tied to a shrub or stake with a short rope, and their owners or guardians check on them from time to time. Most of the time, however, when the animals are not working, they are kept in the stables (*kandhang*). People must thus locate, cut and haul back home one to three baskets of forage for their cows each day, or up to 20-30 kilograms for a grown animal. All member of the family, except very young children, participate in this time-consuming task. During the rainy season, sufficient fodder can usually be found on one's own land or a short walk from the *tanèan*. During the dry season, when fodder growth comes to a halt for two to five months or longer (Payne 1973: 28), the stock in agricultural residues will play an important role, alongside the collection of leaves from household garden trees. The Madurese make one major tradeoff on this score through their efficient use of crop residues for cows. The thickness of the upper layer of soil is thin, particularly in the hilly areas, but by feeding most residues to cows it means that less can be left as green manure to improve the quality of the soil.

Invariably, and despite the careful efforts to conserve all available crop residues, the stocks will run out and the family will have to begin searching forage wherever it can be found. This may mean travelling very far to cut green fodder or leaves on foot, truck, or even on bicycle (in which case two *karanjang* are fastened to the rear). The low-lying town of Sumenep is one destination, as there always seems to be grass available in town on vacant lots, on the cemetery grounds, around the administrative buildings and in the town's outlying rice fields left fallow during the dry season. On a typical early summer morning, a steady stream of bicycles head for the town from villages up to 20 kilometres or more distant, including Batuputih.

It is not unknown for this trip to be done on foot. Those out of reach of the town must scour their local area to assure their cows a sufficient, if meager, ration. The stock-raisers in the Gunung Papan area of Batuputih frequently go on foot to collect leaves in the forest reserve near Sergang, some 8 kilometres away. An indication of the gender and seasonal variation in time in relation to fodder can be seen in Figure 3.5.

Figure 3.5 – Minutes spent looking for fodder for cows and goats by age, gender and month in Gedang-Gedang in 1986



In the hilly areas, the provisioning of water for cows can also demand a lot of time and energy, as wells or springs may be several kilometres from the *tanèan* Cows are usually washed down following plowing, and the Madurese are known for the attention they give to their animal's appearance. Other care is involved when, on occasion, cows participate in ritual or sporting events, are bought and sold, or when cows need assistance m parturition. Finally, the ownership of cows implies the construction of a *kandhang*, a simple stable housing from 1 to 4 heads. *Kandhang* are constructed in Batuputih with wood or bamboo frames, walls of split and woven bamboo, fans from the Asian palmyra or (less often) wood planks. Baked tiles or Imperata provide the roofing. Some agricultural residues can be stored in the *kandhang* but their bulkiness often necessitates the construction of one or more separate rudimentary shelters (*bharung*). The *kandhang* is always placed near the *tanèan*, where the cows can be under regular surveillance, since in many areas cattle theft is rampant.

As in other peasant agricultural systems, draught animals are kept for their multiple uses. Cows can provide draught and road haulage power, milk and derived products, meat and carcass products, manure for fuel or fertilizer, calves and a form of investment. Up to 100 kg of manure are put on each *lagghu* each year to make agriculture possible. Commercial fertilizers have been available for over thirty years but they are costly and must be handled with care, particularly when applying close

to the stalks of young plants without watering at the same time. Cow dung is better and little, if any, is "wasted." What is collected in the stables is often mixed with weeds and corn stalks, dried, and partially burned before application as a fertilizer. The increased temperatures induced by this composting treatment significantly reduce the pathogens and parasites present in livestock wastes (National Research Council 1981:97-98). What is lost on fields, paths and roadsides cannot really be considered as wasted, since it plays a role in the maintenance of fodder resources. Dung was once also used as a domestic fuel, as in India, but this practice seems to have died out for Batuputih farmers, who now laugh in disbelief at the suggestion. Dung is also sometimes burned in small quantities in the stable to ward off biting flies and mosquitoes.

Madurese consumption of beef is extremely low. Consumption of all animal protein is low, though in some areas fish is taken almost daily. One study (Kardjati et al 1978:28) found that in rural areas only six percent of the households had meat and about eight percent had eggs three times per week or more frequently. Though beef is highly esteemed, it is rare for a Madurese farmer to slaughter his cow. This occurs only on the most special occasions, such as a marriage, funeral, and some ritual occasions when many guests will have to be fed. Poorer families who may not have a "spare" cow to slaughter will likely opt for a more modest ceremony, where chickens, a goat or small quantities of beef purchased in the market can suffice. As in other peasant and pastoral cattle-rearing societies, the overall value of the animals discourages unrestrained consumption.

In Madurese village society, few commodities can compete with cows as a form of family savings and investment. Selling cows is a way of liquidating assets, usually old, unproductive cows and new-born or young calves. A calf at birth was worth around Rp 75,000 in 1986. The same calf raised to the age of one year netted an average of Rp 135,000, representing an added value of Rp 60,000. Though this is a small reward for the hours of collecting forage over the course of a year, it compares favorably to the earnings from other agricultural endeavors. For comparison, as we saw above, the average household in the Gedang-Gedang sample group cultivating five *lagghu* received just over Rp 71,000 in net value from their first maize and intercrops in 1986. The returns to labour are, however, much lower due to the fodder collection, as will be shown. On the other hand, most of the family members can be put to work collecting forage, and the most time-consuming collection, during the dry season, comes when there is little other agricultural work for those not involved in tobacco cropping. Unfortunately, too many of the poorer families are forced to sell their calves just after weaning, rather than add weight and value to them, due to a pressing need for cash.

The most obvious of the energy transfers referred to above is the contribution to traditional agriculture of bovine draught power. Motorized machines and implements are almost totally absent from the Madurese context, where few farmers have large enough holdings or the financial means to make their use viable. One factor that should be mentioned is the unpredictability of rainfall, a factor that insures that with high human population under the prevailing mode of production, the accompanying reduction in the average size of land holdings will not lead to a proportional decline in the number of plow animals per holding. Observations in Batuputih can serve to illustrate this point.

As has been shown earlier, most farmers in the Batuputih area plant two or three main crops each agricultural cycle: one or two maize crops, sometimes rotated with rice, and a possible third maize or tobacco crop during the dry season. Proximity to a source of water is necessary, as the tobacco plants necessitate frequent hand watering. Almost all of the plots in Batuputih are dependent on

rainfall, as there are very few areas where springs or rain runoff can assure regular irrigation, and there were no tube wells in the local area until after 2000. The first crop must be planted at the onset of the first adequate rains of the monsoon period. Immediately following these rains, within a few days or even hours, the cows will be put to work plowing. Time must not be lost, for if the farmers do not take advantage of the humid soil their seeds will have little chance of taking hold. A household that neither owns nor sharecrops draught animals has no way to contribute to a working party of plowmen, and if they must hire plowmen, there is the risk that their turn will come too late to ensure optimum timing in the planting of their crops. Often, especially in the dryer regions of the island such as the hilly area of Batuputih, the first rains will be followed by a dry spell which kills the young plants. Those without access to draught animals following the next rain may be again disadvantaged and delayed to the point where their crop reaches maturity only during the second planting season. Furthermore, the cost of renting draught animals with a plowman is prohibitive for many cash-poor farmers, especially for the first planting when those without tobacco revenues or in debt from the cash crop are in financial straits. The only safe solution is to have one's own pair of draught animals. Also, plowing an average field is usually done with two to six pairs of cows, so as not to overexert the teams. Those who own or guard cows are sure that through reciprocal arrangements they can count on enough help when the edaphic conditions are favorable. Less predictable rainfall, along with the specialization in cow-calf operations (smaller animals on average) explain why the number of cows per household in East Madura remains high in relation to household holdings in land and to population.

Compared with horses or cows used for transport purposes, Madura cows are surprisingly underutilized; they are sometimes seen pulling carts but only in West Madura. Considering that they work a few days (or more often, a few half-days) during several plowing periods lasting only a few weeks at most, Madura cows spend most of their time idle in the stable. The necessity of plowing and sowing following rains, which can be highly unpredictable, and the lack of substitutes for cow draught power, outside of humans themselves, explain part of the reason why cow numbers have remained high in the face of population growth and the reduction in the average size of holdings, even if the relative efficiency of reciprocal arrangements helps keep the cow population from growing even further.

Calculating returns to labour for cows is fairly straightforward if one ignores the multiple benefits cows provide. If we forego putting a price on the manure that replaces chemical fertilizer purchases, or the value of the draught power that allows farmers flexibility in crop scheduling, we can simply take the amount earned during the year as a function of time spent in cutting grass, building *kandhang*, and other bovine care. The total value of the 36 households' holdings was estimated at Rp 24,750,950 or Rp 687,526 per household at prices current in 1986, their earnings that year representing a return on investment of nine or ten percent. This is based on total sample earnings of Rp 2,715,000 from sales of bovines in 1986, or an average of Rp 75,417 minus Rp 10,000 for expenses. I estimate Rp 10,000 as an average amount spent for constructing a *kandhang*,[136] paying for an occasional basket of fodder or water, eggs sometimes given cows as a fortifier, or a treatment from the agricultural extension officer or a traditional healer. This includes sales of weaned calves and larger animals, but does not take into account the value added on to the remaining household stock. This latter element is extremely difficult to calculate

[136] A *kandhang* cost anywhere from Rp 50,000 to 150,000 in 1998 depending on materials and labour used, and remains functional many years. The wood boards under the hooves should to be replaced yearly.

without weighing the cows at the beginning and end of year for a more exact determination of value than my estimation based on site and average market prices. For simplicity sake, I use the amount earned from sales, which were based on precise reported figures, as an indication of an average year. Sometimes, farmers requiring funds to plant tobacco will liquidate a cow or two before planting and purchase cows again with the gains from the harvest. But in 1986, the only purchase made in the 36 households was by one well-off household that purchased two males for racing (*kerrabhan sapè*). Fifteen families did not sell any cows during the year. But all kept some cows at some point during the year. Only one was without cows at the end of the year, a female trader living alone, as she had sold her only cow during the year. Although basing returns on one year, even an unexceptional year like 1986, is not a perfect solution, it gives a general idea if one assumes as I do that those households selling more stock than usual will be offset by those not selling any. Table 3.21 summarizes the data for time allocation to determine average returns to labour.

Table 3.21 – Time allocation observations and time equivalent for cow husbandry activities for 36 Gedang-Gedang households in 1986

	age/gender:	M > 15	F > 15	M 6-15	F 6-15
TA OBSERVATIONS	*6606**	*2412*	*2466*	*1064*	*664*
Gathering, giving fodder	796	288	389	53	66
Fetching, giving water	20	7	11	1	1
Constructing cow/goatshed	12	11	0	1	0
Other care for cows	16	12	3	1	0
Trading one's animals	5	4	1	0	0
Total	849	322	404	56	67
TIME					
Gathering, giving fodder	307	86	114	36	72
Fetching, giving water	7	2	3	1	1
Constructing cow/goatshed	4	3	0	1	0
Other care for cows	5	4	1	1	0
Trading one's animals	1	1	0	0	0
Total	325	96	118	38	73
age/gender weighted	326	123	156	21	26

* The number of observations for each group is presented in italics. The first figure is the total number of observations. The calculation of time spent in separate activities is a function of the number of observations, as follows: time = number of observations x 720 minutes / total number of observations. Totals may not add up exactly due to conservation of decimal places.

Returns to labour, consisting almost entirely of collecting fodder, come in at only Rp 33 per hour or Rp 264 per 8-hour day. Children under 16 provide 14.5 percent of the total labour charge. Gathering fodder is a task that is suited to children, and from the age of 6 or 7 they will be encouraged to take part in the chore, and given a small sickle. From the table and figure of monthly variation it is seen that girls participate almost as much as their parents, but their score in the table once weighted drops. Although returns from animal husbandry are very low in comparison to other crops and employment (compare to the Rp 110 per hour for maize and intercrops), but their multiple uses ensure that they will continue to be central to these households. Cows provide wealth that can be disposed of readily in case of need. Some years

there is no cash benefit, but the multiple uses continue to be of value while another year of equity goes onto the hoof. I will return to cows and bulls in the next chapter to illustrate how one of their uses—in festive bull races or cow beauty and agility contests—stimulates various forms of economic and social exchange between households and within the wider community.

3.10 Goats, chickens and other animal husbandry

Goats

Fifteen of the sample households kept one or more goats (*embi'*), and three had sales during the year for an average of Rp 25,333. The time involved is much less than for cows, since goats can be led to a vacant field and left to fend for themselves. Only if there is nowhere to take them or a storm approaching will they get grass meant for the cows (the destination of cut fodder was not asked since all families had cows, but was always assumed to be primarily for cows as I rarely saw goats indulging in cut fodder). Children can do all work involved, and goats can be taken to the field and picked up en route to other activities. To calculate returns to labour, it is necessary to count all the families keeping goats both for time and for returns. The per household "sales" then drop to Rp 5067 a year on average. The time allocation data must use different age/gender coefficients, since the average size and composition of the fifteen households varies from the norm: 3.09 individuals.[137] The figures also need to be corrected with the proportion of families raising goats (15/36) to give the actual returns, which are only somewhat better than for cows. For the households keeping goats, Rp 43 is earned per hour of work, or Rp 347 per 8-hour day. [138] These returns are not as high as wage labour or agriculture, but keeping goats has the advantage of using child labour: over 48 percent of all the work is done by children. Goats are kept not only as a financial asset, but also to be slaughtered for special occasions, since for most life-cycle events a goat is more than enough for feeding guests.

Chickens

The total value of free-ranging chickens (*ajam*) sold in Batuputih in 1986 was only Rp 21,250 by three households. The returns to labour are not easy to determine since poultry is often consumed within the household for special occasions and eggs are often exchanged without cash, or sold in small quantities to buy supplies. Selling a live animal provides more than enough for shopping usually, so the value as investment cannot be overlooked. Very little work goes into looking after chickens, though they can become pests in that they need to be shooed away from drying crops and from going indoors. None of the sample households were keeping large numbers of fowl, aside from one household which had 16 hens and 5 roosters. The average holding was 3 or 4 head. Eggs (*telor*), however, were an important supplement to the household budget, with 23 households selling eggs for an average

[137] The composition of these households is as follows: adult males: 1.00, adult females: 1.10, boys 6-15: 0.60, girls 6-15: 0.32, boys 2-5: 0; girls 2-5: 0.7; boys 0-1: 0; girls 0-1: 0.

[138] The calculation is as follows: Rp 5067 average returns for the fifteen households raising goats = Rp 5067 / (365 days x 8.00 household minutes average time per day) x 15 / 36 (to correct for families raising goats) = average returns to labour for goat husbandry of Rp 1.73/min = Rp 104.09/hr = Rp 346.97/8-hour day. Figures may vary as decimals were carried forward.

earning of Rp 4136. I recorded very few observations of work attached with fowl. They fend for themelves, and the selling or exchanging of eggs eggs or marketing of birds can be done with neighbours or in the market, so does not require much real time. The most time-consuming work seemed to be managing to catch them to take to market or the chopping block, or to coax them into climbing bamboo poles to spend nights in the trees, a practice thought necessary to avoid them being snatched by thieves. Many do seem to disappear, going by the stories one hears, and disease can suddenly decimate an entire flock, so there is an important degree of investment risk involved. The returns are probably high, but risky, and moving from free-ranging to cooped-up chickens, which provide high and regular returns, requires a substantial investment in housing, feed and medicine, none of the sample families were able to do between 1986 and 2009.

Other animal husbandry

Some households did beekeeping, using a hallowed-out log hung from a tree or the side of their house. Rp 101,000 was earned in 1986 by eight households for the honey, which in Sumenep is prized for medicinal and fortifying properties and sold for up to Rp 50,000 a litre. Time allocation data was not sufficient to judge the time involved, indicating that the returns are very high, but one household cannot easily or regularly earn more than Rp 20-30,000 in one year from beekeeping. Nevertheless, it participates in the diversified income repertoire.

Fishing

Unlike much of the north coast of Madura (see Niehof et al. 2005), fishing is unimportant in Batuputih. There are few boats in the sub-district except in Sergang, to the west of Gedang-Gedang, and none are owned by any of the sample households.

North coast villagers can collect milkfish fry (*Chanos chanos*), called *nyèsèr*, when the fry proliferate along the coast for about four to six weeks, three seasons a year. Winds from the north provide the best conditions. The barely visible fry are collected in pails and sold to a middleman in nearby Batuputih Daya who sells to a trader who comes from Sumenep. The fry will be sold to stock brackish-water fishponds elsewhere in Madura or Java. The collector advances with a triangular shaped net on a wood V-shaped frame held at the intersection of the two branches and placed halfway in the water with the large open netting towards the front. Women and children work near the shore, in mid-calf depth. Men can gather milkfish fry more effectively walking or swimming in chest-high water using a long necklace of khuskhus strung between two bamboo poles (a contraption called a *kanaongan*). The milkfish fry are attracted to the khuskhus blades. Harvest varies greatly depending on the winds and currents, as well as technique and skill, though during some periods during the season there are none to be found. On a good day, a man can collect 30 an hour or 300 in a long day (400-500 is possible on exceptional days), but some people will still continue to collect even if they only harvest 3 or more an hour. One group of men along the coast calculated that in a typical month-long season, seven days can provide a man 500 live fry a day, three days at 100 a day, and 20 days at 25 a day. The price in 1986 stood at Rp 1500 per 100 fry, for a return of between Rp 45 and 450 per hour of work. In 1990, the price shot up to Rp 6000/100, offering returns of Rp 180 to 1800 per hour. In 1996, the price was at Rp 4000 to 4500/100, giving returns of from 120 to 1350 per hour. The “typical” season using the calculation above would give seasonal returns of Rp 64500 at 1986

prices (Rp 270/hr), Rp 258,000 in 1990 and Rp 182,750 in 1996. Comparing with the average 1986 maize crop in Temberean (see Table 3.8), we find that *nyèsèr* provides two-thirds as much as one cropping season net harvest. For households with little land or when prices are high, *nyèsèr* outperforms agriculture. The cost of equipment is negligible, and access is open to anyone though most participants live near the coast where they are informed of the season and the fluctuating availability of catch. The main limits are the short periods during the year when high earnings are possible and the irregularity even during the seasons.

Some small and rickety boats are owned in Gedang-Gedang and can be rented on a "sharecropping" basis. The owner of the boat takes one out in the two-person boat and receives half of the take. The people who did this sometimes only were able to catch enough for household consumption. They usually catch small sharks, tuna and rays, or shrimp for making a local salty shrimp-based condiment often eaten as a meat substitute.

3.11 Mining limestone bricks and handicrafts

Limestone bricks

People living in the north of the village can excavate limestone bricks (*ngalè bato'*) in the outcroppings of pure limestone. Nothing of use can be grown in these areas, still the land is privately owned by individuals. The stone bricks are quarried near the surface using picks, right-angle shovels and handsaws to the standard sizes demanded by the buyers in Sumenep and elsewhere, who use the bricks for all building construction. Bricks are sold by the 1000 units, or in smaller quantities for building homes or other structures locally. In 1986 in Batuputih Daya, a generator driven electric saw began to be used. The trucks come in greater numbers during the tobacco season and it is said "bricks follow tobacco." Cutting bricks was an important occupation for many households in Gunung Papan and Temberean, particularly the poorest households. The job is open access if on one's own land, or through sharecropping arrangementI on someone else's land. Children, the elderly and women can do the job, but usually men are found in the quarries. Women and children can cut 25 bricks a day; elder men 50 and an experienced man 100 a day. In 1998, the bricks were going for Rp 11,000 per 1000. The returns to labour (not counting the cost of replacing the tools yearly) were therefore from Rp 23 to Rp 92 per hour. By 2000, the northern areas of outcrop in Gedang-Gedang were no longer producing, but the work continued in other areas to the west and east. At the highest output, one can equal the highest wage labour in agriculture, but at the lowest output it is not possible to provide for one's own minimal subsistence, a predicament that is also encountered in the case of those who make sitting-mats.

Handicrafts

With three Asian Palmyra fronds, a sitting- or sleeping-mat (*tekker*) can be woven in about 14 hours and sold for Rp 500 (or Rp 600 during then tobacco season when they are required for wrapping shredded tobacco). One who does not have the trees himself has to buy the fronds for Rp 100 each. The returns to labour were only Rp 36-43/hr for those with available leaves and Rp 14-21/hr for those who needed to buy the leaves in 1986. Removing leaves can have an impact on the production of sugar from the trees. Only three can be taken safely for making *tekker* per tree, resulting in some tree owners still having to buy from others (if the tree is cut down,

it will yield fifteen fronds). The low returns are due to the highly accessible nature of this occupation, able to be done by almost all household members, and at any time day or night. Particularly, *tekker* making is done by poorer households or those with senior members who are unable to do other more strenuous labour. It is often their way to continue to contribute to the household, even if their productivity is not enough to ensure their own subsistence, as measured by rice-equivalent consumption minima. It is generally assumed that the poverty line is equivalent to 240 kilograms of milled rice equivalent per person per year,[139] or two-thirds of a kilo of rice per day (in Madura about the same amount of maize could be substituted). In 1986, with rice at Rp 350 a kilo, a tekker maker would have had to work from 5.4 to 16.7 hours to reach this bare minimum subsistence level. During the tobacco season, nonetheless, when the demand rises for the *tekker*, many more people will be found spending evenings making them while socializing in the *langghar*.

3.12 Trading and marketing strategies

Traders come in many shapes and sizes. Few live only by trading, because nearly every household in the village owns land as well and plants crops every agricultural cycle. Most traders deal in one or two items in very small quantities. Those who deal in small quantities of standard commodities such as maize (most of whom are women) make their income off of the small differential between the price large traders will pay for commodities in small as opposed to larger volumes. The tiny difference means the small trader must purchase small amounts from many villagers in order to make enough for her subsistence. Similarly, when large traders in Labung Dua' sell to outside traders, generally meaning the Chinese dealers in Sumenep (*taukè*), they may receive very little per kilo, but make their profit on the tonnage they can put together. To obtain the additional Rp 5 for one's maize, one has to sell to them of 100 kg or more, otherwise, sales are to smaller traders. If the farmer receives Rp 350/kg, the small trader will sell to the *juragang* at Rp 355/kg and he will sell to the *tauké* for Rp 357.5. For bananas and other fruit, small traders do the work of collection and bulking and another trader will take a load to Sumenep to sell in the markets there. A small trader therefore needs to try to buy at least a quintal or two of maize from farmers, or complete a smaller amount with purchases of beans (where she can make a higher markup, almost 10 percent, as in Rp 550 purchased – 600/kg sold). A good small to medium-sized trader with a large network of villagers who sold to her was able to purchase 50 kg each of rice beans and green gram at each market day during the harvest seasons. This gave a return to labour of Rp 833 per hour for six hours. In the off season, returns could be half this. Some small traders are satisfied if they can get the minimum quintal of maize during one market day, netting them Rp 500 for the day, or Rp 83/hr.

An idea of the multiplicity of small traders and the variety of items bought and sold can be obtained from a sketch of the market I did in November 1990 with my wife (see Figure 3.6). We approached each trader and arrived at an estimation of the value of each type of item being offered for sale. A videotaping was also done of each trader and his or her wares. Other traders are sometimes posted along the roads leading to the market to engage customers en route.

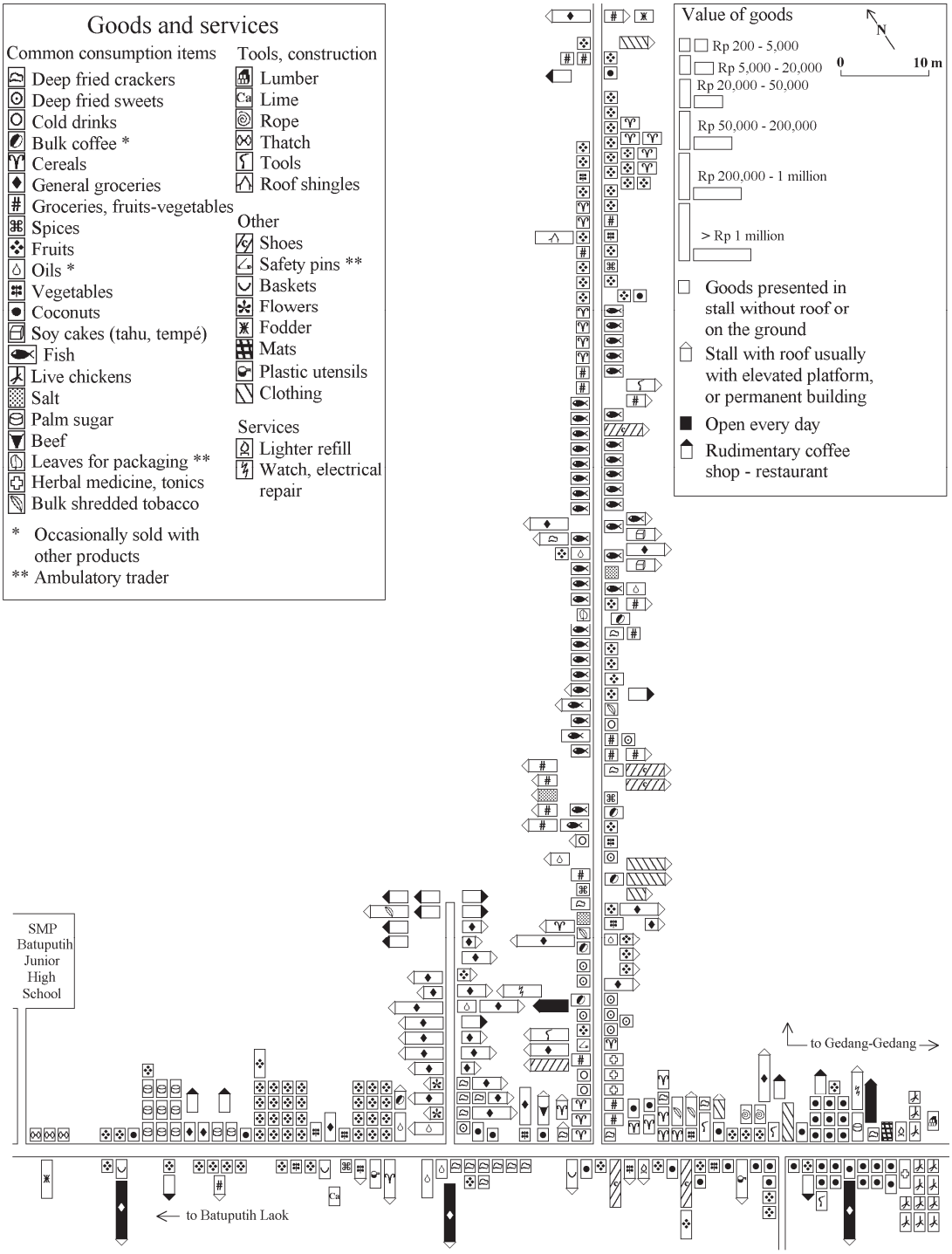
[139] Half this amount represents a minimum daily ration of one-third kilogram of rice (about 1200 calories) with the other half supposed to cover all other expenditures (see Penny and Singarimbun 1973:3 and White 1976:144-146).

The large number of traders results from the need for farmers to sell small quantities frequently to obtain cash for daily necessities. This in turn requires a great number of people who can collect and control the quality of many small quantities, bulk them, and transport on to the next level. Between the farmer and the *taukè* the goods will pass through at least two hands, if not more. Trading also takes place in ambulatory fashion, when traders, almost exclusively women, sell small quantities of necessities walking from house to house in the hills, accepting either cash or maize in payment.

Medium volume traders buy from farmers and from small traders and sell to a *juragang* or *blidje' raje* or take the items to Sumenep for sale in the market there. One woman in the sample bought bananas and other fruit at the local markets on Tuesday, Wednesday and Saturday and brought them to Sumenep to sell at the Pasar Malam, a small fruit market open afternoon until morning. She would typically buy 10-15 bunches of bananas for Rp 1000-1500 each and pay 1000 to transport herself and the bananas to and from Sumenep. At the market, she would break down the bunches into hands to sell townspeople. She would stay from 11 a.m. to 6 a.m. the next morning, and if it all went well she would gross Rp 30,000. Minus expenses, she would have at least Rp 6500 and often more for almost 24 hours work, a return of at least Rp 270 per hour.

The major traders with large capital resources at their disposal are those who were well-placed on the main road between the time when Labang Dua' began to be a focus for trade in the mid-1950s and the asphalting of the main road in 1977. Before then, the market was at Aengmera or Batuputih Laok, Labung Dua just a juncture on the main road with a couple of coffee shops where small time trade could be done. In 1970, a trader from Aengmerah married a woman with land on the road at Labung Dua, and started receiving crops from the farmers. Today he is a *juragang*, one of the largest traders in the sub-district, buying everything from maize to sisal to tobacco and selling a complete range of items in his stores, of which he and his family own five. It is hard to pinpoint his exact earnings or returns to labour, but they are considerable. During the tobacco season, he sends each day one to two trucks loaded with 50 *bal* of shredded tobacco (2.5 tons) each to the warehouses owned by the tobacco companies. He says he takes a cut of only Rp 100/kg on the price agreed beforehand with the warehouse, so as to leave a margin of Rp 100 for the *blidje'* as well. This lasts for six to eight weeks. If he is sending 45 days a season an average of 1.5 trucks with expenses of Rp 30,000 per trip, he is clearing Rp 14.85 million a season, or 20625/hr. He has to work 16 hours a day for this period, consisting for a large part of discussing business on his porch.

Figure 3.6 – Market traders, inventories and structures (Labang Dua' market; Tuesday, 20 November 1990)



Knowledge of the prices and quality, colour and aroma desired by the companies puts the *juragang* in a privileged position to give his *blidja* the capital and commissions to retain them while still making a comfortable profit on every shipment he makes. He needs to be politically astute to know when he or his drivers need to give money to military or police on the road. For tobacco traders, that often means sending the trucks at night, or bringing along a veteran to dissuade the predation. He also has to tactfully refuse most of the frequent requests for loans of capital to buy crops or tobacco for him from people who want to try their hand at

trading. He had twenty *blidja* working for him in 1986-1990, and gave them each capital of between Rp 500,000 and 1.5 million. The *blidja* who can send five *bal* a day will make over Rp 1700 an hour (outside of shredding), and much more if he has a big shredding operation and several *tukang masat*. A large trader with extensive contacts can get up-to-the-date price information that gives him a key advantage in dealings with others. The dependence of buyers on his products leads to a special trust developing between them, and he will generally know what he can receive for his goods before committing funds to their purchase, effectively shielding him from most risk.

Livestock trading can generate high incomes for the livestock trader (*dhagang sapè*), and very low incomes for the many assistants (*nangke'*) he has under him. The trader, with his capital and knowledge of villager's holdings, market prices and their fluctuations—for example, cows drop in price at the end of the second maize season (April-May), remain low during the dry tobacco season, and rise again before the first rains (September-November)—negotiates with villagers the sale of their animal. He pays in advance or after the market sale, depending on the agreement. The animals are brought to one of the four main markets used by Batuputih traders (Sumenep, Dasok, Rubaru, Gapura) in one or more trucks hired by the trader. The *nangke'* load the animals into the trucks and are in charge of holding them and making them look lively and healthy in the marketplace, a job that entails whipping and shouting at the beasts. They hope that one of the cows they are in charge of will sell, which will earn them a commission (around Rp 3-5000 for a large cow in 1986). The trader earns substantial sums from the difference between what they pay the farmers and what they receive from the sale, though on any given day very often they will say they lost money, hence the difficulty in determining their earnings.

I am able to estimate, however, the number of market days worked by one trader, who happened to be in the sample group and with whom I developed good rapport over a year, based on the number of weekly visits to his house when he was reported out trading or at the market (9 out of 53 visits which can be assumed to equal approximately 63 days of trading). We went over his results in 1986 and came up with a figure of Rp 3,000,000 in profits after expenditures. This would mean a return of Rp 47,619 per day or Rp 5952 per hour. Over the years, he put together a small fortune and his daughter and family were living quite comfortably in one of the most imposing houses on the coast by 2009. I also have a *nangke'* in the sample who was at the market 24/53 times (equal to 165 days) and who claimed to have only earned Rp 120,000 during the year, a return of Rp 90 per hour or Rp 727 per day. More than once the wife of the *nangke'* corrected me during my weekly visits when I confirmed that her husband was out trading livestock, saying: "he's not a trader, just an assistant." This household was one of the poorest in Gedang-Gedang and had received government assistance to repair their house given to only one or two families per year as determined by the village secretary. Despite his hardship, his elder son was able to learn the trade from him. After trading a while in bananas, the son had enough capital, and in 2005 began livestock trading.

Many different types of food are cooked and sold on market days or at public gatherings such as elections, marriages, performing arts, or other events, with the goods placed on the ground or in small stands with or without benches. Items cooked including *rujak*, rice and meat dishes, soups, sweets, or simply coffee and tea. Returns are variable, depending on the items cooked. The returns range from Rp 2500 to 5,000 per person involved after expenses for 5 hours of preparation and 5 hours of sale (250-500/hr).

Most marketing in the village is based on the need for villagers to sell sometimes large but often small amounts of their production to meet daily needs. The small average sales of commodities and purchases of consumption items by farming households requires multitudes of small traders buying and selling similar goods and keeps margins thin for most products. The thin margins require traders to make many transactions to hope to arrive at a reasonable income over household consumption. Successful marketing is contingent on developing the tools of the trade and a sufficiently large network to attract large number of regular clients among the farmers (for the small traders) or the *blidja* and small traders if one is a medium-or large-trader dealing in bulk quantities. The most successful have an infrastructure of vehicles and staff to handle large quantities of merchandise coming in, and have developed extensive networks and the trust of *taukè* and warehouses able to receive truckloads of commodities, not to forget the political acumen to deal with the administrative and social obligations that come with high income.

3.13 Summary of returns to labour

The basic rule to returns from production in Gedang-Gedang can be summarized as follows. High earnings are possible in situations where the risk of loss is high (as in tobacco cultivation and trading), when conditions of urgency, high demand, or risk of spoilage require that work be done quickly (as for plowing fields after rains, or shredding tobacco), when the individual has special and rare technical expertise or craftsmanship (such as a *juragang* or to a much lesser extent a carpenter), and when the individual has access to a large and diverse network of bosses and clients. The latter can provide credit and insurance against loss depending on the level of trust built up and the access to up-to-the-date information on evolving prices for certain goods. Finally, rare or new objects may fetch high prices until their value is established, giving those with access to price information a special advantage.

Occupations that are open-access generally pay less than occupations that depend on networks, rare technical skill, capital, or that have a long gestation period. Also offering less returns are occupations that are secure and regular, such as working as a maid or as an assistant doing manual labour for a trader.

Table 3.22 – Common occupations in Gedang-Gedang: summary of returns to labour (1986) and constraints on access

Occupation	Returns to labour (Rp/hr)	Meals included	Land	Seasonality	Patronage	Network required	Technical skill required	Risk	Returns highly variable	Gestation period	Occasional short duration	Capital at least Rp 1 M	Male only	Female only	Children or seniors can
Agricultural and wage labour															
Maize, intercrops	110		X												X
- sharecropping	73				X										X
Rice	147		X												X
- sharecropping	73				X										X
Tobacco	36		X	X				X	X						X
- seasonal rental	32			X	X			X	X						X

Occupation	Returns to labour (Rp/hr)	Meals included	Land	Seasonality	Patronage	Network required	Technical skill required	Risk	Returns highly variable	Gestation period	Occasional short duration	Capital at least Rp 1 M	Male only	Female only	Children or seniors can
Tobacco shredding	1167			X											
- *tokang masat*	714	X		X	X		X								
- *tokang ghulung*	250	X		X											
- *tokang lantak*	250														
General garden	233														
Cantala fibre	131									X					
- sharecropping	65														
Palmyra sugar	100									X					
- sharecropping	50				X										
Fetch coconut	125										X		X		
Plowing,own cows	183	X											X		
Hoeing	87	X											X		
Planting	69	X												X	
Weeding (men)	49	X											X		
Weeding (women)	49	X												X	
Water, etc. tobacco	99	X		X									X		
Carpentry, masonry	99	X					X						X		
- assistant	93	X					X						X		
Animal husbandry															
- cows	33									X					X
- goats	43									X					X
Fishing															
- *Chanos* fry	270			X					X						
Trading															
- large wholesale	1500					X						X			
- large tobacco	20625			X		X						X	X		
- small tobacco	1700			X	X	X	X		X			X	X		
- livestock	6000					X	X		X			X	X		
- livestock *nangke'*	90				X				X				X		
- fruit, Sumenep	270+					X									
- market, small	83-415														
- market, medium	415-833					X									
- cooked food	250-500	X													
Services and crafts															
- *becak*	73-504								X				X		
- porter Sumenep	300												X		
- porter, local	156												X		
- maid, Sumenep	63	X			X									X	
- water porter	75-100												X		
- water porter, bike	188														
Cut lime bricks	23-92														X
- sharecropping	12-46														X
Sitting-mats	36-43														X
- fronds purchased	14-21														X

CHAPTER FOUR
SOCIAL, POLITICAL, AND RELIGIOUS DYNAMICS

4.1 Introduction

This chapter defines and describes the main elements of Madurese social organization, beginning with the most fundamental unit of the family before considering more encompassing groupings such as the neighbourhood, religious and political institutions important for understanding social dynamics and stratification. The household or kitchen unit will be defined first, then using data from the village census patterns of kinship and household composition will be described and quantified. I will illustrate the physical space of the domestic unit, particularly the various types of Madurese houses from the simple to the elabourate, and household groupings (*tanèan*). In the discussion of groups that unite beyond the household cluster, I will go into some detail into religious and ritual institutions that impact on the household and its members, and the political structures that involve and control them. The chapter will close with a discussion of social differentiation and stratification, focusing on the key distinction between labour receivers and labour providers, categories that are subject to change as households move through developmental stages and economic opportunities shift.

4.2 Households and their composition

The household (*soma* or *dhapor*, the latter meaning hearth or kitchen in Madurese) is the fundamental entity for social interaction in rural Madurese society. A dynamic empirical unit, it fulfils the functions of production, reproduction, pooling, distribution and redistribution (Arnould 1984:130) and makes decisions as part of a larger process encompassing the household and the wider social context (Pennartz and Niehof 1999:1-2). Income sharing and care giving may also occur between households, such as when households with members sharing kinship ties make up a household cluster (*tanèan*, meaning the courtyard around which the dwellings are situated). More distant kin and neighbours also engage in exchange and care relationships. However, these examples of resource sharing are less obligatory in nature than those occurring within the household.

A household (*soma*) is composed of one or more conjugal units or conjugal family units (CU or CFU), a CU consisting of a married couple and their offspring (Hammel and Laslett 1974, Arnould 1984:138). In its most basic form, the conjugal family unit is equivalent to the nuclear family. A household, or several households, grouped around the courtyard, comprise a *tanèan.* In 1996, *tanèan* in Gedang-Gedang were composed of anywhere from one to five households and up to 23 individuals. The most important point defining the household is the kitchen (*dhapor*), since a household exists when it shares a single kitchen, and the resources of the household for food consumption are more or less pooled. In most cases, agricultural harvests are also pooled, though land, livestock and other valuables generally belong to individuals who release them into the common domain of the household for as long as the household remains intact. As dynamic units, house-

holds may incorporate new members or split into two separate households asthe situations of its members change, actions which entail a redistribution of valued resources.

The three elements of a CU are usually present: the husband/father, the wife/mother and the child(ren). Taking a cue from Skinner (1997:56), I consider a CU any combination of two of these three components.[140] Thus, a couple without children, a mother and her children, and a father and his children all constitute a conjugal unit. Households may constitute stem families, composed of two or more CUs, but not more than one per generation, and joint families, with two or more CUs at least two of which are of the same generation. Joint families are rare in Gedang-Gedang, due to their instability, the reasons for which will be discussed later.

The definitions of conjugal unit and household adopted here are at variance with Indonesian administrative practice, which considers the eldest man as head of family or household (*kepala keluarga, KK* or in Madurese *kepala soma).* The acronym *KK* also denotes the single family or household for census purposes. Indonesian marriage law (*Undang-Undang 1/1974*) mandates that the husband is the head of family and the wife the matron of the household (*ibu rumah tangga*). Despite the Gedang-Gedang village administration's efforts to give more recognition to female-headed households and to the kitchen as the focus of a resource-sharing unit, the KK (N=905) counted in the village census did not correspond with the household unit based on resource pooling and sharing I was looking for. The KK captured most of the CUs I identified (N=967) but not the extent of resource sharing. When the actual pooling and sharing of kitchens and other resources was taken into account, 745 household units could be identified.

In families where the complete CU was still intact, I followed the Indonesian convention in identifying the male as *kepala keluarga* or household head, but with a modification to take into account the fact that in growing older, Madurese men lose much of their decision making power within the family to their son or the husband of their daughter. To leave elderly married men automatically as the heads of household would mean frequent conflict with local conceptions of "who is the KK" or "who is in charge." Though some men with exceptional health and presence in the community can hold their own, more often they are eclipsed by their more active young family. The younger family has taken possession of the best buildings for their house and has already received most of the land and other possessions they can hope to receive during their parents' lifetime, unless they agree to maintain the original household including the parents. Every major decision now is approved by the young couple, even if they might choose to leave decisions in some domains to an elder parent. At the very least, the wider family and neighbours consider that once married with children, the young couple is now an unavoidable interlocutor.

By analyzing household composition from this vantage point, we give ourselves a strategically powerful tool for uncovering household process and evolution. While the traditional method of looking down from the eldest male (through the lens of the "pater familias") gives a snapshot of at least one person's "completed" family or household, the method is not necessarily as useful from the point of view of the other individuals in the household, or the wider community. Nor is it as useful for characterizing household evolution. Taking the eldest conjugal

[140] Contrary to Skinner (1997:86n7), I do not include the same individual in more than one conjugal unit at a time. This would mean counting two CUs for the following three people: H, W, and HM, with H and W in the first CU and H and HM in the second. To detail the family structures of village households in this manner would add undue complexity without advancing our purpose here.

unit would provide a more balanced gender-neutral viewpoint than using the eldest individual as the focus. In the Madurese setting, however, one still risks taking for focus a conjugal unit with little remaining influence on the present workings and future course of the household, however critical they may be for the daily functioning of the home.

The data presentation that follows aims to provide a comprehensive view of household organization and the complex varieties of household possibilities in Gedang-Gedang. In Table 4.1, I have elected to consider as focus (EGO) and head of household (as well as head of primary conjugal unit in the case of household clusters of more than one household), in the following order:

- the oldest married man not yet having attained the age of 50
- the oldest married man
- the oldest single/widowed/divorced man
- the oldest single/widowed/divorced woman.

The parents remain the focus above 50 years of age if their co-habiting children are not married. "Relatives" (or "rel") refers to additional kin who alone or with other additional kin could not form a CU on their own. Some authors consider two or more co-residing kin that together do not add up to a minimal CU—two or more siblings, two or more first cousins, a woman and her unmarried niece—to constitute a sub-conjugal unit, but instead I have added such individuals to the most logical CU already determined in the household. Where none exists, as in A19 and A21 below, they have been added nonetheless to the list, as a "surviving conjugal unit." Also considered a surviving conjugal unit is a person residing alone, without other kin (singleton, A8).

Table 4.1 presents the composition of primary or focus CU (and second, third and fourth CUs) in relation to the head of household and the number of CUs in the household. Each section must be considered separately. Section A (1-21) provides the composition of primary CUs for households of one to four CUs; section B (1-15) provides the composition of second CUs for households of two to four CUs, and so on. Taking line A5, for example, we see that 282 households comprised of a single CU are nuclear families (husband, wife and children), 94 households comprised of two CUs have as their primary CU a nuclear family, 8 households comprised of three CUs have as their primary CU a nuclear family, and the two households comprised of four CUs are both led by a nuclear family CU. Of the 745 households in Gedang-Gedang in 1996, 550 were composed of a single CU, 170 had two CUs, 23 had three CUs, and 2 had 4 CUs.

Some clear tendencies in Madurese household organization can be seen from this data. Though both stem and joint family households exist, complete joint families with two couples and children are much less common. This is probably because two or more CUs of the same generation in a single household would be unstable if significant economic differences arise that complicate resource pooling. Commonly, however (as in A6 and A7), in a large household including both surviving parents one also finds additional siblings. Resource pooling also arises in stem households, of course, but as they are usually composed of parents and their children less problems seem to arise. This point will be returned to in later chapters.

Table 4.1 – Household composition and kinship links for all households (N=745) in Gedang-Gedang, according to the composition of each Conjugal Unit (CU)[141]

Kinship composition	Number of CUs in the household				Total
	1	2	3	4	
A: 1 CU[142] *+/- additional relations:*					
1. H (EGO) + W (no Ch)	108	47	12	-	167
2. H + W (no Ch) + rel H	4	2	-	-	6
3. H + W (no Ch) + rel W	6	4	-	-	10
4. Fem. (EGO) + Ch +/- rel	19	1	-	-	20
5. H + W + Ch	282	94	8	2	386
6. H + W + Ch + rel H	4	-	1	-	5
7. H + W + Ch + rel W	6	2	1	-	9
8. Fem. (EGO) alone	6	-	-	-	6
9. H + W + Ch + Wid./Div. M or F of H	32	4	1	-	37
10. H + W + Ch + Wid./Div. M or F of W	27	3	-	-	30
11. H + W (no Ch) + Wid./Div. M or F of H	17	3	-	-	20
12. H + W (no Ch) + Wid./Div. M or F of W	7	6	-	-	13
13. H + W + DD/DS (without D) +/- rel H	6	-	-	-	6
14. H + W + SD/SS (without S) +/- rel W	3	1	-	-	4
15. Male (EGO) + Ch +/- Gr Ch	4	-	-	-	4
16. Male (EGO) + M +/- his unmarried siblings +/- rel	6	3	-	-	9
17. Fem. (EGO) + M or exHM	2	-	-	-	2
18. Fem. (EGO) + Ch + Gr Ch	5	-	-	-	5
19. Fem. (EGO) + Gr Ch	3	-	-	-	3
20. H + W + Ch + rel. of H & W	1	-	-	-	1
21. No conjugal unit, strictly speaking (Masc. (EGO) + Z; Fem. (EGO) + BS)	2	-	-	-	2
B : 2 CU +/- add rel; CU1 +					
1. S + SW +/- Ch		18	2	-	20
2. D + DH +/- Ch		37	3	-	40
3. Div D + Ch		13	1		14
4. Wid M of H (EGO) + Ch		2	-	-	2
5. Wid M or F of W + Ch		3	-	-	3
6. M & F of W + WB and/or WZ		23	4	2	29
7. M & F of H + HB and/or HZ		41	12	-	53

[141] I have adopted a format similar to that Niehof (1985:159-160) used for examining the family units (FU) in the *tanèyan*, though my table focuses on conjugal units in the household. The interaction of households within the *tanèyan* will become clear when we look at specific cases in Chapter Five. Key: F=father, M=mother, S=son, D=daughter, B=brother, Z=sister, H=husband, W=wife, Fem.=female.

[142] Or surviving conjugal unit as in lines A8, A19 and A21.

Kinship composition	Number of CUs in the household				Total
	1	2	3	4	
8. M & F of W + add rel W		6	-	-	6
9. M & F of H + add rel H		-	1	-	1
10. WZ (or Z of Fem (EGO)) + Ch +/- WZH		5	-	-	5
11. HZ (or Z of Masc (EGO)) + Ch +/- HZH		4	-	-	4
12. WM + WMM or WMF +/- add rel WM		6	-	-	6
13. other CU rel of W		7	-	-	7
14. other CU rel of H		4	-	-	4
15. DS + DSW		1	-	-	1
C : 3 CU +/- add rel; CU1+2+[143]					
1. HMM + HMF			-	1	1
2. WMM + WMF			1	-	1
3. HM + HMH			1	-	1
4. HM + HZ			1	-	1
5. D + DH (no Ch)			5	1	6
6. D + DH + DD or DS			3	-	3
7. DS + DSW			1	-	1
8. HB + HBW + Ch			3	-	3
9. HZ + HZH + HZS			2	-	2
10. H2Z (half-sister) + H2ZH + H2ZM			1	-	1
11. WZ + Ch			3	-	3
12. WZ + WZH +/- Ch			2	-	2
D: 4 CU +/- add rel; CU1+2+3+[144]					
1. HMMM + HMMB				1	1
2. HB + HBW + HBD				1	1

4.3 Households and the *tanèan*

Households are spatially organized around a central courtyard, in which children play and crops are set out to dry. Around the *tanèan* are found home gardens and crop land belonging to the *tanèan* members. Most of the *tanèan* in Gedang-Gedang are composed of one household with one or two conjugal units, but a large *tanèan* composed of 7 CUs grouped in 4 distinct households may be seen at the upper right, on the south side of the road. Neighbouring *tanèan* members know each other and most have some kinship links and maintain exchange relationships. Kinship and affinal networks as well as non-kin neighbours frequently associate in collective work groups that exchange labour for agricultural work, home building and repair, and other activities.

[143] The first two CUs for the households in this section are as follows: 1: A5+B6; 2: A1+B7; 3: A7+B7; 4: A1+B3; 5: A1+B1, A1+B6, A1+B7(2), A5+B6, A9+B1; 6: A1+B7(3); 7: A1+B1; 8: A1+B2, A5+B6(2); 9: A1+B6, A5+B9; 10: A5+B2; 11: A5+B7(3); 12: A5+B7, A6+B7.

[144] The first three CUs for these two households are: 1: A5+B6+C1; 2: A5+B6+C5.

A variety of house styles exist in Gedang-Gedang. Which one a family has depends on many factors, including whether the family is rich or poor, if they are located near the limestone brick quarries on the north coast, or if they are fortunate enough to include a carpenter.

The simplest expression of a house (*bengko* or in *alos, roma*) is a *bengko gedek lalang kuno'* (ancient house of bamboo and thatch, see Figure 4.1),[145] considered to be representative of the style of dwellings most rural folk possessed since time immemorial. Measuring around 4 x 6 meters, built on a foundation of stones with a dirt floor, the frame and walls are of bamboo rods and plaited bamboo (*gedek*) and the roof of alang-alang (*lalang*) grass (*Imperata cylindrica* [L.] Beauv.). Such homes are very rare today and no longer built for principal dwellings due to the necessity to change the roof every year and the availability of terracotta roof tiles. A poor family today would more likely live in a *bengko gedek* (Figure 4.2) which replaces the alang-alang with terracotta roof tiles. The hearth would be placed in a corner, unless, as usually is the case nowadays, a separate building or wing is preferred for cooking.

Bengko gedek are still widely used by the poorer families in Gedang-Gedang, though in recent years many have been replaced with homes made of limestone bricks, without reinforcement, considered more modern and "healthy"—an idea from recent government promotion of the notion of solid-walled "*rumah sehat*" (healthy homes).[146] When supplanted by a new house, the old bamboo walls and roof tiles can be used for building a cow shed or other out building. Or the old house can be used as a kitchen.

An "improved" *bengko gedek bato'* (Figure 4.3) would have a better foundation and floor using cement mixed with sand or earth, for at least part of the walls or porch. Inside, a ceiling of thin plaited bamboo panels can be put in to absorb moisture making its way through the roof shingles during rainstorms. This style of home was probably the standard for better-off families in the past, particularly those with adornments on the crest of the roof resembling bull horns (called *bangsal*, as opposed to *pègun* without), or having carved doors, window frames or shutters. In the figure can be seen (from left to right) a hanging kerosene lamp, against the wall a plow, rolled palm frond mat and baskets, a hanging bird cage, and attached to the outside *gedek* two beehives made from hollowed-out tree trunks.

Whether due to government promotion, concern with durability or simply status-seeking, virtually all homes built today are the *bengko bato'* (Figure 4.4) made of limestone bricks. Paradoxically, the highest percentage of such homes is in the poorer northern section of the village due to the proximity to small individually-owned limestone quarries near the coastal road. Those living nearby can cut their own bricks if they have access to a quarry through ownership or work. Since the 1980s, a wide diversity of building materials in various qualities (roof and floor tiles, glass,[147] furnishings) has become available in the Sumenep stores, bringing new trends to the villages as to the towns. This frontal view has an insert (upper left) showing how the roof is supported. To pay for home construction one usually has to borrow money, sell livestock, or gain necessary funds from a very good tobacco season. Some can have work done by family or neighbours on an exchange basis. Due to the cost factor, most home construction drags on for years as owners hope to find the funds for completing the foundation or the next stage, buying bricks, wood,

[145] Figures 4.1 to 4.4 were drawn by Yan to Why from photos I took from 1986 to 1990.
[146] As to which type of construction is healthier, I can offer that the natural ventilation of the *bengko gedek* is appreciable.
[147] The tinted glass is known locally as *rayban.*

cement and tiles, and paying carpenters and coolies. It is estimated that by 1963, half of the *tanèan* in the village had at least one *bengko bato'*.

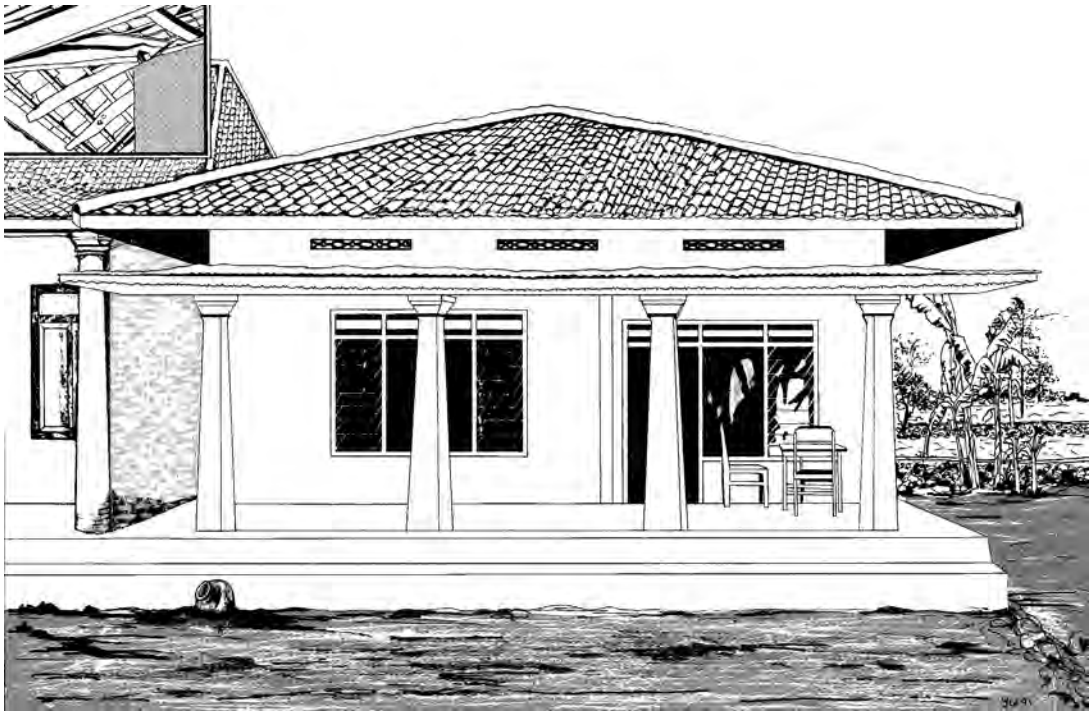
The layout of homes in a *tanèan* follows a standard pattern unless a road or other obstacle intervenes. The first dwelling is always built to the north of the central courtyard, with the porch opening to the south. If additional houses are built, they will be aligned with it or across the courtyard from the first house, opening to the north. Different styles of dwellings may coexist in the same *tanèan*. Kitchens (*dhapor*), cowsheds (*kandhang*) and shelters (*bharung*) are usually simple constructions of bamboo posts, woven bamboo walls and a thatch roof, the latter *bharung* also having a plaited bamboo sitting platform, open to the front and often used to store leaves and crop residues for fodder. These outbuildings are placed beside or behind the main dwellings. *Bharung* are also built in the fields to provide shelter or in the marketplace to spread out items for sale.

Figure 4.1 – Bengko gedek lalang kuno'

Figure 4.2 – Bengko gedek

Figure 4.3 – Bengko gedek bato'

Figure 4.4 – Bengko bato'



At the western end of the *tanèan* is the prayer house (*langghar*). It must be built so that the back wall is facing the west, since prayers are done facing Mecca. The *langghar* may be of simple wood and bamboo construction on short stilts, like a solidly-built *bharung* but with a shingle roof, or even more elabourate using limestone bricks and floor tiles (called *keramik*), and adorned with religious symbols and pillows. These *langghar bato'* in some *tanèan* can even outshine the main house, as in the case of neighbourhood religious teachers (*kiyaji*) whose *langghar* regularly receives groups of young children for prayer readings.

4.4 Kinship

Madurese kinship is bilateral, reckoned along maternal and paternal lines in ascending and descending generations through both sexes.[148] Kinship for an individual begins in the conjugal unit to which he or she belongs. Beyond the conjugal unit and the household cluster, an individual will recognize the quality of kinsperson for a large percentage of the immediate neighbourhood and even the village and local area. People considered kin are called *bhala* and non-kin are called

[148] There is some recognition of a patriline of ego's ascending and descending male relatives (*pancer lakè'*). The female equivalent does not normally exist, though in Batuputih a matriline is at least tacitly recognized through the passing down of the ability to perform certain ritual tasks from grandmother to grandchild, skipping one generation. The asymmetrical tendencies in Madurese kinship reckoning are explored by Niehof (1985:89-104). Elsewhere, Niehof (2007:200-201) shows a double-unilateral tendency in inheritance practices in her follow-up study of the north-central coast fishing village Patondo: houses and fish trade titles (*amba'*) are inherited in the female line while boats and fishing gear are inherited in the male line.

orèng, often the latter qualified as *orèng jauh*, meaning far (non-)kin, indicating that some kinship link could still be there but if so it would be a distant one.

Kinship terminology provides an important key to understanding the role of family in village society. The Madurese kinship system is bilateral and Hawaiian, reckoned along maternal and paternal lines in ascending and descending generations through both sexes. Kinship terms are presented in Table 4.2 (terms are marked (a) if in *alos*, High Madurese).

Table 4.2 – Madurese kinship terms

Description[149]	Terms of reference
F	epa', rèng towa lakè', rama (a)
M	mbu', emma', mamak, rèng towa binè', èbhu (a)
FF (=MF)	kaè, emba
FM (=MM)	nyaè, emba
FFF/FFM	emba, juju', nju', bhuju', aghung (a)
FFFF/FFFM	juju', nju', buyut, aghung (a)
FFFFF/FFFFM	buyut
S/D	ana'
SS/DD	kompoy
SSS/SSD	piyo'
SSSS	krepek
SSSSS	ghrobhak
Z/B	tarètan teppa'
BW	èpar
BS/BD	ponakan rèba'an
BDS/BDD	kompoy ponakan/rèba'an
FZ/FB/MB/MZ	majhadi rèba'an
SW/DH	manto
SSW	kompoy manto
BDH	manto ponakan
FZS/FZD	tarètan sapopo
FZH	majhadi' èrèng
FZDD/FZDS	ponakan sapopo
FZDH	èpar sapopo
FMB/FMZ	kaè/nyaè/emba + majhadi' or name
FMZH	kaè/emba majhadi' èrèng
FMZD/FMZS	majhadi' sapopo
FMZSD/FMZSS	tarétan dupopo
FMZSDD/FMZSDS	ponakan dupopo
W	binè, raji (a), robiya (a)
WB/WZ	èpar
WZH	loway
WZS/WZD	ponakan
WF/WM	mattowa
WFZ/WFB	mattowa majhadi'
WMF/WMM	kaè/nyaè/emba mattowa

[149] Key: F= father, M=mother, S=son, D=daughter, B=brother, Z=sister, H=husband, W=wife.

In Batuputih, one calls a parent's eldest brother or sister *obà'*. A parent's youngest sister will be called *bibbi*, and youngest brother *paman*. Genealogical memory rarely extends beyond four generations.

Kinship is only one map of Madurese behaviour. Close biological or affinal relatives may or may not always be there on a daily basis to participate in work groups, or provide aid in a crisis. Knowing this, many individuals seek to develop binding relationships of mutual assistance with non-kin through formal or informal associations. The importance of kin bonds can only be fully grasped when individual household functioning is analysed over time.

4.5 Community associations

Many formal and informal associations provide opportunities for cooperative discussion, work and saving. Associations are organized by neighbours and family in the case of exchange labour, and by community, religious or political leaders to encourage saving, to engage in religious fellowship, to promote community involvement in decision-making and work groups to repair village buildings or roads, and to organize political action in support of candidates.

Most families engage in informal labour exchange groups composed of kin and non-kin neighbours to accomplish labour-intensive agricultural activities such as plowing, field preparation, sowing, and harvesting. Non-agricultural tasks such as house-building, cooking or other tasks for a life-cycle event such as a circumcision, wedding or funeral, are commonly accomplished in similar fashion by both kin and non-kin working together. There is always the expectation that such work will be repaid during the current agricultural cycle, or in due time for life-cycle events.

At one time or another, most families have at least one member who belongs to one of the many revolving savings and credit associations (*arèsan)* found locally. The *arèsan* are composed of anywhere from a few people to over one hundred who meet regularly (usually once a week) at a member's house to collect cash contributions (can be a standard amount set by the group, or left up to the individuals). The amounts contributed by each participant are noted in a ledger, and often broadcast over loudspeakers. Then a lottery is conducted to award the proceeds to one of the participants, who will host the following *arèsan* meeting. Alternatively, should a participant need funds urgently, following a death in the family for example, the *arèsan* can elect to award that person in lieu of the draw. The person receiving the lot must repay to each of the other participants the exact amounts they contributed to that lot. In this way, the *arèsan* serves as a savings institution that can also provide credit in emergencies. Each person eventually gets back what they have put in, no more and no less.

At the one extreme, the *arèsan* are used by wealthy traders to save large amounts of money, and by poor villagers contributing very small sums to receive in turn a set of cups and saucers. Some *arèsan* also put on or invite amateur or professional performing artists to provide entertainment at their regular meetings (see Bouvier 1995). Others are organized by religious leaders to provide a means of gathering for communal prayer and sometimes to play religious music as well as to promote saving. An *arèsan* with *tahlil* prayers is the basis for weekly meetings of funeral associations to which many villagers belong. The lottery is distributed normally, but participants also contribute a small sum that is not redistributed but goes into a fund to be used to purchase equipment required for funerals and burials that villagers can share. Some local government offices sponsor associations, with

or without *arèsan,* that advance their communication efforts, their health or planning programs, or the upcoming election campaign.

4.6 Religion in village society

Religion is one of the most unifying institutions in Madurese village society, where all share the Muslim faith and most contribute to mosque building funds or contribute labour for construction, maintenance, and teaching in connection with religion. Annual religious festivities serve to bring distant families together for religious and mundane fellowship. Daily prayers are often done together with others, either in the *langghar tanèan* or in a mosque. Some village men will attend Friday prayers and the sermon at the mosque.

The role of Islam in village society is a fascinating topic for fieldwork in Madura. We are fortunate to have the excellent study of Iik Arifin Mansurnoor (1990), which demonstrates the immense value of devoting an entire PhD dissertation to the role of Islam and its leaders in one area of Pamekasan, Central Madura. Roy Jordaan's dissertation (1985) on folk medicine provided bountiful information on Madurese religious and ritual conceptions. It is beyond the scope of this study to attempt anything of the sort here. I will merely sketch some of the contours of Islamic religious life in the village as I have seen them in a first part; then I turn to some elements of Madurese traditional beliefs (one might say "pre-Islamic" survivals) which also govern life in the villages. Finally I will comment on the relations between these two belief systems. The discussion will overlap into the last section of this chapter on political change, as it will be seen that each—religion, tradition and politics—cannot be analysed without reference to the others.

There are several key loci of Islamic religious practice in Madurese society, and they correspond with key individuals. The key loci are the *langghar,* the *masjid*, the *madrasah,* the *pondok*, and the *pesantrèn*. The key individuals are the *kiyaji* (sometimes referred to as *mak kaeh*), the *kiyaè*, the *kiyaè ulama,* and the *hajji* (one who has made the pilgrimage to Mecca[150]). People from the religious milieu are sometimes referred to as *orèng santri* (religious students), or *orèng alèm* (pious people).

The *langghar* is the most common place for prayer, and is present in every *tanèan* in Gedang-Gadang, and in principal in every rural *tanèan* in Madura. The *langghar,* or prayer house is a small building constructed on the west end of the *tanèan,* opening onto the courtyard to the east. It usually is a wood and bamboo framed structure supporting roof tiles, sheltering a square flooring of split and plaited bamboo elevated up to a meter off the ground, and allowing a seated gathering of about twenty adults or more. The walls are usually of split and plaited bamboo. Some are now following a modern trend of building brick and cement structures, elevated only by their foundation, and more closely resembling homes with an opening to the east. Prayers are directed to the back wall, in the direction of Mecca. Some adorn the walls with Islamic inscriptions, or a place to put the Koran. Most *langghar* are unadorned, and one is likely to notice laying about cigarette papers, coffee cups, pillows, or farm implements since the *langghar* is also the place men usually retire to for a nap or to socialize with other villagers passing by. The *langghar* can be used for small meetings of villagers, *arèsan,* or to conduct social or economic affairs. When many guests are being entertained at a *tanèan,* the *langghar*

[150] Of the 25 persons from Batuputih who made the pilgrimage to Mecca in 1995, 3 were from Gedang-Gedang (Kantor Statistik Kabupaten Sumenep 1996).

serves as an additional place to seat a number of people, and gender-segregate them at the same time. Men always pray in the *langghar,* women generally will pray inside their house.

The *langghar* takes on an important community religious function when large numbers of villagers get together for joint prayer or evening religious education for the youth (*pengajian,* which means literally "reading texts") under the direction of a *kiyaji* or *mak kaeh.* The *kiyaji* is the lowest-ranking religious leader. Each neighbourhood has one or more *kiyaji,* who are respected more for the service they provide in instructing young children in the Koran and prayer than for their knowledge, although some can perform simple ceremonies upon request. The *kiyaji* generally uses his own *langghar* in his own *tanèan* for this basic religious instruction *(pengajian),* and his influence rarely extends beyond his own neighbourhood. He does not charge for this instruction, but may receive compensation in the form of kerosene for the lamps and a small token gift of maize once a year. When he is invited to lead a ceremony at someone's house, he will take home a generous portion of the left-over food.

Seating arrangements in a *langghar* illustrate the premium rank accorded religious specialists and *hajjis* in the village setting. The *kiyaè* or *ulama* will sit on the far west side of the *langghar* (the side facing Mecca), followed by *hajjis,* and finally by others near the *langghar* entrance at the east. This protocol is also followed elsewhere in Madura (for Pamekasan district see Mansurnoor 1990:104).

I identified 17 *langghar* dispensing religious education in Gedang-Gedang on a regular basis between 1985 and 1996. A comparison of the total number of religious pupils (*santri*) in each year showed that on average attendance rose from about 31 to over 33 *santri* during those ten years. In 1996, 39 men were considered *kiaji* in Gedang-Gedang.

A *langghar raje* is, as the name indicates, a large *langghar* constructed on donated land by the community to provide a place to pray or to rest. The *langghar raje* was until a few years before our research in Batuputih the primary focus of community religious practice. Indeed, the *langghar raje* has a long tradition in Madura, since accounts of early Islamization on the island speak of the *langghar* as the place where the new religion was disseminated. Today in Batuputih, communally-built *langghar raje* have fallen into relative disuse, unless they are closely connected to an existing *tanèan,* and effectively reintegrated into it. New religious construction outside the *tanèan* is now directed to building and repairing mosques.

The mosque, or *masjid* brings together many of the village's men for the Friday noon prayers and sermon. Batuputih's mosques being located near main springs, such as the one near Labung Dua', they also provide a place to freshen up when away from the home, to rest, and exchange information with other villagers. Mosques are always constructed of brick and mortar, with roof tiles and a tile floor. They usually have the distinctive aluminum bulb at the apex of the roof with the crescent-star. There are now fifty-one mosques in the Batuputih sub-district, four of them in Gedang-Gedang. The oldest mosque in Gedang-Gedang, Mesjid Nurul Muttaqin, was built near Labung Dua' in 1960, while the most recent, Mesjid Darul Fatah near the north coast, was completed in 1993. A mosque in Larangan Barma built in 1950 appears to be the oldest mosque in the sub-district besides the mosques belonging to the religious boarding schools in Batuputih Laok. The sub-district had 46 mosques in 1990.

The mosque is headed by a *kiyaè* (sometimes called an *imam*), who was the primary figure behind the search for funds and workers to build the mosque, though one may be considered a *kiyaè* without connection to a *masjid*. The important

distinction with the *kiyaji* is one of degree: the *kiyaè* is recognized beyond his own neighbourhood as having profound knowledge of the Koran and other Islamic texts, and is proficient in healing and propitiatory rituals. The *kiyaè* makes his living, in addition to tending his fields like most people or trading, by officiating at marriages, deaths, circumcisions and other life cycle events, and providing medication in the form of prayers and amulets for various physical or social ills affecting the individuals who come for consultation. In 1996, the village had ten *kiyaè*, four of whom were also considered important village leaders (*tokoh masyarakat*).

A *kiyaè* may also run a *Madrasah Ibtidaiyah* (Islamic elementary school, MI), with the help of his wife and family members. Three *madrasah* exist in Gedang-Gedang, providing religious education to 321 students (in 1997), more than the 96 attending Gedang-Gedang's public *sekolah dasar* (primary school, or SD). Between 1985 and 1997, there was a drop in attendance at the SD as a second and third *madrasah* opened in the village. Traditionally, the SD and *madrasah* would work together, the children attending the SD in the morning and, those who wished, the *madrasah* in the afternoon. They could even attend evening *pengajian.* The decision by the *madrasah* to schedule their classes in the morning in the mid-1990s gave a further blow to the Gedang-Gedang's SD. Parents were forced to choose and many chose the *madrasah* for reasons of proximity, cost, or out of concern for their children religious education.

The next steps after public elementary school are SMP *(Sekolah Menengah Tingkat Pertama* and *SMA (Sekolah Menengah Tingkat Atas),* respectively junior and senior high school. The SMP for the entire sub-district is located near Labung Dua', while for SMA students must go to Sumenep to board or stay with family. The equivalents in religious education for junior high school (*madrasah Tsanawiyah* or MTS) level has been available at Sumber Tumbet since 1985 The senior high school level in religious education (*Alia*) is not yet available; those who continue their religious education to *Alia* and above usually go to Guluk-Guluk sub-district to the largest *pondok pesantrèn* on the island, An-Nuqayah, begun in 1887. In 1996, 2634 students were studying at An-Nuqayah, 1652 boys and 982 girls. As many as 150 students come from Batuputih each year. A few from Batuputih do *Alia* in Sumenep at the P.P. Nyai H. Akidah Osmuni at Tarate. Since 1990, a select few have gone on to religious schools in Java, including IAIN Surabaya. All of the boarding schools are affiliated with Nahdlatul Ulama, Indonesia's largest Islamic mass movement. The son of the first head of An-Nuqayah would come to Sumber Tumbet to teach the Batuputih *santri* a century ago. Most of the *pondok* in Batuputih have links with each other, their leaders sometimes share kinship ties, and a few have links to religious institutions in Java. Virtually all teachers are recruited in Batuputih, most among the family of the leader. Some of the key religious leaders and teachers in Batuputih have at one point done studies in Saudi Arabia and other centres of learning in the Middle East and Java, a mobility which improves their leadership credentials significantly.

In 1990, the registration fee for the *pondok* was Rp 300, and monthly fees amounted to Rp 250 for MI and Rp 700 for MTS. Classes are from 7 am to 5 pm with a one or two hour break at noon. Evening prayers are from 7 to 8 pm. Religious instruction accounts for half of the curriculum in MI, and 30 percent in Tsanawiyah. The *pondok* covers less than two *lagghu* (0.25 ha), and depends on contributions from wealthy individuals, and an occasional government building grant. The *santri* help in the construction of new classrooms. *Santri* do their own cooking. The little ones are taken care of by the older *santri.* They return home during the planting seasons, when their parents need them most, and return after about a week once the

planting is completed. They stay about 43 weeks at the *pondok* in all, returning about five times for a week each time, and for the duration of the fasting month.
The five main *pondok* to which Gedang-Gedang families send their children are the following (attendance data from 1985, 1995, 2008-9, or lacking --):[151]
- Raudlatul Muttaqin, Sumber Tombet Batuputih Laok founded in 1860: 85, 125, 143 santri;
- Madrasa Tsanawiyah Al-Iftitahiyah, Sumber Tombet, founded 1985: 120, 167,-- santri;
- Mathalibul Hidayah, Sumber Tombet, founded 1960: 158, 256, 132 santri;
- Al-Munawarah, Batuputih Kènè', founded in 1927: 40, 56, 115 santri;
- Raudlatus Syabab, Pajung Sergang, founded in 1880: 170, 290, -- santri.

Attendance in these five religious middle schools increased by an average of over 35 percent between 1985 and 1995, mirroring increases in secular schools as well during the same period, as children's aspirations for education increased and parents became more willing to allow them time away from household chores and to pay the costs involved. *Pondok* educational fees are very low; the parents must basically just give the child rice to cook while away at school. Even the *Alia* cycle and beyond at Al-Nuqayah is financially within reach of Gedang-Gedang families. In various ways, *santri* "pay their way" by teaching classes and doing school construction work or work in fields belonging to the school or its administrators. Public education at the elementary level is theoretically free, but there are hidden costs to pay for exams, particularly to the low-paid teacher if the child needs assurance to succeed in exams. Public school infrastructure is often dilapidated, or the number of classrooms is insufficient for full-time teaching. In some schools, the absenteeism rate is high among the civil servant teachers, who have other economic pursuits. Families began to consider sending a child to university in the 1990s; before 1990, only three Madurese possessed the level of *Sarjana* (two or more years of schooling beyond the high school diploma) in the Batuputih sub-district. If families decide to send their child to university, they will also be put off by the high tuition fees and boarding costs for public higher education. These factors, and the changes in morning and afternoon hours for the SD, along with the desire for their children to have religious training, have led to the preference for religious education among most Gedang-Gedang families.

Two annual religious ceremonies are celebrated on a grand scale, with processions organized by the Koranic schools: the 12th of the month of *Molod*,[152] Molod Nabbhi, celebrating the anniversary of the birth of the Prophet, and the 2nd of the month of *Rejheb*, the Me'rad for the anniversary of the ascension of the Prophet. The ceremonies for each were similar when seen several times since 1986: processions of children dressed in Arab-inspired costumes carrying lamps on poles and floats or wearing masks are led by one or more *haddrah* groups composed of men playing hand-held *rebbana* drums and dancing in step.[153] The culmination is their arrival at the main mosque near Labung Dua' accompanied by two young boys dressed as bride and groom, who exchange a *sambha* sign of respect and sit immobile side by side in state as they would in a wedding ceremony while the observance at the mosque concludes with a sermon and prayers.

The most important religious date is at the end of the Ramadan fasting month, on the first of the month of *Sabal*. The feast of *Tellasan Aghung* (or *Idul Fitri* in Indonesian) marks the first day of the Muslim new year, and is the moment

[151] Figures for 1985-1995 were collected from each *pondok*. Figures for 2008-9 are from Departemen Agama (2009).
[152] Madurese terms for the months are used.
[153] Details of the ceremonies and performing arts may be found in Bouvier 1995.

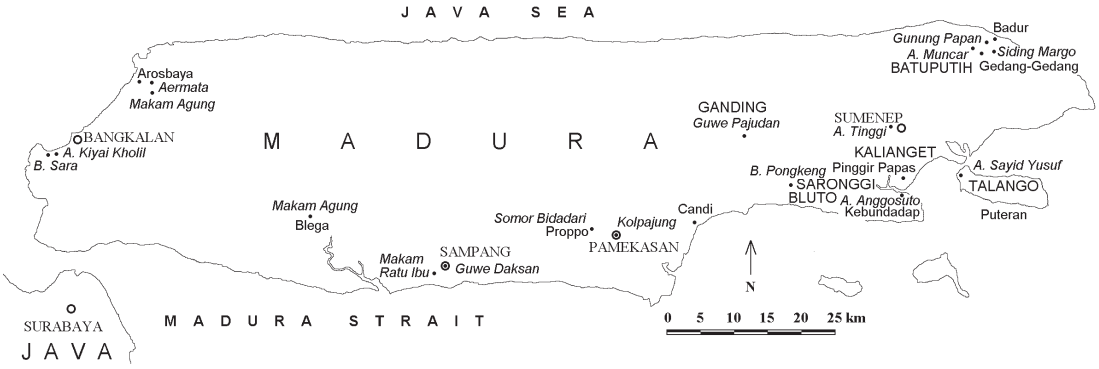
during the year to return home to reunite with family, renew vows of respect and support, and share in feasting with family and neighbours. Families are expected at this time to tend to the tombs of deceased family members. Tombs are an important focus of ritual and religious beliefs that find validation in both Muslim and pre-Muslim Austronesian conceptions.

4.7 The sacred tombs

The tradition of honouring tombs, and considering some to be sacred, is so significant and longstanding in Madura it is surprising so little has been written about it (exceptions are Lombard 1972 and Smith 1998). Small yearly offerings to sacred tombs are made by most households, and occasionally a household will make a significant offering. Thus, it is worthwhile to consider in some detail the place of tomb worship in Madurese village society, particularly in Gedang-Gedang.[154]

By definition, a sacred tomb (*bhuju'*) is thought to contain the remains of someone out of the ordinary. Three types of *bhuju'* are found today. First, the grand princely necropolis (Lombard 1972) and isolated sites thought to be the tombs of princes. The main sites (see Figure 4.5) include, in Bangkalan district: Aermata and Makam Agung (both near the town of Arosbaya) and Makam Agung Blega (in Blega); in Sampang district: Makam Ratu Ibu (in Madegan); in Pamekasan: Kolpajung Laut (or Makam Pangeran Ronggo Sukowati, located in the town of Pamekasan); and in Sumenep: Asta Tinggi (west of the town of Sumenep). Such tombs are the object of veneration by Madurese from village and town alike. Second, the tombs of *wali,* or Muslem saints believed to have come to spread Islam to specific areas (Asta Yusuf on Talango Island). Third, the more localized tombs of persons considered sacred due to their known political, religious or magical influence exercised during their lifetime (such as the tomb of a renowned Muslim educator at Asta K. Kholil in Bangkalan), or tombs of individuals thought to emanate some mysterious power, either of which can be tapped into by worshipers today. Much as the hermits and sages (*resi, begawan, adjar)* of Java (Anderson:1972:52), the few Madurese who remove themselves from society for short or extended periods to seek power through asceticism may elect to pray and meditate at tomb sites, on lonely hilltops or in caves.

Figure 4.5 - Main sites of sacred tombs (*bhuju'* or *asta*), caves (*guwe*) or wells (*somor*) in Madura



[154] In this section I will expand upon my earlier treatments of this subject in Smith 1998.

The third type of sacred tomb is significant at a local or even household level. The origins of these tombs can be seen from recent cases studied in and around Gedang-Gedang. Very often the scenario is the following. A family consults a *dukon*, a sort of magician-healer to treat a sickness in the family. The *dukon* indicates a tomb found on their land, sometimes that of a known ancestor, a child or a stillborn but most often of an unknown person, and advises the family to put a roof over it and honour it. If the family has the means to do so, they may build a small house around the tomb. Alternatively, a specific tomb on the property can become sacred when a member of the family has a dream in which he or she is instructed to provide a shelter for a specific tomb.

In the 1996 Gedang-Gedang census, I added questions on household sacred tombs. Of the 876 families who responded, 92 had a *bhuju'* on their land. For the more ancient tombs, the families had no recollection of when they were built or who was buried inside. Half of the families did not know the age of their tomb. Of those who could recall the date of construction, the average age was thirty-five years. Fourteen families had built their tomb shelter within the preceding ten years, indicating that the practice continues.

Household sacred tombs persist perhaps because they provide an acceptable support for beliefs in territorial spirits, a characteristic identified in the anthropological literature for Austronesian societies as far back as Tylor (1903, 2:114-115). These spirits need to be identified as they grant usufruct of the land and demarcate local space. Households do not appear to identify those buried in their sacred tombs as personal ancestors in order to bolster land tenure claims (their tenure is not in question), though by conferring sacredness to local land they perhaps hope to discourage transgressions.

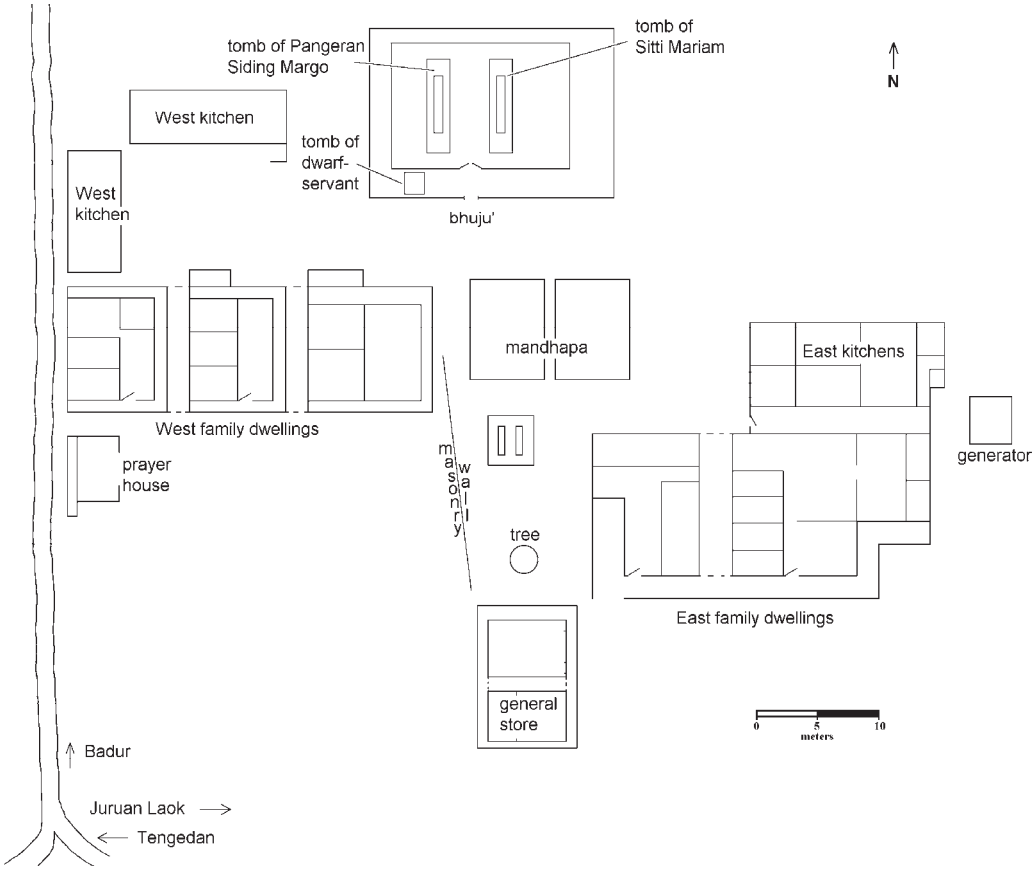
The spirits receive offerings to ensure protection and tangible benefits or simply so they will not cause trouble for the household. To detail the spirits comprising Madurese cosmology is unnecessary here, but a few can be mentioned due to their relationship to the sacred tombs. Propitiatory rituals are held for the construction or anniversary of houses and cattle stables, abodes of the *orèng attas* ("people on high") and *orèng kapajung* ("people of the parasol"), both supernatural protectors. Either benevolent or malevolent are the various *roh* ("spirits") who inhabit large trees, springs, wells, and unusual rock formations. Rituals are conducted at these and other spirit abodes and at crossroads in order to influence their disposition and movement, particularly to repulse dangerous spirits. Although belief in these spirits and ritual practices aimed at them are widespread, it is less common nowadays to hear Madurese openly use these terms; equivalent terms from the Koran (*jinn, sètan*) are more often used to refer to malevolent spirits.

Every Thursday and sometimes Monday evening, the ancestor at the *bhuju'* is honoured by offerings in the form of cakes or a symbolic meal with incense burned on a roof tile or coconut husk. At the same time, incense is carried around to purify and protect the rooms of the dwellings, the cattle stables and the well, and bits of food are set out at the four corners of the household cluster (*tanèan*) to repel any unwanted spirits. These household rituals are also accomplished by many families who do not have a *bhuju'* on their land. Tomb ceremonies integrate, in varying degrees, three types of rituals found in Madura, beginning with the veneration of sacred individuals, *orèng saktè*, who increasingly tend to be referred to as *wali*, or saints. Rituals for non-human territorial spirits (*roh*) consisting of hanging miniature meals or food trays in trees and other spirit abodes are a second type. And rituals of exorcism, the third type, referred to as *nolak bala'* ("repulse the jinx"), are used in symbolically casting out unwanted spirits from a home or

neighbourhood. Madurese ritual specialists employ invocations and magical formulae.

Accounts of the origins of household *bhuju'* are fairly simple, if they are remembered at all. When a sacred tomb has stood the test of time, however, its history is more elabourate. Take, for example, the origin story of Siding Margo, in Juruan Daya. Siding Margo is a *bhuju'* consisting of two tombs in a sanctuary resembling a house with a porch, on which is found a third, and smaller, tomb. According to legend, a prince from Sumenep, Raden Pata, otherwise known as Pangeran Siding Margo, and his wife, Sitti Mariam, are buried within the tombs inside the sanctuary, and their dwarf servant in a tomb on the porch. The tombs are said to be at least three hundred years old. The story has it that a merchant seafarer touched land about three kilometres away on the north coast at Badur. In search of drinking water, he noticed a beam of light emitting from behind the hills to the south. Following the beacon, he crossed the coastal range and found its source to be two neglected tombs in the middle of a forest next to a spring. He built a house nearby and told the inhabitants of the forest to take care of the two tombs, obviously those of saintly persons. He then returned to Badur and his boat and set sail. About one hundred years ago, guardianship of the *bhuju'* was given to a second family, so that today the tombs are cared for by female guardians or caretakers from two extended families sharing adjoining dwellings in front of the tombs. The two clans are simply referred to as "east" and "west", or by the names of male heads (Figure 4.6). Guardianship of the tombs is matrilineal in Batuputih, and has long been passed down from grandmother to granddaughter, skipping one generation.

Figure 4.6 – Layout of Bhuju' Siding Margo, Juruan Daya, with East and West family dwellings



Today one finds the tombs within a Madurese-style dwelling built less than sixty years ago. Like other tombs in Madura belonging to nobles, the graves are capped with rectangular step-pyramidal limestone monuments covered with whitewash. Two Moslem head and foot stones adorn the monument, and are enveloped with cloth. Offerings of flowers are put in the soil-filled cavity running lengthwise in the centre of each monument. Other adornments found within the *bhuju'* include children's beds decorated with pillows and mosquito netting, and small wardrobes with glass doors through which one can see cloth and various ornamental articles. Well-worn copies of the Koran lie on one of the tombs, available for the passing pilgrim. Thus combined in this *bhuju'* are the tombs themselves along with the symbolic artifacts of daily life that are usually found within a *pasarèan* or *roma semula*, house of origin or place where the deceased is thought to have lived or passed through (*pasarèan* also denotes a bed or tomb-cemetery in High Madurese). Several meters in front of the *bhuju'* are two *mandhapa*, buildings consisting of a tile roof supported by posts and beams over a raised cement floor, without walls (structures similar to the ubiquitous Indonesian *pendopo)*. They are used as places to serve meals to guests, give performances, or prepare offerings. *Mandhapa* is also an older term of household topography to designate a dwelling built with an opening to the north and facing the main house built earlier and opening to the south.[155]

4.8 Ritual practices

There exists, therefore, a series of *bhuju'* types, from those belonging to a household or household cluster, to the well-known and much-visited necropolis, with collective *bhuju'* of saintly persons somewhere in-between. The latter, which may have begun as household *bhuju'*, have acquired a reputation that extends beyond the family, attracting offerings from the wider neighbourhood, village, or region. Social and economic aspects of ritual practices at collective *bhuju'* merit a closer look, because during the period of this research local ritual practices underwent dramatic transformations.

4.8.1 The ritual calendar

Ritual ceremonies for sacred tombs (*rokat bhuju'*) range from simple prayers at regular intervals at household tombs to grand events mobilizing dozens or even hundreds of helpers and attracting participants from a wide area bearing offerings. At the Siding Margo *bhuju'*, five major rituals are held annually (changes occurring since 1992 will be discussed later). The rituals take place on the eve of *Jumat Manis* (*malem juma'at manes*) or *Baghi*, based on concordance between the seven-day week and the Javanese five-day market calendar.[156]

First, during the Madurese month of *Lawal*, there is the *Masang tora* ritual (ritual to "set up the markers") during which banners are placed at the four boundaries of the neighbourhood, northeast, southeast, southwest and northwest

[155] Aside from Siding Margo, the best known tomb complex in Sumenep is at Kebundadap in the Saronggi sub-district in the southeast of the island, tombs reputed to belong to Balinese troops defeated by Madurese in the sixteenth century, or early descendants of them. These ancestors are honoured each year during the *nyadhar* ceremonies taking place in Kebundadap and in three *pasarèan* in nearby Pinggir Papas in the Kalianget sub-district.

[156] The rituals and their accompanying performing arts are described in more detail in Bouvier 1995.

corresponding with streams or village limits. Second, during the month of *Rejheb*, a group of seven men dance around the *bhuju'* imitating the sounds of instruments with their mouths. *Dhamong Ghardham* is the name given to this very rare, and likely very ancient form of ritual music (Bouvier 1995:132-136).

The third ritual is the most spectacular, and attracts the most spectators and participants. It takes place during the month of *Rebbe*, beginning on the eve of Jumat Manis or Baghi and lasting into the following day, and involves two gamelan orchestras, two *loddrok* theatres, two dancing horses (*jharan kenca'*), and two *saronèn* orchestras, the latter composed of an oboe and gongs. Each pair performs simultaneously in front of the *bhuju'*, each representing the east or west guardians of the tombs. People from the neighbourhood and adjoining villages come to pay their respects and watch the performances. Following the various ritual performances, the offerings on display (though not the offerings by villagers to tomb guardians) are divided up and distributed fairly equally to each of the performers in compensation for their services.

The program for this grand celebration begins with gamelan music by the two groups on the Thursday evening. Guardians, their families and close allies make offerings inside the *bhuju'*. In the pre-dawn hours of the next morning, gamelan music accompanies a steady stream of women neighbours and allies carrying offerings atop their heads into the tomb. The guardians and their helpers prepare a myriad of offerings, different types of fruit, rice cones, cakes, coloured drinks, and meats including a roast chicken. These are placed on the porch of the bhuju'. Then ritual dances and theatre performances are put on by the two troupes, while other village women continue to bring offerings of maize, rice, eggs, and bananas to the guardians sitting on the porch. These women exchange a few coins with the guardians for small packages of flowers which they pass above incense burners as they make a wish. As incense is thought to protect children from adversity, mothers will pass a hand through the smoke to apply it to the head, neck and chest of their children. The performances take place facing the sanctuary and the table full of offerings on its porch. The mandhapa is where the gamelan of each theatre troupe plays and where the actors retire to change and await their next entrance. A tarp or backdrop serves to separate the "stage" from the backstage and orchestra found in the mandhapa. The theatre performance ends with a procession of masked dancers, remnants of to former ancestor cults in Madura. In this ceremony, a Klonoan masked dancer opens the theatre performances in order to call upon the spirit of the ancestor to manifest himself in his dance, which in former times probably led the actor into a trance.[157] While the theatrical procession continues, four women begin filling with offerings a ritual recipient (ancak) made from pieces of a banana tree trunk The ancak will be used in a closing ritual to exorcise undesirable spirits from the neighbourhood.

A fourth ritual takes place during the month of *Sabal* for the Moslem *Me'rad* festivity. A *mamaca*, or *mocopat*, is given from 10 p.m. to 6 a.m. Finally, in the month of *Laher* a reading of religious texts is carried out by twelve men on the porch of the *bhuju'*. Similar, if a bit simpler, rituals are celebrated at Asta Muncar several kilometres to the west and at Gunung Papan in Gedang-Gedang.

The Gunung Papan *bhuju'* is perched at the summit of a steep hill, about 250 meters above sea level. The site was discovered before World War II by an ancestor of the current village head who noticed on the spot what looked to be a piece of gold. Reaching to pick it up, he realized the "gold" was only a light radiating from

[157] Calls on the ancestors to manifest themselves in trance are also basic to rain dance rituals such as the *Ratep* or *Cahè* (Bouvier 1995:136-140).

the ground. Later in a dream he received the name of the person buried there, Kasean, and a command to shelter and begin honouring the tomb. Today, the *bhuju'* is a tiny house-like structure built with limestone bricks and tile roofing, just large enough for the tomb. A simple *mandhapa* stands close in front of it, and to the side higher up on the hilltop is another open pavilion in which meals can be prepared during celebrations. All food, musical instruments, and other necessities must be carried up to Gunung Papan by the steep southern approach or the easier northwestern path. Along this path, sellers of food, cigarettes and other goods lay out their wares. The same as at Siding Margo, offerings are placed on a table at the entrance to the *bhuju'*. The actors have to perform in a four square meter area in front of the *mandhapa,* a very tight area for the gamelan orchestra. The summit of the hill is abrupt and craggy, with limited room for seating or crouching, but the audience makes use of every available spot among the rock outcrop overlooking the performance.

Ritual gestures differ slightly depending on the site, even within a single sub-district. Processions by the *bhuju'* guardians, sometimes followed by horses dancing to the rhythm of a *saronèn* orchestra, are done either around the *bhuju',* as at Asta Muncar, or around the *mandhapa*, as at Siding Margo. The *Dhamong Ghardham* can also be performed as a procession around the *mandhapa* or the *bhuju'*. Significantly, the choice and style of rituals depends on the dreams the guardian or a family member has had. In these dreams, the ancestor provides the instructions as to precisely what rituals are desired in order that benefits may accrue to the living. The ancestor may, for example, have a preference between a *Dhamong Ghardham,* a *loddrok,* a *mamaca* (poetry reading) or a *tanda' binè'* (sung-dance by village men and hired female dancers).

The four notions of kinship, death, sacredness and power would seem to encapsulate the features common to Madurese conceptions and ritual practice surrounding the tombs. Linguistically, the connection between *bhuju'* and ancestor is straightforward enough. Besides meaning sacred tomb, *bhuju'* in low Madurese refers to "great-grandparents" and "ancestors." (Kiliaan 1904-1905). In Indonesian, the double meaning is also found: *buyut* designates "ancestor" or "sacred place." The term has also been claimed to refer to the "elder" representative of a village who was the lowest official in the chain of authority linking the king to his subjects from the time of Madjapahit (Brahmantyo 1984:63). It might not be too far-fetched to speculate that, as official representative of a territory, such persons could become candidates for enshrinement by virtue of their connection to the court, which they visited yearly to pay homage.

Like other Austronesian societies, the Madurese celebrate multiple funerals. The corpse is washed and shrouded soon after death and buried after prayers (*dhikker*). Then propitiatory rituals must be held on specific days following the death, at 3, 7, 40 and 100 days, at 1 year, and at 1000 days. These rituals (*dhikker, tahlil*) are necessary to wash the deceased clean of his sins and stave off any malevolent behaviour on his part towards the living. The spirit is believed to be erring around the house and fields, at least during the first forty days following death, observing the family on Thursday evenings. The family of the dead cannot rest entirely at ease until they have accomplished the ceremony at 1000 days following the death. During this ceremony, the wood planks set over the body at the burial can be removed and the tomb definitively sealed. Sometimes, before sealing the tomb, someone will touch the shrouded body of the deceased to see how firm it is, or more rarely, view the body. Some believe that if the remains are still firm after more than three years, the deceased lived a good honest life in retrospect. At the 1000 day ritual, the deceased takes one more step towards the status of ancestor, or

at least becomes "someone" whom one will no longer feel reticent or afraid to consult for advice and assistance. These rituals can be compared with Madurese birth rituals as portrayed in Niehof (1985). Jordaan (1985), in reflecting on Madurese ritual practice, has offered the notion of liminality to account for the importance of life-cycle transitions from before birth to after death.

The guardians of the Siding Margo and Gunung Papan *bhuju'* are considered among the elites of the community. Their status gives them access to labour services, sometimes unpaid, and an important role in local decision making, which has over the years included holding a village headship for periods. Guardians draw on the histories of the sacred tombs to validate their claims to longstanding residence. Origin narratives for ancient tombs usually recount that there were few or no other inhabitants in the area before the tomb was rediscovered. Siding Margo, for example, was supposed to have been rediscovered in an area of dense forest, inhabited only by an ancestor of one of the present guardians and a few others. The large tomb complex in Kebundadap, site of the Nyadhar ritual in Saronggi, was said to have been found in a forest. A local resident said one of his ancestors many generations ago lived in a bamboo shack near the present-day tombs. One day he noticed a light coming from a pile of dust. The pile was swept away but the next day it reappeared, with the light again shining through it (a parallel to the Javanese *punden* cults).[158]

4.8.2 Ritual economy

The symbolic meals offered to a household *bhuju'* have almost no measurable value, but the average three kg of maize, some eggs and the flower money contributed by families going to the annual tomb ceremony (again using the example of Siding Margo) correspond to a value of approximately one day of pay for agricultural labour. When hundreds of villagers bring such offerings, the total value for the custodians becomes appreciable. Annual offerings are only part of the economic value of custodianship. Sizeable gifts can be made to tomb custodians on other, more personal occasions.

Most important of these are the special offerings made to a tomb custodian following the granting of a wish (*nèyat*) originally made to the spirits of a tomb. It is common, of course, to make requests in prayers said at tomb sites, but crucial demands made to a spirit are often formulated with a proviso that the person will pay back the spirit through his or her tomb custodian.[10] Most common of these requests are those made by parent seeking their child's recovery from illness. If the child recovers, the parent can either make a payment to a tomb custodian to clear the debt (*otang*), organise a bull race (*kerrabhan sapè*) or cow beauty and agility contest (*sapè sono*) on his field (Smith 1996, 1998), or make a procession to the sacred tomb (see below). In the 1960s, during a time of extreme poverty, a number of *nèyat* involving cows were made in the Batuputih area. The desperately poor would initiate a long-term pact with a sacred tomb to pay back one head in exchange for receiving twenty head in the future, counting each cow born or purchased. Individuals embarking on a journey can promise to make a repayment in exchange for a safe return. Agreements to repay granted wishes are usually kept to oneself,

[158] Although for many collective shrines and virtually all household shrines there is no such identification of the inhabitants as first-founders, the social activity surrounding the grand annual festivities resembles that common to the *punden* shrines or the *Tengger Kasada* ritual (Hefner 1985:58-59).

and probably a great many are forgotten over time. Vows may involve only small livestock or small amounts of cash. Custodians claim that they are not normally made aware of a *nèyat* until they receive the gift.

At Siding Margo, a tradition that might have been more widespread formerly is still practised. Twice a week, on Tuesday and Saturday, the *bhuju'* receives processions led by pilgrims, their cattle, and a *saronèn* orchestra. Often made in repayment for a *nèyat*, the celebration begins with a night of feasting and *saronèn* music before the group leaves from the debtor's farm and progresses to the *bhuju'* on foot or in a truck. At the *bhuju'*, the pilgrims cook food they have brought with them, visit the tombs and make their offerings to the tomb custodians before returning as they came.

At renowned sites, contributions are made to tomb custodians by groups of pilgrims. In the case of major sites on the itineraries of Muslim pilgrims and educators, like the Kiayi Kholil complex near Bangkalan, hundreds of worshipers can be found assembling for prayer at any one time. Tomb custodians actively seek to create links with other sacred tombs in order to encourage exchange of pilgrims. Pairs of tombs associated on the basis of their occupants having supposed kinship or teacher-pupil relations might conceivably have been first linked through some sort of pilgrim exchange. The two extended families at Siding Margo have competed a bit in forging links with tombs in Java so that pilgrims coming from Java will be channeled to them. Visits by an important personality, such as an Army general or *kiyaè*, also serve to legitimize the aura of a sacred tomb, and guardians frequently refer to such visits even long after their occurrence.

From the village census, the frequency of visits to sacred tombs between 1986 and 1996 remained high. Increasingly, villagers join organized tours to distant sites, renting a van or bus for the occasion. Every year about two hundred people from the Batuputih sub-district do a one-day circuit of the various *bhuju'* on the island of Poteran, bringing food to cook in utensils lent by the tomb custodians; one or two busloads visit holy places on the island of Java. Though the cost of undertaking a pilgrimage is low considering the distances covered, people tend to rationalize pragmatically what are still significant expenditures for the average rural family. The author was present when a large group was assembling to leave for Java in early 1996 on a tour led by a local *kiyaè*. As people were arriving to pay their fees, one villager sought reassurance from the *kiyaè* through his remark and question: "Rp 50,000 is a lot of money, *Ki*, but if we consider all the benefits we can gain from making this trip, then its worth millions and millions, isn't that right *Ki*?" The *kiyaè* nodded, a bit embarrassed to have an outsider hear the pilgrimage rationalized in this way. Villagers regard prayers, pilgrimages and offerings primarily as means of obtaining profit, good fortune (*podjur*) and health and avoiding misfortune in this life, and secondarily as acts earning merit or a better place in an afterlife.

Struggles over the control of lucrative *bhuju'* are common today. Custodianship is coveted, and longtime overseers must sometimes bow to coaxing and turn over a share of responsibility or earnings to others claiming jurisdiction. Control may be wrested away outright. Many years ago, one of the two custodians at a well-known Batuputih tomb, fourth wife of a powerful village figure, was evicted following the death of her husband. Supporters of her rival claimed that she had poisoned her husband, a claim vigorously denied by her son. Control of a lucrative *bhuju'* being one way to amass considerable wealth, it is not surprising that the families of custodians often include village chiefs and wholesale traders.

One indication of the historical value of tomb custodianship can be found in the common usage of the term *bhuju'* to designate the semiofficial road tolls exacted

by police. When a driver is warned that a *bhuju'* is ahead, he prepares to be stopped at a roadblock manned by police in search of "infractions" that a few thousand rupiah can set right. The reference here harks back to the days when roadside *bhuju'* could count on receiving gifts from passersby in exchange for safe journeys.

4.8.3 Ritual transformations

There were signs from at least the mid-1980s that beliefs and practices were evolving with regard to sacred tombs. Already in 1985, reacting to the proscription of any representational imagery in orthodox Islam, custodians were reluctant to acknowledge the importance of statuettes and bas-reliefs adorning the entrances or interiors of some sacred tombs. These were usually explained away as children's play or a creative mason's bit of amusement. The movement was accelerated by the increase in the numbers of village youths pursuing Islamic education in the *pesantrèn*, particularly at Al-Nuqayah in Guluk-Guluk. As these students returned to the villages in the late 1980s and early 1990s, they began to influence local religious leaders and together with them impressed on tomb custodians the view that offerings to territorial spirits were incompatible with modern teachings. At the same time, more and more village elites were making the Hajj pilgrimage to Mecca. One of the two family heads at Bhuju' Siding Margo recently became a hajji, ceased to play gamelan and perform with his theatre group, and through his new alliances with religious figures hastened ritual change there. In the early 1990s, ceremonies at the major collective tombs in the Batuputih area were terminated or replaced with readings of Islamic texts and *haddrah* religious dance and chant. At a 1996 ceremony at the Siding Margo *bhuju'*, a leading *kiyaè* celebrated the changes that had transpired, urging villagers to put their faith solely in the Koran and use Islam on every possible occasion, including circumcisions, marriages, funerals, and other life-cycle events.

The transformations at Siding Margo were also made possible by the death of the other of the two family heads, an influential village leader who was opposed to any changes in the celebrations. Interviewed in late 1990, he expressed concern with the mounting tide of opinion against the still-current mode of tomb celebrations using theatre performances and dancing horses. He warned that changing the form of the celebrations could have unforeseen consequences. When theatre was excluded from the ceremonies, in 1993, and a disastrous tobacco harvest followed, opposition was particularly vocal. In response, religious leaders expressed their steadfast belief that the poor harvest was in no way linked to the changes, and the following year a normal harvest served to quell most opposition. To this day, however, female custodians at Siding Margo covertly do simple rituals based on the former ones, just in case.

Ritual change at Siding Margo has dramatically reduced the size of the celebrations. In 1990, 242 individuals contributed labour for the anniversary of the *bhuju'*. By 1995, the number had fallen to 112, and only a fraction of the villagers brought offerings.[17] Through transforming the tomb ceremonies from collective rituals to religious meetings under the high patronage of the *kiyaè*, the families of the custodians have been able to retain some of their privileged status, and significantly, have been able to forestall a more radical questioning of the very legitimacy of tomb celebrations. Such measures would, of course, mean their losing revenues gained outside of the tomb celebrations, notably from the weekly *nèyat* processions. For the time being, at least, religious leaders seem content to use the forum provided by sacred tomb celebrations as platforms for extending their networks and influence further into the community.

A fundamental result of the changes just discussed is a lessening of the control women have in the affairs of sacred tombs, although it would be an exaggeration to claim that women ever really controlled sacred tombs. If one questions a family on the genealogies of custodians (*sè ajhagha bhuju'*), invariably the men will respond and give only the names of male ancestors, despite the fact that the custodians for many collective tombs (including Siding Margo) are women. In such cases, descent of custodians is from grandmother to granddaughter, skipping one generation. Families of *sè ajhagha bhuju'* at different tombs of a same region often intermarry, as is the case in Batuputih. These women are assisted by other women, usually traditional midwives (*dukon rèmbi'),* who have ritual experience. In 1996, at a *bhuju'* southeast of Siding Margo, men were asked to take over the ritual roles formerly held by women. Watching the young men awkwardly filling the *ancak* as instructed by an elderly woman, and their amusement at their pagan gestures, I couldn't help thinking the heyday of Madura's sacred tombs was quickly passing. Perhaps once the men grow tired of play-acting, the rituals will still be covertly carried out by the women who lost their overt recognition as ritual specialists. Another question that affects households more directly is whether reduction in their ritual expenditures will result in a rechanneling of resources to the religious institutions of the mosque and *pondok*.

4.9 Village government

This research covers two very different periods: the New Order regime of Suharto, which expanded government bureaucracy and control down to the sub-district and village levels Indonesia, including Madura, from 1966 to 1998, and the post-Suharto *Reformasi* period where much of the bureaucracy has remained in place, but its control function has been significantly curtailed. The most profound changes have been the opening up of election procedures and greater liberty of speech allowed in all public forums. Research has become much less arduous since 1998, since people have less fear in opening up to outsiders than before.

Each district *(kabupaten* or *regency)* headed by a *bupati*, appoints to each sub-district *(kecamatan)* a *camat* who, aided by a team, is in charge of carrying out directives and policies determined by the district and higher levels (provincial or national). The *camat* is also responsible for ensuring that village heads follow directives.[159] Near the *kecamatan* office are found administrative offices representing the many government services which extend down to the local level, staffed by civilian or military functionaries, including fourteen policemen (at the *Polsek, kecamatan*-level police post) and eight soldiers (at the *Koramil, kecamatan*-level police post).[160] Virtually the same offices are found in every *kecamatan* in

[159] *Kabupaten* and *kecamatan* correspond, respectively, to the former Dutch administrative and political units *afdeling* and *onderafdeling.* The latter was replaced by *kecamatan* during the New Order period. The *kewedanaan,* which includes several *kecamatan,* is headed by a *wakil bupati* (vice *bupati*) who serves mainly as a liaison between the *camat* and the *bupati*. All levels above the village chief are appointed and are career civil servants. In nearly all cases, they are recruited outside the subdistrict, though a Batuputih native, Zainal Abidin, was appointed *camat* in the 1990s.

[160] The presence of representatives of the security forces at all levels down to the sub-district (and even some villages)—the so-called "territorial command structure" that provides the opportunity for the military to engage in politics and business, both legal and illegal—dates back to the war of Independence. Increasingly criticized since the beginning of *Reformasi,* the structure is defended by most military and politicians, such as General

Indonesia, the sign of Suharto's New Order government's "totally successful extension of state power to all corners of society" (Vatikiotis 1993:96). In 1997, twenty-one offices were staffed by 128 functionaries, to which should be added the sub-district's 148 teachers. In a sense, the presence of all of these offices is somewhat unreal, detached from the rest of the landscape. Few villagers ever enter these offices, and they normally have little direct contact with the *kecamatan* authorities. Most administrative matters that concern them can be taken care of at the village level. On the whole, most villagers have little contact with these offices and no real idea of what work they do.

An example is the Religious Affairs Office (KUA). The Marriage Law of 1975 requires that marriages be registered with the KUA. Many marriages in Gedang-Gedang were not declared in the 1980s. The Law of 1974 requires that petitions for divorce be lodged at the Religious Court, and likewise, few Gedang-Gedang residents bothered to go through this formality, some assuming the *kiyaè* or the imam of the mosque would inform authorities as was the practice traditionally. When asked why they failed to report to the KUA, villagers cited the central importance of the religious ceremony and the presence of a *kiyaè*, or the high fees charged for the KUA paperwork.[161] In 2009, I learned that policy changes, ostensibly to reduce the divorce rate, have resulted in the cost of divorce papers skyrocketing from a few thousand rupiah in the 1980s to Rp 450,000 (the official fee according to a legal aid advisor), though Batuputih people are being asked to pay up to Rp 1 million. The price for marriage has also risen to Rp 300,000, weakening the argument that the increased fees are to support the marriage institution.[162]

The government employees that villagers have the most contact with and the most appreciation for are without a doubt the teachers and principals present in Batuputih's twenty-seven elementary schools *(*SD*)* and the one junior high school *(*SMP*)*, and the medical doctor *(dokter)*, paramedics (*mantri*) and midwife *(bidan)* attached to the main health clinic *(Puskesmas)*[163] in Batuputih Laok and the village-level clinics staffed by *bidan desa* (village nurse or nurse's aide). The agricultural and animal husbandry officials *(mantri pertanian, mantri hewan)* residing in the *kecamatan* are also appreciated for their material aid in dealing with the basic agricultural and veterinary crises that arise. The extension of these educational, health and agricultural services, however rudimentary and unreliable they may be at times, represents one of the lasting contributions of the New Order period.

On the downside, the New Order period stifled critical thought and action. Children and adults alike submitted to a barrage of campaigning by functionaries for the regime's party, *Golkar* (Party of the Functional Groups), in the run-up to every election. It was almost as if normal administration in the sub-district shut down for a

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Wiranto, who said in the closing debate to the first round of the 2004 presidential election: "If we don't have soldiers down to village level, we won't have an early warning system and there may be infiltration into the country."

[161] Marriage and divorce outside of the legal systems is more common in Indonesia than usually thought. For an example in Sulawesi, see Idrus 2009.

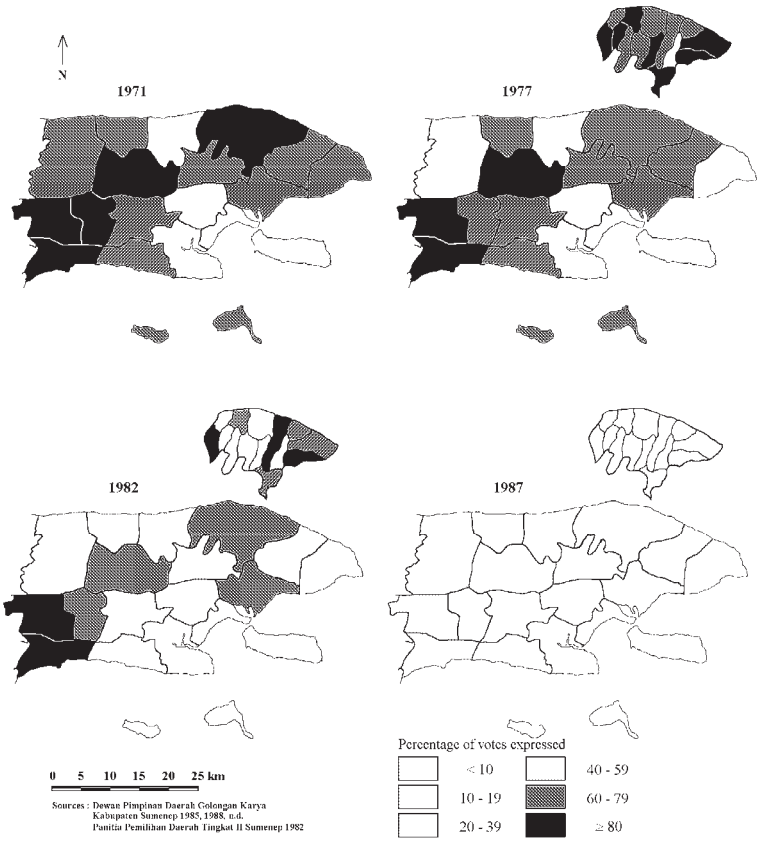
[162] An amusing anecdote was related to me in 2009, which confirmed all at once the confusion villagers have about marriage law, the role of the government religious affairs bureaucracy, and my own anthropological research. A few years before, a Gedang-Gedang household head went to the KUA to obtain an authorization to marry his daughter. When the official refused to deliver it, on the grounds that he could not produce his own marriage certificate, the father protested. He was convinced his 20-year marriage was legal because *I* was present at the ceremony.

[163] *Pusat Kesehatan Masyarakat*, or People's Health Clinic.

year before the election so that civil servants could redeploy to canvassing the villages. The two other official parties were prevented or at least discouraged from overt campaigning in the villages. In our early days in the village, we happened to have a government-sponsored *arèsan* group composed of young girls using our *tanèan* for their regular meeting. They were required to play an appalling game called *Simulasi,* in which stock questions regarding respect for authorities had to be respond to with pre-set answers. To "win" the game, one merely had to parrot authoritarian and patriarchal notions of an obedient, submissive villager. The group played the game over and over again in the village in 1986, and from the presence of literature on the game offered in Sumenep bookshops, I gathered the game was a runaway success in other parts of the country as well.

Golkar was formed in the 1960s by the military to check growing communist influence. Used by Suharto as his political vehicle, *Golkar* successfully won all six national parliamentary elections during the 32-year dictatorship. However, Madura (like the province of Aceh) had a tradition of voting for the Muslim parties, and the official *Partai Persatuan Pembangunan* (United Development Party, or PPP) usually gained most of the votes on the island. Through developing an effective political machine using civil servants as local cadre, *Golkar* was able to assert dominance over political life in Sumenep by the 1980s (Figure 4.7)

Figure 4.7 – Percentage of Muslim party (PPP) vote from Sumenep subdistricts in national elections (including available data for Batuputih villages)



As an administrative unit, the village has an ancient history. Javanese inscriptions from the seventh century indicate autonomous village administrations bearing some similarity to what exists today (Setten van der Meer 1979:60, cited in Maurer 1994:99). Village bureaucracy (known collectively as *pamong desa*) was still elected by local elites at the time of Majapahit in the fourteenth century, and paid

through the provision of usufruct rights on service land (in Madurese *tanah percaton*) though increasingly their position needed confirmation by higher authorities, a practice that was generalized by the Dutch when they instituted indirect and direct rule. During the nineteenth and twentieth centuries, the village leader (*klèbun* in Madurese) increasingly became an administrator, losing most of his prerogatives, though in the late 1930s, the Dutch reintroduced elections for the village chief. All autonomy was lost during the Japanese occupation, and though regained after Independence, the politicization of village life in the early 1960s and rural turmoil leading up to the aborted coup of 30 September 1965 convinced the post-Soekarno New Order leaders that autonomous villages were liabilities. The village was to be governed by the "floating mass" theory forbidding any political activity at the village level, and firmer central control over village administration, ensured by regular meetings with the *kecamatan* apparatus[164]. The legal basis and general organization of governance at the sub-national level were set down in the Law No. 5 (1974) concerning Basic Principles of Administration in the Region. The qualification system was made even more selective with the *Undang-undang No. 5 (1979) tentang Peraturan Pemerintahan Desa* (Decree No. 5 (1979) regarding the function and structure of village government), which affected the election of the village heads in many villages of Batuputih, including Gedang-Gedang, particularly by its regulations regarding command of Indonesian language and level of formal school attained.[165]

Despite the new regulations, there are advantages in being a *pamong desa.* The *klèbun* is assisted by a village secretary *(carèk)* appointed by the district head following consultation with the sub-district head and village authorities, treasurer and other officials in charge of agricultural, religious, social and security affairs. Gedang-Gedang has four neighbourhoods, or *kampong* (from south to north: Jaruddin, Ares Tengah, Gunung Papan, Tamberean) under the responsibility of a neighbourhood chief, or *apel.* The *klèbun* and the *carèk* automatically receive use of the *tanah percaton.* The *klèbun* can distribute part to his other assistants to compensate their work. *Tanah percaton* are drawn from the best rice fields in the village, or for villages like Gedang-Gedang with insufficient irrigated surfaces, in neighbouring villages or sub-districts. The land is usually sharecropped out and traditionally ensured a substantial income for the village chief.[166] In recent years, the value of holding rice fields has declined substantially all over Indonesia due to the rising cost of fertilizers and other inputs, and the falling market gate price of rice as a result of new competition with imported rice. Tobacco planted on *sawah* fetches lower prices than that planted on *tegal.* Nevertheless, this represents a stable income to complement increasing revenue from other aspects of their position. The *klèbun* receives a honorarium (Rp 120,000 in 1990) from the district; the *carèk* and other members of the village council receive a smaller amount. The *klèbun* and the *carèk*

[164] See Maurer 1994:99-100.

[165] In order to qualify to run for office, one has to take exams on 1) village government, 2) the official *Pancasila* ideology, and on 3) speech techniques, and be approved by three teams: 1) village leaders, 2) a *kecamatan* committee, and 3) an examining committee at the district level. The Law No. 5 (1979) was an attempt to model Indonesian society on the traditional Javanese *desa,* one characterized by high population densities, hierarchically-ordered communities led by a headman with wide-ranging powers. A study by Taufik Abdullah commissioned by the interior ministry in 1988 on the impact of the law in ten provinces outside of Java found that non-Javanese patterns of village organization persisted, and that the system imposed on the villagers was considered alien (Vatikiotis 1993:110).

[166] In 1990, it was estimated that the village chief received Rp 700,000 from his *tanah percaton.*

charge small fees for establishing official documents, or for a variety of jobs on the computer equipment provided them.[167] Increasingly, village officials are required to attend meetings and workshops at the district seat or elsewhere, for which they receive *per diems* or other compensation.

In Madura like in Java, it is often said that the village head is virtually a hereditary position because those who occupy it are among the richest in the village. Considerable means are required to mount a successful campaign. The position of *klèbun* in Batuputih Laok has been in the same family for three generations, approximately one hundred years. Similarly, three generations of *klèbun* in Aengmerah (over 115 years) and Juruan Daya (grandfather to son-in-law to grandson) come from the same families. Though he did not "inherit" his position, Pak Mo'é was *klèbun* of Gedang-Gedang for twenty-seven years (1963-1990). The implementation of Indonesian language rules eventually led Pak Mo'é's son to run in the *klèbun* election of 1990, though pulling out before the voting due to lack of funds, thus allowing the *apel* or neighbourhood chief of Gunung Papan to win uncontested. The following election Pak Mo'é's daughter's son won, and is still the current *klèbun.* Village head elections are now held every eight years and entail considerable expense for the candidates. The process begins in the village where a group of eight village elders certifies the candidates and forwards the applications to a sub-district board, which then transmits to the district examination board. The exam consists of questions on the subjects of village government, *Pancasila* and public speaking. The cost of registration and examination was Rp 1.5 million in 1990, and about Rp 4 million more was needed to buy votes in the village. It was estimated that the winner's post-elections celebrations entailed slaughtering 4 cows and spending an additional Rp 2.5 million on 40 days of festivities. It is not surprising that even the winners find themselves deeply in debt on assuming office, often to village notables who will expect preferential treatment in exchange for their votes.

On Election Day 1990, it appeared the entire village was present to vote and mill around among the 50 or so stands selling food, drinks, ice, toys, cigarettes and other consumption goods. Voters gave their voting summons to the official checking the voter roll before entering one of the eight voting booths to check their ballot. They then placed the ballot in one of four ballot boxes according to their neighbourhood. Behind the boxes were seated the candidate and three village elders. About 25 sub-district officials were on hand, assisted by five soldiers toting machine guns. On a board was written the requirement that the candidate be elected by at least half of all votes expressed plus one.

During the New Order period, funds made available for village development significantly enhanced the prestige of the *klèbun*, who had the final say in their allocation. The amounts were quite substantial in comparison to what the colonial authorities or the Sukarno government[168] invested at that level, since beginning in 1969 the New Order government earmarked a portion of the budget for so-called *Inpres* programs (ordered at the discretion of the president) to be distributed directly at the provincial and village level. *Inpres* is primarily concentrated on infrastructure development, meaning schools, health clinics, roads, irrigation, and so forth.

[167] For example, in 1990 the village fee for issuing a certificate of marriage or of never having married (*surat keterangan belum kawin*) was Rp 5000-7000, a divorce certificate Rp 10.000, and a laissez-passer *(surat jalan)* cost Rp 500 or a pack of cigarettes. It is assumed and generally accepted that a percentage of these sums that are supposed to enter the village treasury *(kas disa)* is kept by the functionary.

[168] Between 1956 and 1965, needy villagers would sign up on lists to receive rice, sugar, maize, fertilizer and cement.

Targeting of funds and technical guidelines for implementation came from the central government, but sub-district and village leaders had some say in local implementation; for example, they could decide where a new elementary school was to be situated. Although these suffered a decline in the years following the 1982-1983 recession in the oil market, in the fiscal year 1991-1992, 16.3 percent of the development budget, or Rp 3.27 trillion, was allocated for *Inpres* funding. As far as Gedang-Gedang was concerned, the funding went primarily to improving roads and bridges in Batuputih and building the check dam to reduce soil erosion and provide a small reservoir of water within the village. The Provincial Area Development Programme (PDP) was another program, assisted by USAID (United States Agency for International Development) aimed at the provincial and district levels, but which could have impact on the village level. Since 1998, the World Bank has provided loans and technical support for one of the largest poverty-reduction projects in the world, the Kecamatan Development Program (KDP), which directs funds to local governments but gives the power of deciding how to use the funds to village councils and sub-district development forums. It lets local people design, evaluate and approve projects on a competitive and transparent basis, largely independent of the village and sub-district leaders. Grants are available for community projects, such as to improve infrastructure, or for individual revolving funds to allow for small scale income-generating activities that are later repaid with interest and put back into the project.

Prior to the KDP program, most regional government village public works projects would provide village elites with opportunities for enrichment, or at least the way to pay back their election debts. One recent example of this was the asphalting of the North Coast road. Since the early 1990s, the local residents had formed small work parties and taken it on their own to cut and set rocks in the bed of the coastal dirt track. This was done to facilitate the passage of trucks coming to buy bricks from their quarries, but also in the hope that by showing their active initiative the Public Works Department would be spurred to asphalt over this foundation and thus complete the last link in the Madura coastal road. Their efforts eventually paid off when it was decided to pave the coastal section from Sergang to Legong, in Batang-Batang. The decision was also taken in order to link up the two undeveloped beaches thought to have tourism potential, at Slopeng in Dasok and Lombang in Batang-Batang. In exchange for their "contracting" services, the village head received a van and the village secretary a motorcycle.

In the past, a village council meeting, or *rempa' disa*, was frequently called to enable a wider spectrum of villagers to make proposals or approve decisions, but it is now used mainly to transmit information, explain taxes that are being collected by the village and deal with any complaints, and to arrange logistics for public entertainment and other events. Several voluntary groups exist in each village (and throughout Indonesia) to coordinate social activities or publicize government programs. Before 1999, the LMD (Village Deliberations Institution) existed as a village council composed of notables who were to be consulted on village affairs and the use of government aid. Many saw it and similar organizations throughout Indonesia as instruments of the village heads, and its members recruited or appointed from his network. After *Reformasi,* the Habibie government (1998-1999) sought to respond to demands for more democratic institutions at the village level by replacing the LMD with the BPD (Village Representative Body). The Yudhyono government recently changed the name to Village Deliberations Body. Local BPD have from 9 to 15 members, based on population (Gedang-Gedang's has 13), and better reflect the diversity of their communities than in the past (although women are still underrepresented). Members are elected rather than appointed, and

discussion on all issues is much more open than before. At least so far this new institution has been welcomed by villagers. Two motorcycles are provided by the government to each BPD, one for the BPD chair and one for the village head.

Older institutions from the New Order era, such as the LKMD, PKK and KKBS, are still operating but they have lost their monopoly over assembly and communication. LKMD (Village Community Resilience Institute) is a group of around 15 men, five of which are officers, who call on the *apel* to provide additional funds for community development and maintenance programs the group identifies, such as building and repairing roads and public springs. Ideally, the LKMD was intended to be the primary institution for overseeing and coordinating the implementation of development projects at the village level (Morfit 1986:59-60), but it has been supplanted largely by the BPD and the KDP. The PKK (Family Welfare Development) is headed by the wives of the *pamong desa* and organizes revolving credit association meetings, prayer meetings and other activities aimed at educating village women on aspects of health and family welfare. The KKBS is a group that disseminates information to women about family planning.[169]

4.9.1 The village head

Observers of Madurese society agree that the prestige and bargaining position of the village head is weaker than that of the religious chiefs (Touwen-Bouwsma 1988, Mansurnoor 1990). In Gedang-Gedang people more readily participate in mosque building funds and work groups than in repairing a local road. Routine religious activities such as prayer group meetings *(pengajiaan)* are attended by most village children and many adults. The *klèbun* lacks the symbolic and practical place of the mosque, the *pesantrèn*, the *pondok* or the *langghar* of the *ulama* the *kiayi* or the *kiyaji*. Generally deserted, the *balai desa* structure built near the village head's house consisting of a meeting table and chairs with charts and statistics on the walls is hardly an assembly point of equivalent symbolic value. His official clothes, stamp and installation ceremony notwithstanding, the Madurese village head and the *pamong desa* do not even receive the symbolic annual rice offerings *(janggolan)* as do their counterparts in Java (Koentjaraningrat 1985:192).

Having said this, through personal efforts, the Gedang-Gedang *klèbun* has acquired a respectable and non-negligible status in the village, as have the other *pamong desa*. The *klèbun* does not have the aura of a *kiyaè*, but (at least in Gedang-Gedang's recent history, exemplified by Pak Mo'é) he is present at all the important village events, and is appreciated for his articulate and outspoken defence of the village. Even though obligations to belong to the government party[170] and collect taxes identify the *klèbun* as an agent of the government, Pak Mo'é was able to present an acceptable image to his fellow villagers. Reelected every five years since 1963, he had the time to build a network throughout the village. He was independent in nature. The *camat* considered him the a major sub-district headache, a village chief who was intractable, did not follow directives to the letter, and brought insufficient fervor to the *Golkar* get-out-the-vote campaigns in the village. He was a man of the people, who wore the traditional sarong and headscarf, spoke only

[169] Gedang-Gedang was the runner-up (*Juara II*) for the entire Sumenep district in terms of family planning acceptance rate in 1990.

[170] The fall of Suharto in 1998 ended this obligation referred to as *monoloyalitas* (sole allegiance to *Golkar*). Candidates must still be politically savvy or studiously neutral to manoeuvre successfully through the burgeoning village political scene.

Madurese, and enjoyed participating in village distractions such as cattle contests and alternated song and dance.

Where Pak Mo'è was less successful, so were all other local village heads: in recruiting large numbers of villagers for collective work. The place of the village head and the little interest villagers express in collective and unpaid work appears to be due to the particular way that daily life and productive activities are organized. Ecology and society are again related. In many parts of Java, the construction and maintenance of irrigation infrastructures to support rice cultivation demands close cooperation between different sections of the population, owners of paddy fields, sharecroppers and mutual help groups. Common interest facilitates cooperation. Until recently, there was no need for a centralized organization at the neighbourhood or village level for ensuring subsistence on land planted in rain-fed maize. This depends mainly on household labour, and contributions of exchange labour from neighbours and more distant relatives. The same goes for tobacco cultivation: field preparation and daily watering are done by small units of neighbours, people access to a well, and possibly hired labour.

This situation could be in the process of changing to an extent with the advent of large-scale tobacco cash cropping. Many households are now dependent on access to the water contained in the *cekdam*. Claims on this small reservoir of water have also been made by downstream communities, and particularly the town of Sumenep. The Gedang-Gedang village head has a key role to play as spokesperson and advocate for local ownership of this water. Already, rationing has been put in place during long dry seasons to mitigate conflicts over access and enable the springs to replenish the reservoir.

Road improvement to facilitate circulation of goods, water and people requires capital investment and machines. Though allocated in the 1990s for the road north from Labang Dua' to the coast, villagers had to wait until 2008 for the road to be paved to the top of the hill, and for were still waiting the final kilometre or two needed to join the coastal road. Corruption has been claimed to be involved in several road projects that did not complete the projected length, despite villagers performing unpaid preparatory roadwork as part of the contract. The maintenance of lesser stone-base roads represents the most time-consuming collective work done by Gedang-Gedang residents.

The end of the New Order and the first decade of *Reformasi* have brought sweeping political and social changes to Batuputih and Gedang-Gedang. Villagers are no longer afraid to speak their minds, and enthusiastically began to take an interest in the new political parties and leaders that sprung up. Many of the 33 parties vying in the Sumenep district campaigned in Batuputih, with nine having some measure of support, led by the Islamic party from the Suharto era, the PPP, and the parties that supported the former and the current Presidents (PKB, *Golkar*, PDI-P, *Demokrat*). Islamic figures and anti-corruption figures openly campaigned with the support of young local intellectuals influenced by the student movement in Java, alongside candidates from the well-funded mainstream parties. The fast-changing scene had another significant effect in causing Madurese to question their generally unwavering support for their *kiyaè* and even for Nahdlatul Ulama. Just before and following the impeachment of President Abdurachman Wahid (a former chairman of NU) in 2001, a few religious leaders in political office or in Islamic schools were accused of corruption. The edifice of NU in Madura was shaken and the political landscape shifted to favor the town-based Islamic organization Muhammadiyah, and the PPP. Accounts of *kiyaè* allying with powerful thugs (*blater*) in West Madura to capture political office (Rozaki 2004) also served to undermine the image of *kiyaè*. The new and painful doubts Madurese townspeople

and villagers alike were expressing in the first decade of *Reformasi* regarding the infallibility of their religious leaders was naturally exploited by some political parties, though most villagers in Batuputih continue to accord the same respect to the politically discreet leaders of their local *pondok* and mosque, and to the religious teachers who are beholden to them.

4.10 Social control

Social control is exercised at every level of social organization, from the family to the kin group, the neighbourhood, within religious and secular associations, and through the apparatus of the village and the state.

Within the family, parents are permissive and indulgent for their young infants and toddlers. By five or six years of age, the child will be encouraged to help watch or carry younger siblings and begin learning basic chores, such as collecting fodder for livestock. A few cases were found of harsh socialization and punishments for older children, but on the whole, children grow up in their homes under quite lenient circumstances in comparison with, for example, Western societies. In the sample group, there were children who rarely participated in family work, generally boys, and they were tolerated by the parents who simply waited for them to grow up. Parents appear to be less tolerant with girls, and expect them to help more with cooking and other household chores. Time allocation of children between the ages of six and fifteen shows girls spend significantly more time than boys in the three most important task categories: commercial (64.0 minutes for girls compared to 50.1 for boys), food production (106.3 to 61.6) and food preparation (29.3 to 7.4).

Parents have always had a say in key decisions facing their children, none more important than choice of spouse. In the past (pre-1970), the parents would often arrange marriages for their children, who were felt incapable of taking into account all the complex factors that combined to make a successful marriage. At least since our arrival in the village in 1986, children have respectfully differed with this view. Often, however, the marriage negotiations had progressed to the point where the only socially viable alternative was to go ahead with the wedding. The alternative for the girl or boy was then to refuse to consummate the marriage (*kabin tape ta' akompol*), giving as reasons such as "we didn't get along" (*ta' rokon*), or "we were not suited for each other" (*ta' beccè*), acceptable reasons for terminating it. A common scenario, it was found in 26 first marriages reported in the fertility survey (see Niehof 1985, Jones 2001:75). The length of time elapsed between the ceremony and the divorce or separation was between 1 night and 40 days, for an average of 9.6 days. This phenomenon illustrates the lengths to which Madurese in Gedang-Gedang will go to avoid offending the other party to a marriage and at the same time the ease at which their child's preference is accommodated in the long run. Today, most youths claim that they chose or will choose their spouse themselves, albeit after consultation with their parents. A sizable minority, however, say the decision will be shared equally with their parents, who are wiser than they are. Parents who insist on forcing a child into a marriage against their will are today increasingly the object of scorn.

Religious doctrine is not subject to much question in Batuputih. Villagers place their trust in their local religious leaders for interpreting doctrine, and are not usually eager to discuss even the most basic religious issues for fear of making a mistake. In the past, there have been differences in affiliations at the leadership level. The Pajung *pondok* was affiliated with the Masyumi movement before its disbanding by Sukarno in 1960; today all *pondok* in Batuputih embrace Nahdlatul

Ulama and its traditionalist orientation. Religious deviations have been reported elsewhere in Sumenep and are not tolerated. A prominent kiyaè in Sumenep who taught notions considered heretical was being sought by the police in 1996. He taught that a man and women could simply declare they were married for the bond to be recognized by God, and that debts of a financial or property nature need not be repaid.

Political order became tightly enforced when the New Order bureaucratic expansion reached the sub-district in the early 1980s. Since *Reformasi*, the enforcement of political order has relaxed significantly at the local level leading to growing tolerance, even appetite, for debate and criticism.

At the village level, the organization of the village into neighbourhoods and the neighbourhoods into smaller units (RT and RW), each with someone in charge, serves as a level of control of villager's movements and actions. A local men's security patrol (*hansip)* makes rounds (*ronda*) of the village at night, knocking on fences with their sticks to show that they are active.

The sub-district military post (*koramil)* is staffed by veteran soldiers in pre-retirement who rarely come in contact with villagers. They are in charge of rooting out subversion and providing early warning of foreign attack, thus they have little work to do in Batuputih. Sub-district police (*polsek*) are much more active in what is an area reputed to be the nest of thieves of the Sumenep district. They often make rounds in the villages, at all hours, and have a network of informants at their disposal. Villagers have an ambivalent view of the police. Few will report stolen items, because the cost of filing the complaint will be equal or more than the value of the object. Drivers will not report accidents to the police, as normally required, because the cars or motorcycles involved are likely to be impounded for reasons of unsafe driving and costly to recover. Trucks transporting tobacco to the cigarette company warehouses need to employ subterfuge or drive late at night to avoid police looking for extra cash as they attempt to bring their valuable commodity to market.

These annoyances aside, police inspire ambivalent feelings due to their treatment of suspects. Beatings in the Batuputih police station are known, even in cases of petty theft. In 1991, a young man was beaten publicly by a Batang-Batang sub-district village head and at the police station after having been caught stealing maize. He escaped, only to be caught again in Juruan Daya, shot and wounded, and then executed without trial in a nearby marketplace. Subsequently, police put out the word that villagers should no longer bring captured thieves to the station, the villagers should deal with them in the village. This proclamation probably had little effect, as villagers had long been dealing with similar problems themselves. But it reminded me of the accounts of police-sponsored duels in colonial times in Saronggi.

Elsewhere, I have written extensively on the subject of Madurese interpersonal violence on the island (Smith 1997, 2000, 2004b) and the 2001 ethnic conflict opposing Madurese and Dayak in Central Kalimantan (Smith and Bouvier 2006b; Bouvier and Smith 2006, 2008). Though I originally began the research in Madura to dispel what I saw as the myth of the violent society, my research uncovered enough cases to cause me to reconsider the validity of this notion, at least under certain conditions.[171] The historical discussion in the previous chapter revealed the extent to which violence, both structural and physical, was a part of Madura's heritage, from the soldiers and thugs that provided the support base for

[171] The Kalimantan case is quite different, and can be summed up as a largely successful effort by the Dayak to use the violent reputation of the Madurese as a pretext for expelling them from the province and taking over their property.

princely and colonial power to the defences mustered to face frequent pirate attacks, to the mundane efforts of peasants to secure access to water on the island. That period was violent, no question in my mind. My problem with the notion of the "violent society" was its suggestion that ethnic individuals and groups are violent outside of history and environment—I remain unconvinced that individuals are programmed by nature for violence over cooperation and will commit violence in the absence of structural or environmental conditions that favor its expression over common civility. Common civility was what I was familiar with in Madura until I began to look at the evidence for violence, and even once evidence of incivility was in my hands, I needed to understand what conditions favored its emergence, what caused it, and what triggered it. To claim that it was simply a cultural phenomenon was not enough; that answer was, and still is in my view, a conclusion reached without completing the hard work of research and analysis.

In 1995 and 1996, I gathered accounts of 47 cases of homicide or attack described as *carok* in Batuputih and across the sub-district border in Batang-Batang through direct interviews with the participants, or when that was not possible, with family members, neighbours and persons informed of the case. *Carok* is the term used when attacks said to be prompted out of desire for vengeance or to preserve honour, so attacks by thieves were excluded. In the popular Indonesian press, it has come to mean virtually any violence associated with Madurese. I also collected dossiers of similar incidents in the district courts of the island (Bangkalan, 25; Sampang, 11; Pamekasan, 2; Sumenep, 16). Shorts notes of another 40 cases were taken during the fertility survey in Gedang-Gedang, some in which violence was narrowly avoided. Finally, in 2009, I noted a few cases that showed that *carok* still occurred locally, albeit less frequently.

The results of this research show that protection of kin and struggles over valued resources are the main causes of *carok* in Batuputih and in Madura as a whole. In case after case, men (perpetrators are exclusively male) are prepared to face up to ten years to defend what they feel is rightly theirs. Like the situation Chulalongkorn wrote of in 1896, Madurese in the mid-1990s were engaging in fights over access to water and fodder, the limits of agricultural plots, non-payment of debts, commercial transactions, and suspicion of theft. One's family, wife and children are also considered valued resources, and this explains why half or more of all attacks are carried out for suspected advances on one's wife, or black magic against one's child. Without proof, it is difficult to request help from the police, all the more so when the police themselves demand that crimes be settled in the village. The court system in Sumenep is widely regarded as corrupt and thus beholden to the highest bidder. The stakes are seen as too high to risk being on the losing end of an uncertain mediation session with the village head or a local religious leader, and risk an unveiling of marital infidelity or weakness before the community. Perpetrators often explain that they did not reveal their plan to anyone before execution because they wanted to ensure its success. Perceptions that no viable legal avenues exist and that the cost of inaction is high lead many to opt for self-help. The prison terms averaging six years are insufficient to deterrence. In this context, the recourse to individual violence can be perceived by many in the community as an unfortunate yet somewhat pardonable act of self-defence.

Non-lethal violence or the threat of violence is considered by most, at least it was until the mid 1990s,[172] a legitimate means for resolving a conflict over valued resources. Succeeding in Gedang-Gedang or elsewhere in Madura demands hard

[172] Most youths and young adults today declare their opposition to *carok*, which they see as an archaic throwback.

work and people living on the edge of poverty are only one or two adversities away from falling over. Slight offenses to honour, if ignored, can lead to more serious incursions. When one considers the importance attached to the work done by Madurese women, and by husband-wife teams, as well as the emotional attachment that is threatened by an incursion into this relationship, the distinction made in the psychological and criminological literatures between "instrumental" violence and "angry" aggression (Buss 1961:1-16, 1978:342-343) is wholly inadequate when applied to Madura.

Historical and contemporary research supports a view of Madurese violence as a product of specific economic and institutional contexts that have favored its manifestation by individuals as one possible response to perceived threats to valued resources. It is too early to tell for sure, but a drop in cases since *Reformasi* might mean that the new openness to discuss village issues is having an impact. Other promises of *Reformasi,* such as judicial reform, police good practices, and corruption eradication, if implemented, could also have the effect of reducing structural and self-help violence and of improving many other aspects of village social organization as well.

4.11 Social differentiation and the control of labour

Ethnicity and class represent important markers of social differentiation in the town of Sumenep, cleavages that are readily evident to the outsider and articulated by the people themselves. In the towns, ethnic Chinese (*orèng cena, orang Tionghoa*) are clearly distinguished from ethnic Madurese and Javanese. Madurese are engaged in a variety of occupations in government, trade, transport and services, often working under Chinese and Javanese, or cultivating land on the outskirts of town. Most of the Javanese living in the town staff government offices or teach; other Javanese pass through on business. Most of the Chinese are traders and shopkeepers. A small but economically successful Yemeni Arab community has long existed in Sumenep, engaged primarily in trade. These ethnic groups generally marry endogenously, but intermarriage has always existed and is a trend that is perhaps on the rise. The Chinese community in Madura is divided into two main groups, the *peranakan* or *baba* whose descendants arrived on the island centuries ago and speak Madurese at home, and more recent arrivals (*Tionghoa totok* or *Tionghoa singkek*) who still speak Cantonese. These Chinese townspeople represent the only Christian community on the island, though they may still practise Confucian rites to honour their ancestors. Ancient Chinese influxes to southwest and northeast Madura rural areas (for example in the Batang-Batang sub-district adjoining Batuputih[173]) have been entirely absorbed into their Madurese village societies through intermarriage and adoption of Islam, though some physiological traces may still be detected.

Socioeconomic differentiation is evident in town through comparison of shops and their inventories, neighbourhoods, houses, means of transportation, and occupations, in ways that are obvious to the outsider. Thirteen of the 16 gold shops are owned by Chinese (one person owns five shops, another four). The size of homes and quality of building materials and decoration provide a first view of social differentiation. Possession of a late-model private automobile is a sign of a very well-off family in town, though virtually all middle class families possess at least

[173] The neighbourhood of Mincai in the village of Petenggeng in the Modung sub-district on the southwest coast between Kamal and Sampang is thought to have been settled since the thirteenth century by routed Chinese soldiers.

one if not several motorcycles, quite often one for each member who can legally drive. Household furnishings provide another measure of wealth. Wealthy families have vast living rooms with many tables and armchairs, often intricately carved and richly upholstered, to seat the many guests they are accustomed to entertaining. China cabinets display porcelain, educational, occupational or sporting awards and souvenirs from travel outside Madura, and increasingly outside Indonesia. Household wealth can also be estimated by the number of servants and their quarters, as well as the number and variety of dishes served family and guests at mealtimes. Other markers of wealth include expensive clothes and leather footwear, and (though also often sported by the not-so-rich) premium brands of cigarettes, fancy lighters, watches and gold jewelry.) With more disposable wealth, one might possess competitive singing birds (such as the peaceful dove), or old homes left vacant for breeding swiftlets (*Aerodramus* sp.) for their edible nests. Though far from the metropolis, Madurese townspeople follow national fads in status symbols, the most recent being investment in costly hybrid *Aglaonema* plants. Aside from these ubiquitous signs of wealth, status is declared in specifically Madurese fashion both in town and in the villages by the possession of bulls bred especially for racing or cows for agility contests. The hope of riches through breeding or at least the recouping of expenses through future sale is never absent from the decision to acquire any and all of these symbols of wealth.

It should be emphasized that regardless of economic situation (at least up to a point) those who have achieved high levels of secular or religious education are held in high regard. Religious scholars such as the *ulama* and *kiyaè* command the most respect of all in both town and village, particularly if they have studied in the Middle East. Mosque *imam,* and lesser religious teachers (*kiyaji*), as well as hajji also command respect. At least until recently, highly educated individuals have generally found a niche in the government apparatus, thereby combining the prestige of office to that of intellect. Proficiency in High Madurese identifies a cultured individual in town and village, and the best can perform at *mamaca* poetry readings. Most of the *tokang mamaca* practicing today are elderly men. Before 1970, SD and SMP teachers were Madurese who taught High Madurese. Since then, many Javanese teachers arrived and classes were increasingly taught in Indonesian. Basic Madurese is still part of the SD and SMP curriculum. A star system exists for male actors in *loddrok* and *topèng* theatre and for women in *tande binè (tayuban)* sung-dance, leading to fame and sometimes fortune for a few who can master the techniques of language and gesture required.

Madurese employ various terms to indicate social differentiation. The well-to-do are referred to as *orèng sè andi'* (people with means), *orèng sogghi, orang kaya* (rich people, in Madurese or Indonesian). People with slightly above average wealth are called *orèng cokop* (people with enough), followed by *orèng dumek* (ordinary people), or simply *orèng biasa* (normal people). In comparison to the rich, one can also refer to ordinary or poor people as little people (*orèng kènè'*) or people without means (*orèng sè ta' andi'*). Another distinction is sometimes made between "insiders" (*orèng dhalem*) and "outsiders" (*orèng lowar*). The meaning of the terms varies, but in each case higher status is attributed to *orèng dhalem*. In a north coast fishing village Niehof (1985) found the terms distinguished those working in fishery and the fish trade (*orèng lowar*) from those working outside fishing (*orèng dhalem*). I have noted the terms used to distinguish economic "haves" from "have-nots", those with aristocratic parentage from commoners, or religious leaders and their families from the rest of the community. Some villagers consider *orèng dhalem* equivalent to *sè toju,* or *pejabat* (those who sit; those who have a position); i.e., the

village head and other government officials. The views of elders are often, though far from systematically, solicited and respected.

The most basic difference among townspeople divides those households that do the standard household chores themselves (housekeeping, cooking, washing clothes and dishes, etc.) and those households that pay others to do them. Those who pay others belong to what would be considered the lower urban Indonesian middle class or above, thus in Sumenep accounts for a sizeable percentage of the population. Caring for children is often also entrusted to servants, and their transportation to school and back to pedicab (*becak*) drivers. Urban Sumenep dwellers find investing in land on the outskirts of town attractive, but few if any would contemplate dirtying their own hands in the field so the fields are sharecropped. One rule that is generally followed in both town and village is that one should not do a task that can be delegated to one of lower status who happens to be at hand. Thus *orèng sè andi'* in town and men in the village remain seated when they command beverages to be prepared by their servants (in town) or wives (in the village), that their servant or child go fetch cigarettes, and that they mop up in the event of a spilled drink.

High rank usually requires and entails the control of the labour of others. Even the salary of the *bupati* (district head) is insufficient to cover his lifestyle. Though the *bupati* has a generous expense account (including a large allocation specifically for purchasing the dress shoes that probably more than any other item of clothing set him off from the ordinary functionary), it is assumed that he benefits in other ways from the position he holds and the power it entails over the destinies of many people. To a similar though lesser extent, people of high rank will generally seek to extract profit from the labour of others under their control, while those who accept to provide the work do so in return for the security of a guaranteed income, care in the event of sickness, or the good offices a patron can provide. A Sumenep housemaid we knew quite well was required to cook to supply her mistress's business selling meal packets to her fellow employees in a government office. Yet she felt her situation was good because she could usually get seven hours sleep a night. Outside of the civil service, the more the salary is regular and secure (as in the case of a housemaid), the lower it tends to be and the less control the employee has over working hours.

The people of the lower stratum in town do manual labour as *becak* drivers, *kuli* (porters[174]) working for the shops and in the marketplace, peddlers and food hawkers on the street, sharecroppers, street cleaners, scavengers, prostitutes (all Javanese) operating in Sumenep hotels, etc. Female servants have their families back in the villages, though most rarely return except for holidays, moving back to the village only at retirement, hopefully having tided away some capital in cattle or land. *Kuli* and *becak* drivers, all men, return home on a regular, generally weekly, basis.

Townspeople hold ambivalent views of rural folk, and of the lives they lead in the villages they have never visited. In these views are found much romanticism and contempt, along with a few grains of truth. In the romantic view offered by several townspeople, villages epitomize the clean life far from the pollution of urban automobiles and litter. Life is much better out in the open air than in town, where people are cooped up in homes and office buildings. Farming people are their own bosses, and receive no orders from any hierarchy. As long as they are hard-working, as most Madurese are, they can get by. People in the villages are more social-

[174] *Kuli* is a term used for many manual jobs involving carrying loads (carrying bricks or stones for construction, unloading trucks in the market, moving stock around in a shop).

oriented, and engage in mutual aid so that nobody is left behind. They are much more generous and hospitable than urban folk. Some claim that the rural peasants who work hard and eat little meat are in excellent health due to the exercise and low fat intake. Other such exaggerated and simplified views are less flattering, of a rural society that is poor, uneducated, unsophisticated and violent. Shopkeepers complain that villagers come to the stores in groups and discuss at length before finalizing a small purchase or selling their gold, so afraid are they of being taken for their money. The contempt of stingy villagers contrasts with the delight shopkeepers express when a good tobacco harvest sends flocks of villagers to town with cash burning holes in their pockets. Others, such as our friends concerned for our safety when we declared we were moving to a hill village, consider much of rural Madura to be the haunts of thieves, where security cannot be guaranteed outside the sub-district seats.

Conscious of Sumenep's marginality, one wealthy shopkeeper who often travels to Java and abroad put the local rural-urban inequity in a broader Indonesian context:

> When the big man in the village comes to Sumenep, he loses his distinction and disappears. When a rich townsperson goes to Surabaya, the same thing happens: he disappears. And when the rich from Surabaya go to Jakarta, likewise they disappear.

In comparison to the town, village society appears relatively homogeneous; "shared poverty" (Geertz 1956:141) might even seem an apt assessment of village life at first view. There is a low degree of occupational specialization compared to town, because agriculture is far and away the most important economic activity. Villagers uniformly claim that they are all *orèng tanè* (farmers), *orèng ghunong* (hill people) or *orèng disa* (village/rural people), to be distinguished from *orèng kota* (townsfolk). Villagers watching the few televisions available—usually facing outward through the window of a store or a village head's house—cannot help but realize the distance separating them from the superrich Jakarta families commonly portrayed in Indonesian sitcoms. Many villagers provide the self-depreciating qualification that unlike townsfolk, they are *miskin* (poor) and *bodo* (stupid). The shared identity as poor ignorant hill people reproduces town conceptions of the village folk, in a telling example of how externally-constructed identities are adopted by the people they are intended to describe. This imported identity shared by most village people notwithstanding, significant cleavages based on social ranking and socio-economic status exist in the rural community. In order to appreciate social differentiation in the village, familiarity with the local context is necessary. Distinct social differences then become apparent and are confirmed by local conceptions of how society is organized.

Ethnicity is the least important marker of social difference in Batuputih. Only a few individuals in some villages (mainly schoolteachers and nurses) are Javanese, in addition to several dozen Javanese civil servants assigned to various sub-district offices. Most of them have little contact with the villagers outside of office hours; many commute from Sumenep daily, and almost without exception are counting the days remaining before they can escape the monotony of village life and return to Java. Few non-Madurese are married to villagers living in Batuputih, and there are no Chinese residing in the sub-district. For some who remain close to home, the only non-Madurese contact are the few poor Javanese men who ply the roads and paths of Batuputih selling reconstituted meatball soup (*bakso*) or the Javanese trader who passes through the area yearly offering cheap shrimp crackers in exchange for used sandals.

Like in town, the extent to which one can control the labour of others influences one's ranking. Few in the village, however, aside from civil servants, higher religious officials, wealthy traders and skilled craftsmen, can free themselves entirely from the menial tasks of agricultural production. Thus in a context where nearly all households own land, the shame attached to menial labour is much less in evidence, or at least is much more widely shared. With most farm work considered undemanding of brains, skill or talent, and done by all, the social ladder is climbed by those with specialized and rare knowledge. The most influential people in the village are followed because they are *kowat* (powerful), a circular reasoning that suggests charisma is an important element of high status. This power to influence others is based on and can enable access to economic goods, knowledge, and political control. It follows that *kiyaè* and *klèbun* are logically the most powerful because the decisions they make in administrative, educational and spiritual domains matter most to villagers. The term *tokoh* (from the Indonesian term for society leaders, *tokoh masyarakat*) identifies prominent individuals in the village. Generally the term implies a person with some charisma who is distinguished from the common villager by his or her abilities in religious education, mediation, performing arts, politics, trade or crafts. *Tokoh* are the people one is encouraged to go to first, because they are articulate, knowledgeable of their surroundings, and used to receiving visitors. They are the "contact persons" for administrative, religious and commercial authorities in their area.

To gain a more complete view of village stratification, in 1996, following completion of the village census, I gave the village secretary a list of all villagers and asked him to identify the *tokoh*, and judge each of the 905 *KK*[175] on the basis of their ability to control labour. The village secretary assisted in my completed village census, and had run several earlier government censuses, making him arguably the most qualified villager to make these determinations. For all except one or two of the families I was familiar with, I agreed with his designations. Families with prominent individuals (major and minor religious leaders and *tokoh*) are presented separate from ordinary villagers. Totals and percentages for each category are presented in Table 4.3.

[175] There were 903 responses due to two KK being grouped with others.

Table 4.3 – Work receivers (+) and work providers (-) among various groups in Gedang-Gedang in 1996

	N	+	-	=+-	≠	Ø	Work receiver (%)	Work provider (%)	Work receiver and provider, or neither (%)
Kiyaè	6	6	0	0	0	0	100.00	0.00	0.00
Kiyaè Tokoh	4	4	0	0	0	0	100.00	0.00	0.00
Kiyaji	21	14	0	6	1	0	66.67	0.00	33.33
Kiyaji Tokoh	18	13	0	4	1	0	72.22	0.00	27.78
Tokoh	185	98	15	68	1	3	53.85	8.24	37.91
Ordinary villagers	669	164	248	172	20	65	27.15	41.06	31.79
Total	903	299	263	250	23	68	35.81	31.50	32.69

To meaningfully distinguish levels of control, we decided each *KK* should be noted as follows (symbols used followed by Indonesian language terms and their translation):

+ *Selalu menyuruh:* "always orders" (others to work for them) – Work receiver
- *Selalu disuruh:* "always is ordered" (by others to work for them) – Work provider
=+- *Menyuruh dan disuruh:* (sometimes) "orders and" (sometimes) "is ordered" – Both work receiver and work provider
X *Tidak menyuruh – tidak disuruh:* "neither orders nor is ordered" – Neither work receiver nor work provider
Ø *Tidak jelas:* "unclear" – information lacking
N Number of families (*KK*) noted

This allows for a categorization of families into work receivers, work providers, or both/neither for families which sometimes provide work and sometimes receive work depending on the circumstances. Patrons are work receivers and their clients are work providers. The categorization is not always cut and dry. Very few in the village refrain from any menial or exertive labour (the same cannot be said for most middle and upper class townspeople). Village patrons may choose to join work parties with people of higher or lower status, particularly at key moments of planting or harvest. Circumstances arise when even a *kiyaè* or village leader does some menial work in his field. The figures should be interpreted as measures of tendencies rather than confirmation of rules. The classification is intended to provide a relative though meaningful measure of stratification on the key principle of labour control.

Table 4.3 shows that the families and households of Gedang-Gedang can be divided into three roughly even groups: labour givers, labour takers and those who give or take labour depending on who they are exchanging with (column =+-). Few (2.5 percent) neither provide nor receive work from others (column ≠), although for 7.5 percent of the families a determination was not possible. As expected, all higher religious leaders are patrons who have many clients throughout the village. All but two of the ten *kiyaè* reside in Arestengga neighbourhood, and four are considered village leaders. The other religious teachers (*kiyaji*) also have clients among the many families who send them their children for prayer recitations, and almost half are considered village leaders. However, about 30 percent are also clients themselves, a reflection of the fact that *kiyaji* on the whole reflect the economic

situation of the community they come from. All but one of these patron/client *kiyaji* live in the northern neighbourhoods of Gunung Papan and Temberean. Similarly, twelve of the fifteen lay *tokoh* who are work providers reside in the northern two neighbourhoods (nine in Gunung Papan). One can be considered a *tokoh* by being the client of a prominent *kiyaè* whose boarding school receives the *tanèan* children, as is the case for a household head in Gunung Papan. He and his family gain prestige by being one of the key links in the hill area for the sub-district religious elite. Breaking the data down into neighbourhoods shows that the ratio of clients to patrons is higher in the north than in the south. Among the undistinguished group (normal villagers), there are roughly equal numbers of labour givers and labour takers in Jaruddin (+46, -42, respectively) and Arestengga (+73, -69), whereas in Gunung Papan (+16, -62) and Temberean (+29, -75) labour givers outnumber labour takers nearly 4 to 1 and 3 to 1. When all categories are included, labour takers exceed givers in Jaruddin (+73, -43) and Arestengga (+131, -71) while the reverse is the case for Gunung Papan (+42, -71) and Temberean (+53, -78).

From this overview, it is clear that labour giving and receiving are prevalent in the village and partially determine social stratification, though the survey information cannot convey the texture of the relationships that bind patrons and clients. For this, we need to look at specific cases. Two of the households in the 24 *tanèan* sample can command significant unpaid and unreimbursed labour from some of their neighbours though patron-client relationships which are often passed down from one generation to the next. In Madurese, the terms for a patron who has many clients are *majikan* or *jaregan,* with the clients called *rosoro.* As the term *rosoro* (a person who can be ordered to do something) is considered demeaning, *majikan* refer to their clients using more neutral terms such as *na'-ana'* (children), *la-bhala* (family) or *ca-kanca* (friends). The following case illustrates the *majikan – rosoro* relationship and the changing fortunes of one *majikan*, Pak Enno, who lives in the centre of Jaruddin neighbourhood. Its presentation in some detail also provides a picture of one household's history.

Pak Enno was born in 1950. He is a carpenter as well as a farmer. He married Asmariya when he was 15 and she only 10. She moved to his family's residence, joining the household with Enno and his parents, because at her *tanèan* there were enough on hand to work, and because Enno thought he would be unhappy living at her place. The strong social position of Enno's family was also a major factor in deciding post-marital residence. At 15, Asmariya gave birth to a boy, but he developed a high fever and died soon after birth. Three years later she was pregnant for the last time. A boy, Rikso, was born and today still lives in the same household with his parents, wife and daughter.

Enno's lifestyle identifies him as a prominent, well-off villager. His carpentry skills are sought after and have usually provided him a steady cash income. In the 1980s and early 1990s, every Wednesday evening he would attended a revolving credit association (*arèsan*) meeting with over 85 other prominent local traders and landowners. The *arèsan* was richly endowed with a gamelan orchestra and entertainment included poetry reading (*mamaca*) and alternated song and dance (*tayub*) with a professional female singer-dancer (*pesindèn*). This required Enno to have enough cash for the *arisan* deposit and tips for the *sindèn* when she danced with his friends. In 1990, he incurred debt to purchase a pair of racing bulls (*sapè kerrab*), a sign of prestige and wealth since these animals do not work the land. His wife's parents had once made a vow that if they were able to own a pair of racing bulls they would hold a village *kerrabhan sapè* race on their land, and invite other owners from the area to take part. His wife's parents unable to fulfil this vow, Pak

Enno assumed the obligation and put on a *kerrabhan sapè.* The food for invited guests came to Rp 350,000.

Like his father before him, Enno has twenty persons (15 women and five men) from neighbouring households who are willing to do work for him without salary. These clients receive three meals and drinks per day when working. He says these families have worked for him since about 1980, and before that for his father and possibly before then, and are expected to continue to work in this way for Rikso. Enno says his role is to help organize work on everybody's land, including his own. He sends men to plough and plant fields, women to sow grain, cook or cut fodder, and children to cut fodder or fetch water. All of the people who work for Enno have land of their own, purchase their own fertilizer and other inputs and retain all their harvests. All these clients have family links with him or his wife (generally second cousins or *dua' poppo*), though other better off relatives do not share the patron-client link. One elderly man who has a half hectare (four *lagghu*) is a first cousin (*sa' poppo*) of Enno's father, Pak Mutah'ben. A woman, Bu Amsiti, is a first cousin of Enno and has only two *lagghu*[176]. She works for Enno with her five children, the meals supplementing her cash income from selling *tikar* and *la'as tarebung.* She also works one to two nights at a time as maid for a Chinese family who own a restaurant in Sumenep.

With the expansion of tobacco cash-cropping in the mid-1980s, wage rates for field preparation and the labour-intensive daily hand watering of plants have steadily increased. During the off-season, planters seek to secure labour locally and throughout the neighbouring sub-districts for the following season. As labourers can easily find work during the tobacco season, Enno's *rosoro* are not available except perhaps to take part in a festive afternoon of harvest or to help out a few hours here and there. Thus, like everyone else, the area he can put under tobacco depends on available cash. He planted two *lagghu* in 1986, for a profit of Rp 130,000 and three *lagghu* in 1990 that earned him earned Rp 1.1 million. Unfortunately for Enno, the 1990 profits were stolen from his house. From this point on, his fortunes began to decline.

From 1992 to 1994, he began suffering from stomach ailments. Not much tobacco could be planted because only his son was available for watering. In 1993 he had to sell off his *sapè kerrab* (recouping the Rp 1 million) to cover losses from tobacco planting and trading, and sold two *lagghu* for Rp 1,350,000 when his father Pak Mutah'ben died the same year. The burial itself was carried out without cost (*eroyong)* by neighbours and family. However, food for guests during the seven days of *dikkèr* (religious chanting) came to from Rp 500,000 to Rp 1 million, taking into account the donations (*kiriman)* of rice, coffee and sugar worth about Rp 100,000. All told, some Rp 1.5 million was spent. Funeral ceremonies in the village can cost anywhere from Rp 100,000 for a simple affair with few guests to Rp 2 to 4 million or more, and the size of the event serves to validate a family's position in the community. Given Pak Enno's standing, he could scarcely avoid a large ceremony for his father Mutah'ben, whose status of *majedi* was passed down to Enno. This year, Enno also had a large well (the circumference measures five armspreads, or *depa'*) built in his *tanèan*.

Well digging is an activity that neighbours are generally willing to assist in without pay, as they will profit from the nearby water access. Nevertheless, the cement and meals were an additional burden for Enno in 1993. In 1994, only one *lagghu* of tobacco was planted, netting Rp 200,000.

[176] The term *lagghu* means "morning"or "tomorrow". It represents the land surface that a pair of cows can plow in one morning or half day, about one-eighth of a hectare.

In 1994, Pak Enno spent 1 month in the hospital in Sumenep, leaving his finances in ruin. It was not long before he had to give up the weekly *arèsan* participation and other social entertainment. There was little now to distinguish the *majedi* Pak Enno from the *rosoro* who still served him.

Life carried on, however, and in 1994, Rikso married Enno's cousin's daughter Saepa in a ceremony attended by as many as 100 people. That year, Enno's mother, Murtasia took ill of exhaustion (*sakè lempo*) and died, obliging Enno to sell 1 *lagghu* of *tegal* land to cover part of the Rp 2 million in expenses incurred for the seven days of ceremonies. His health improved somewhat afterwards, and in 1996 he and his son could harvest 3 *lagghu* of tobacco, but still owed Rp 500,000.

Rikso began learning carpentry and by 2000 was working together with Enno one to two weeks a month in carpentry. Enno spent as much or more time in carpentry than in farming. He felt times were easier in 2000 because "aid from outside the [immediate] family is easier to obtain now, so are contributions from family. Pooling of resources and mutual aid are working together." He reiterated that like his father he still receives help from family and neighbours, because his family has a special status. He noted that his cousin Sahiya, who is also his daughter-in-law Saepa's father, accepts to work for him if asked in exchange for meals. In 2009, Enno's activity was in decline, while Rikso's was on the increase. Enno only works at home on furniture (*meubel*), beds (*lencak*) and cattle sheds (*kandhang*); the finished products are carried to the buyer's house. Rikso works outside laying *keramik* flooring and making wooden window frames for homes under construction. Though Enno' complained that there is less demand for their services, he admits the income is still good, and he probably continues to have substantial income from his landholdings. He was able to plant 4 *lagghu* of tobacco using "only family labour" in the 2008 season.

The patron-client relations still function due to the continued value for clients of having access to food, cash, and labour in time of need though the good offices of a respected family. However, the amount of labour Pak Enno can marshal is increasingly affected by the growing labour market, particularly during tobacco season. Pak Enno has made use of his charisma and standing in the neighbourhood to maintain the alliances with neighbours that provide him with unpaid work when needed. His skill at carpentry, now passed on to his son, allows them to obtain cash income to see the household through adversities, sickness and family transitions. His intent now is to ensure his son continues to benefit from the patron-client ties his grandfather forged. Enno's standing and the strategy that accompanies it, impose however certain ceremonial obligations that are not without cost.

From the point of view of the clients, the work at Enno's is occasional and flexible, to be done during "free" time when they have no other work to do, or vicariously, as when one sends a child to cut grass for the patron's cows. Enno thus takes advantage of the idle cycles in the lives of poor cousins and neighbours and they receive unpaid meals and the security of knowing they will not be alone in the face of critical financial or labour needs. The latter generally arise during planting and harvest, for the clients as well as for Enno. Clients are willing to honour work for food arrangements with an arbitrator who manages the allocation of collective labour and reduces the risk of labour bottlenecks. In addition, clients of Enno can borrow tools and cash from him. The terms of this reciprocity are not equal. It is unlikely that the absolute value of the labour allocation services and insurance Enno provides over the life of the relationship can exceed the value of lost wages for the younger men and women. However, some, livelihood activities engaged in by elderly persons provide relatively low returns to labour (see Chapter Three) so for them the compensation Enno provides may seem acceptable. Furthermore, these

relationships were forged in earlier times when wage employment was much less common.

Patrons in Gedang-Gedang include both those households that have demonstrated an ability to tie labour to them for generations (like the family of Pak Enno) and those that due to their slightly better economic position have been able to attract one or more clients with some degree of regularity in the absence of traditional ties. Tradition can be called upon (as Pak Enno frequently does) to legitimize perpetuating the tie, but without sufficient means to provide food or assistance, a patron can lose clients by attrition as attractive remunerative opportunities elsewhere present themselves. The changing economic landscape of the last thirty years, particularly the transportation revolution and tobacco cash-cropping, has provided opportunities for social mobility for those who have capital or are willing to work hard to create it, despite many pitfalls that must be steered clear of to avoid slipping back. As a result of economic opportunity and increased education, fewer young people today appear willing to accept food for work unless this practice has been instilled in their family.

This in no way implies that family traditions are unbending or unbreakable. Quite to the contrary is the picture emerging from watching households evolve over time. One *majikan*'s household in our immediate neighbourhood lost much of its land following the patron's death and, a few years later, son's invalidity caused by a bad fall and subsequent death. The land was bought up by a former hard-working *rosoro.* The household stages of expansion and retraction and the setbacks that often arise in a risky environment are part and parcel of village life. They have the potential to constrain the exercise of power over others and the accumulation of wealth. And they provide opportunities for those occupying the lower rungs of society at any given time. This dynamic aspect of household development will be treated in Chapter Five.

There is a definite sense in this northeastern Madurese village, at least among those who need to get their hands dirty to survive, that hard work is something admirable. It is one of the surest ways for the modestly-born to achieve respect in the village. The fact that Madurese have always historically been deemed a particularly hard-working people owes its existence to the enduring prestige or at least respect that accrues to those who improve their lot over time by working hard, even through farm work or other manual labour. In the town, hard work is also rewarded, but it would be more accurate to say that diligent manual workers contribute particularly well to increasing the wealth of those who do not get their hands dirty. The latter appreciate the former but few accord them any prestige. Nevertheless, Madurese townspeople are proud to belong to an ethnic group that is praised for the many emigrant success stories built on hard work at menial jobs. Particularly proud are those who themselves studiously avoid menial work.

CHAPTER FIVE
HOUSEHOLDS AND PROCESS

5.1 Introduction

Contemporary households in East Madura function within the specific historical, ecological and economic contexts that have been outlined in earlier chapters. These dynamics shape a constellation of opportunities and constraints that determine in the first instance the repertoire of livelihoods options open to them, although the opportunities are not necessarily open access and the constraints of one generation may become the opportunities of the next. Opportunities for livelihoods are dependent on access to land, capital or water in some cases, to household labour of specific gender and age in others, and nearly always to markets and social networks of some kind. The available literature and discussions with community elders reveal distinct continuities in the lifeways of East Madurese rural households. Maize and bovines have provided the backbone of rural subsistence for as far back as can be determined, and the dry climate and poor soil quality has kept agricultural production low and workdays long, particularly to find fodder for the stock and water for household use. East Madurese households have also had to survive in an environment characterized by conflict of many kinds. In colonial times, conflict was expressed by the regime of forced deliveries, conscription, and the appanage system, leading many to consider solutions in migration to Java and other islands or self-imposed isolation further in the hinterlands to try to escape this form of predation. World War II brought ever-increased claims on local production and manpower by Japanese occupiers; it and the Independence struggle that followed brought with it famine throughout much of the island. Vermin decimated crops in the 1950s until they could be brought under control. Competition for fodder, water and wives in a context of lawlessness had long encouraged self-help and vigilantism and caused rural insecurity that persists to this day. For some, the struggles were too much, and outmigration was the remedy. Some Gedang-Gedang households have family in Banyuwangi, an area of preferred migration; the families still keep contact and sometimes contemplate reuniting through a marriage. Although kinship links like these can extend over great distances and provide options in life, the individual households with the family and *tanèan* of which they are a part and nearby neighbours were and still remain the first focus of solidarity.

Apart from these continuities, and closer to the time-frame of this study, are the important changes occurring in the second half of the Twentieth Century that impacted on households in villages across Madura, including Gedang-Gedang. Communities that had few opportunities for cash income outside of migration, where household farms, symmetrical exchange labour groups or patron-client food-for-work arrangements formed the dominant structures of production, gained increased access to the towns, to North Coast villages, and to new sources of income. The transport revolution that began in Java followed the improvement of local roads, and further integrated the bourgeoning local markets into wider Java-Madura markets. Though Gedang-Gedang was never isolated from the rest of the island, it was far less so by the end of the 1980s. Short-term migration to the town or the ports of the North Coast in search of income became anoption particularly for men, and a way for households to escape the poverty trap. It was around this

time that the East Java based tobacco industry dependent on Madura for much of the shredded and sun-dried (*rajangan*) tobacco used in *krètèk* clove cigarettes began to pay a premium for the crop grown in the Northeast on *tegalan*, considered better tasting. The relative infertility of Batuputih's soil and its long dry season thus changed from being constraints to opportunities for many households, which hastened to convert unused land to intensive dry-season production from the 1980s. In the late 1990s, opportunities were opened up for households along the coast to plant tobacco as a cash crop for the first time. Turning the tables on their southern brethren, north coast dry conditions and infertile soil that condemned their ancestors to high risk subsistence agriculture gave this generation new opportunities for producing high-grade tobacco with almost no risk of rain-out. Though the opportunities for cash cropping and cash employment increased immensely for many households, they were not entirely open access nor were risks entirely eliminated. Hill areas were still left out, and national commodity markets remained largely opaque. Only recently has there been concern expressed by farmers or by government for the longer-term effects of tobacco cultivation on individuals and the environment.[177]

When societies adapt to changes such as these, what is really meant is that their constituent household units adapt. Though one can say in an abstract or metaphorical sense that societies adapt, the household is where adaptation takes place in concrete and observable ways (Wilk 1991:31, Fricke 1986:17-27). The challenges faced by those who try to understand household development stems from the multiple adaptations occurring more or less simultaneously, such as adjusting to new political and economic trends or to a changing environment, to the addition or subtraction of household members, or to lifecycle events and crises, which may include interpersonal conflicts. Simply analyzing discreet examples of decision making to arrive at a model of household adaptation is insufficient if it disregards the temporal perspective, because decisions made in the past influence options in the future and much behaviour is anticipatory of events which may occur in the near or distant future (Pennartz and Niehof 1999:8). Untangling the many threads of causality and feedback is in some cases impossible—for subjects and researcher alike—but the longitudinal approach offers a surer footing for unraveling the decisions households make to deal with short and long-term exigencies and the consequences those decisions entail for the well-being of the household members and of the wider community.

This chapter will start with a basic outline of household development stages, particularly the formation and fission of households, look at how the relation between productivity and consumption changes over time, and examine individual household histories, particularly the strategies of exchange and alliance they employ to reconcile opportunities and constraints. I provide an example of how ecology, household exchange, animal husbandry, prestige-seeking, and performing arts interact as part of a cultural system to mitigate key constraints on household viability and security. I then conclude with some brief remarks on the methods appropriate for maximizing the value of longitudinal comparison of household trajectories and theoretical implications of the findings in this chapter.

[177] The exception is on the water issue, which has become increasingly factious in response to the need for watering tobacco. Children as well as adults participate in the harvesting, receiving nicotine and pesticide residues through the skin. Health effects and whether Madurese tobacco farming will lead to long-term soil fertility depletion and increased need for fertilizers and pesticides (Campaign for Tobacco-Free Kids 2001) are urgent questions that have not yet received enough research.

5.2 Household formation, composition and development

In the last chapter (sections 4.2 and 4.3) I explained the concept of the conjugal unit (CU), and presented data on the composition of the 745 household units (comprised of 967 CUs) found in Gedang-Gedang in 1996. I also explained the concept of the *tanèan.* In this chapter, I will build on this synchronic and descriptive view of the household and *tanèan* to explore dimensions of choice and strategy, which are played out over time and in relation to others.

A household is formed when a conjugal unit, or surviving member thereof, sets up a separate hearth. The household will be perpetuated by succession if a child or relative takes over the household assets and begins a new cycle of expansion, or the household will be dissolved once the last member passes away or joins another household. Household development phases have been identified at least since the studies of Fortes (1945, 1949) among the Tallensi and Goody (1958) among the LoDagaba, both of the Gold Coast (Ghana). For Fortes, there were three phases: 1) *expansion* (from the marriage of two people until the completion of their procreation); 2) *dispersion* or *fission* (often overlapping the first phase, it begins with the marriage of the oldest child and continues until all children are married); and 3) *replacement* (from when the remaining child takes over the family estate until the death of the parents and their replacement in the social structure by their children) (Fortes 1958:4-5). Other authors (e.g., White 1976) have found it useful to identify phases through which households develop: *early:* few children above six and capable of productive or useful work; *middle:* more or less equal numbers of children under six and over six; *late:* have most children above the age of six who contribute in some way to the household's work; *dispersing:* some children have already left the household; *reintegrating:* one or more children have returned to the household with or without spouse or children. These general phases are useful for categorizing, but do not tell us much about how strategies are formed.

The phases of expansion and dispersion do, however, have a direct impact on the child raising charge and the productive capacity of the family. This can be measured in several ways by a dependency ratio, also called a consumer producer ratio or consumer worker ratio. The most often-used dependency ratio divides the number of members under 15 plus the members 65 (some authors use 60) and over by the number of members aged 15 to 64 (or 59). The ratios for the 36 households in the sample in 1986 along with eight households that were offshoots from some of them and that remained in the same *tanèan* are presented in Table 5.1. The table shows the data points for each yearly visit, so all the 1986 households have seven data points, with the exception of three which were extinguished when the last member died or integrated another household. The eight offshoots have between one and six data points each. To trace the ratio for individual households is interesting, but would make the graph illegible, so I have settled for presenting the data as a scatter diagram, which has the benefit of allowing an overall view of how dependency ratios relate to the age of household head.[178] In the next section, the ratio of resources to consumers, a more telling picture of household economy, will be traced over time for individual households.

[178] The household head, as defined in chapter 4.2, is the oldest married man not yet having attained the age of 50, or if none are present, the oldest married man, then the oldest single/widowed/divorced man, then the oldest single/widowed/divorced woman.

Since Chayanov's ground-breaking work became known in the West in the mid-1960s (Chayanov 1966), many authors have considered "the two-sided nature of family labour, as needs (consumers) and resources (workers)" (Barlett 1980b:558) to take into account the fact that individuals are rarely only consumers or workers but are usually both. Chayanov anticipated the emphasis of Fortes (1945, 1949) and Goody (1958) on households as entities that move through development phases (Hammel 2005:7043). He also postulated that households do not count opportunity costs for non-cash inputs (in other words, they do not value household labour at the local wage rate). This is indeed the case for certain occupations in Gedang-Gedang, as was found from looking at returns from animal husbandry, mat weaving and similar occupations where returns to labour can be much lower than the local wage rate.[179] According to classical economic calculations, these occupations provide negative returns, yet households accept these due to the lack of available alternatives and because they take into account the value of cows for savings, agriculture and dung.

Despite these advances, Chayanov's theories and measures were designed for understanding the nuclear family-based subsistence farms of early twentieth century Russia, structures that bear little similarity with rural households based on extended kin common in today's developing world. Chayanov's schedules of age and sex that only attributed productivity scores to men between 15 and 50 and women between 15 and 45 represents a significant limitation in Chayanov's approach if applied in Madura. Hammel (2005) has offered an improved method of calculating household production and consumption that phases in male and female productivity earlier and phases them out much later, takes into account differential contribution and consumption of gender-age groups, and fine-tunes the values to correspond better with ethnographic data on complex multigenerational households. A comparison of the schedules (from Hammel 2005:7044) is found in Table 5.1.

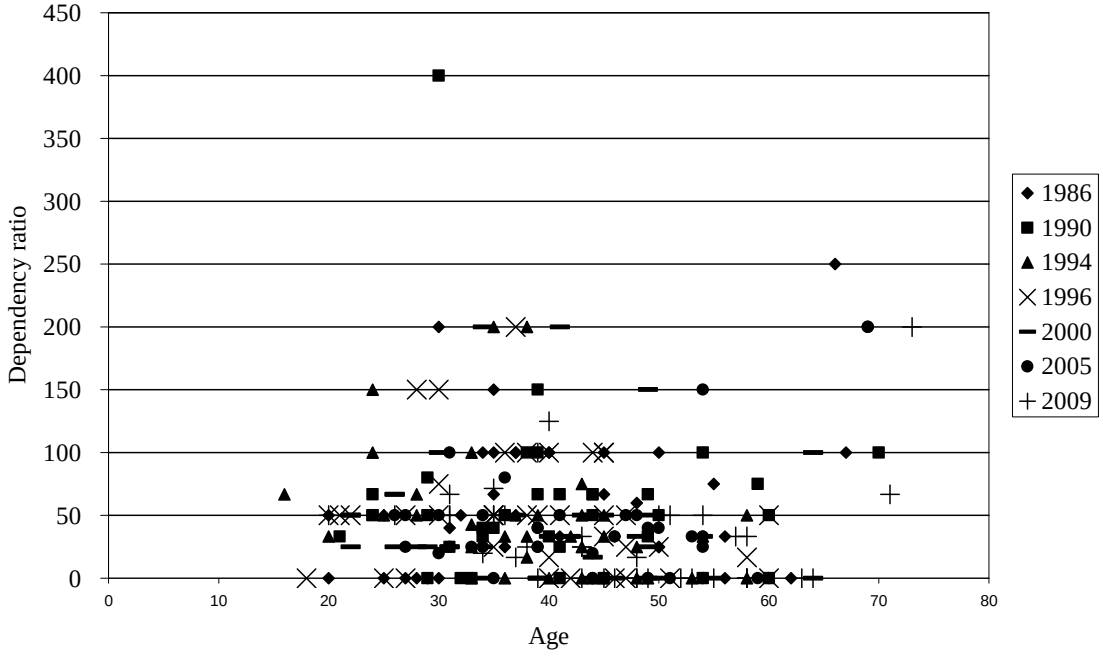
Table 5.1 – Consumer and Producer values comparing the Chayanov and Hammel weighting

Weights	Production				Consumption			
	Male		Female		Male		Female	
	Age	Units	Age	Units	Age	Units	Age	Units
Chayanov (C)	—	—	—	—	<2	0.0	<2	0.0
	—	—	—	—	3	0.1	3	0.1
	—	—	—	—	9	0.3	9	0.3
	<15	0	<15	0	15	0.5	15	0.5
	20	0.7	20	0.7	20	0.7	20	0.7
	50	1.0	45	0.8	51	1.0	46	0.8
Hammel (H)	5	0	5	0	2	0.1	2	0.1
	7	0.1	6	0.2	5	0.3	5	0.3
	9	0.2	10	0.5	9	0.5	6	0.5
	12	0.5	15	0.7	12	0.7	10	0.7
	15	0.9	20	0.7	15	0.8	12	0.8
	50	1.0	60	0.8	50	1.0	60	0.8
	100	0.8	100	0.7	100	0.8	100	0.7
Source: Hammel 2005:7044.								

[179] Otherwise stated (from Barlett 1980a:145): "profits for family farms are calculated by subtracting cash costs from the gross proceeds of the farm (opportunity costs for non-cash items are not included)."

Based on Hammel's values, Figure 5.2 shows that dependency ratios rarely exceed 1.2 for the sample households and are primarily clustered along the 1.00 line and between 1.00 and 1.10, occasionally rising to 1.20 but rarely higher.[180] One could argue that Hammel's productivity scores should be more rigorously culture-specific, based on the economic, social or cultural values of work effort in the society they are being used. If such is the case, Gedang-Gedang men who can earn high wages would receive higher scores on the productivity scale, and older men less as their returns to labour declined (as they went from shredding or watering tobacco for wages to making sitting mats or mining limestone bricks). Since the mid-1990s, a slight asymmetry has crept into the wages paid men and women for some agricultural tasks (Table 3.16), which could be taken into account, though on the other hand women have substantial earning potential from trading, and are as active and productive as men in most agricultural occupations. The values could even have been tailored to the age-gender activity scores from the time allocation study of Gedang-Gedang. I find, however, that Hammel's scoring system is fairly representative of the situation in Gedang-Gedang, and tinkering with the values would make this study less valuable for cross-cultural comparison.

Figure 5.1 – Household Dependency ratios[181] based on age of household head, Gedang-Gedang, 1986-2009 (44 households, 1-7 data points per household)

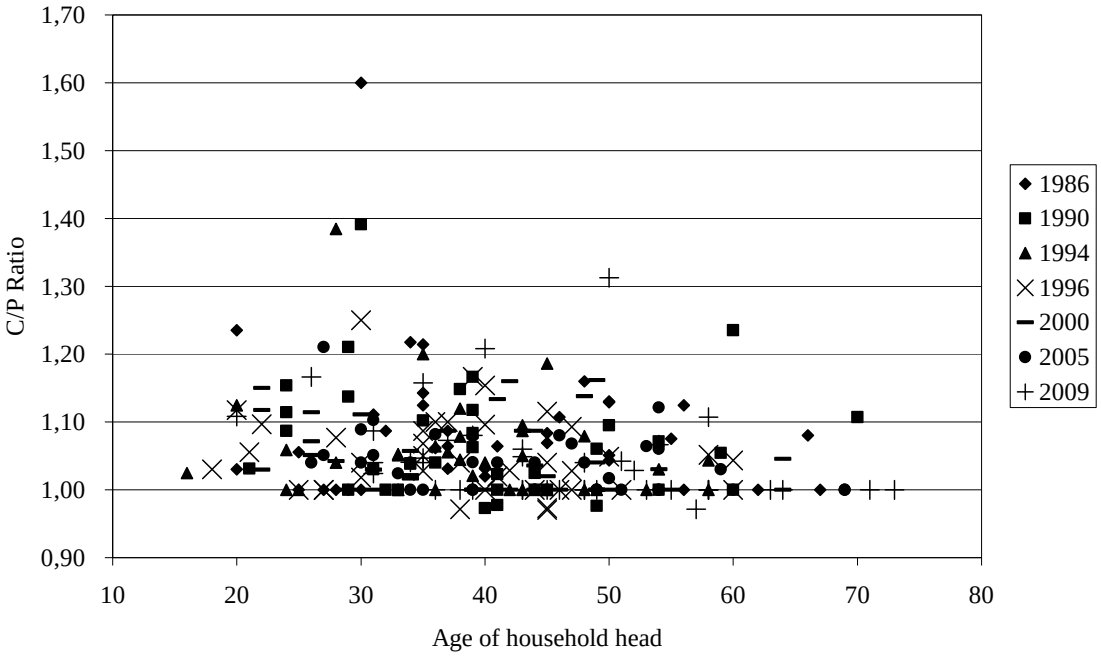


The main lesson from looking at the household dependency ratio in this way is the clustering of values at or under 100, underlining the village's small average number of children per family. The outlier at 400 is a lone mother and many young children (A5B; to be analysed later). But this household configuration is highly unusual.

[180] The presence of teens in certain configurations can make the ratio dip slightly below 1.00.

[181] The dependency ratio is the number of household members under 15 years of age plus the members 65 (some authors use 60) and over divided by the number of members aged 15 to 64 (or 59 times 100). These values are charted according to the age of household head as defined in chapter 4, section 2 for the year of observation.

Figure 5.2 – Household Consumer-Producer (Hammel)[182] ratios based on age of household head, Gedang-Gedang, 1986-2009 (44 households, 1-7 data points per household)



More can be seen from looking at the Resources-Consumer ratio, which is based on dividing land and large livestock holdings by the CP(H) ratio.[183] Land is measured in ares (hundredths of a hectare) and each cow unit (calves and sharecropped cows receive half a unit) are counted as equivalent to one *lagghu* or 12.5 ares. In order to reduce the bias that can enter in due to routine fluctuations in the livestock holdings, and to account for years for which data is lacking, I have averaged holdings for the 24 years and used this measure for livestock holdings each year. The rationales behind this choice are that land is a better indicator of economic level, and the livestock data for a given year may not be representative as they depend on the date of my survey. Still, a measure of average livestock holdings needs to enter into the equation since several families derive their wealth from sharecropping out cattle (particularly J6A), just as other households have a chronic livestock deficit (A5B). Fluctuations in the resource-consumer ratios for individual households are visible in Table 5.3 and will be seen for individual households described in Section 5.3. It is notable that over the years, the value of resources controlled by young household heads 20-29 had dropped in relation to the mean, while all other groups had slightly risen. This reflects the weight of the many households that are still educating children into their 20s, during which time the parents retain the resources and household headship. From 1986 to 2000, the number of households headed by

[182] The Consumer-Producer ratios (Hammel) are based on the values provided by Hammel (2005:7044, Table 1: Schedules of Production and Consumption) under Hammel (H), and reproduced here in Table 5.1.

[183] CP(H) is shorthand for Consumer-Producer ratio using the weights determined by Hammel (2005) and presented in Table 5.1.

individuals under 30 was seven or eight, but in 2005 and 2009, it was only three and two, respectively.

Table 5.2 – Household size according to age of household head and year of observation

Age of HH Head	Year							Mean
	1986	1990	1994	1996	2000	2005	2009	
< 20	-	-	5.00	4.00	-	-	-	4.50
20 – 29	2.57	4.57	4.67	4.57	5.13	3.67	3.00	4.02
30 – 39	4.58	4.31	4.83	4.08	4.60	5.69	5.17	4.75
40 – 49	5.00	4.22	4.31	4.21	3.93	3.64	4.27	4.23
50 – 59	4.29	4.25	3.25	4.67	3.00	4.25	3.64	3.91
60 +	3.67	3.00	-	2.50	2.50	2.33	2.75	2.79
Mean	4.02	4.07	4.41	4.01	3.83	3.92	3.77	4.03\4.00

Table 5.3 – Resource-Consumer ratio according to age of household head and year of observation

Age of HH Head	Year							Mean
	1986	1990	1994	1996	2000	2005	2009	
< 20	-	-	32.12	38.73	-	-	-	-
20 – 29	48.04	41.49	33.59	34.02	24.29	28.27	18.66	32.62
30 – 39	34.89	40.84	36.38	28.06	39.25	26.45	27.32	33.31
40 – 49	27.22	29.05	33.06	37.54	33.38	36.09	30.57	32.41
50 – 59	27.57	27.20	31.53	40.60	43.24	36.03	37.22	34.77
60 +	56.41	26.07	-	41.41	47.21	60.66	53.16	47.49
Mean	38.82	32.93	33.34	36.73	37.47	37.50	33.38	36.12\35.74

Individuals have obvious social and emotional reasons for deciding to have children. This issue will be taken up in the next chapter on fertility, but it should be mentioned here that when the subject arises in conversations, most often children are described as beneficial as parental helpers. Post-marital residence is a very important decision to be taken by the young couple, or through negotiations between the parents, since it will determine which family gains and which family loses household labour. Ageing parents have every interest in having children around to help them with agricultural and household maintenance chores. The ideal from the point of view of parents is for one of their children to remain in the *tanèan* with their spouse in a separate house, and continue to share the same household with the parents. Being in the same household means the parents can count on their contribution in work and household finances, even if some consumption items, and perhaps land or cattle, may be retained as the exclusive property of individual household members. A second-best solution is having them in the *tanèan,* but in a separate household. This solution is less satisfactory for most parents, because it

means the nature of the exchange between the two households will be less obligatory than if they were sharing the same household, though there are situations where separate households are preferred (see below). The burden of cooking, shopping and household work will have to be shouldered alone by each household's females, and may be onerous if they are pregnant, lactating or seniors. If the household separates, land inheritance must usually be given. The abstract decision criteria for separate or combined households can be outlined as follows, though only looking at individual household histories can clarify many decisions.

Reasons for retaining a single household:

- Parents are too old to fend for themselves;
- Young family needs the elders to look after their children;
- The size of the household's land is very small; if split it would not provide both households with an adequate living;
- Cooking separately is a burden—requiring marketing, fetching fuel and water, etc.—thus it is better to let the young workers focus on productive income-earning activities and let the mother (or other older woman) do the cooking and look after the small children for everybody;
- There are still unmarried children, who should remain with their parents at least until marriage, even if they already have an independent source of income.

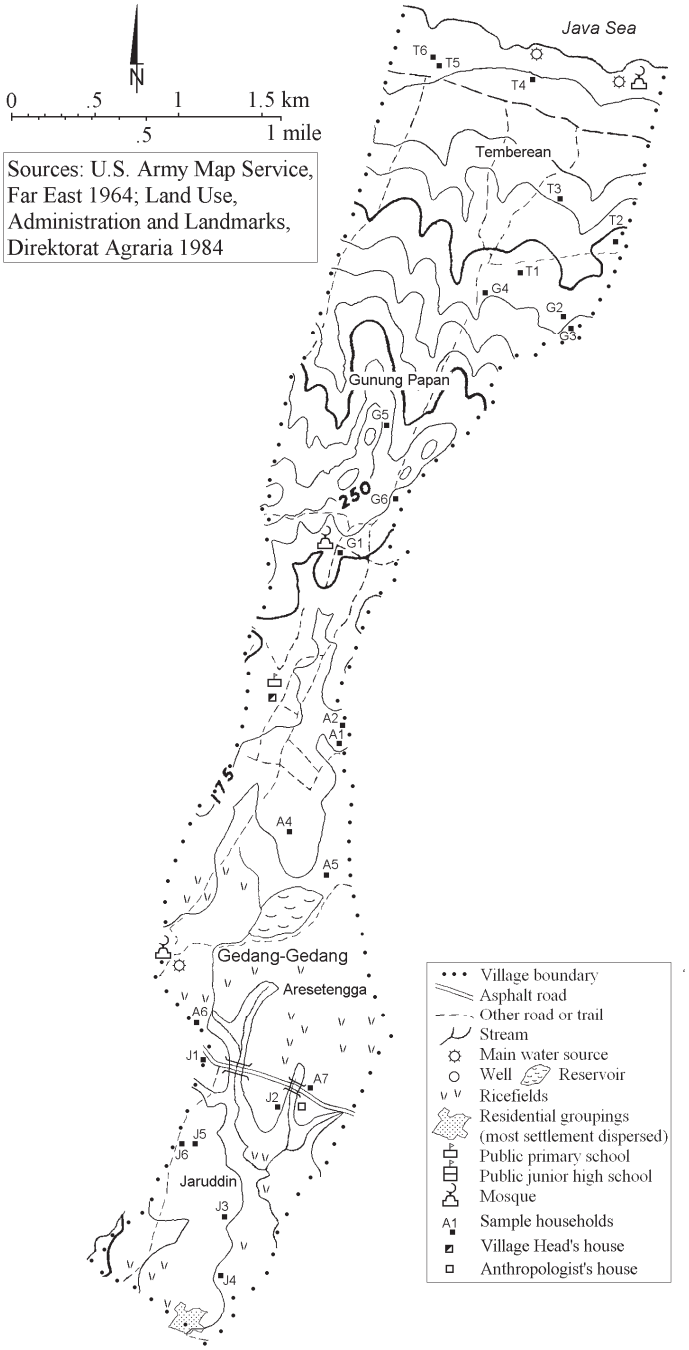
Reasons for separating households:

- The household consists of two or more conjugal units from the same generation, for example two brothers (there are exceptions to this rule);
- The conjugal units currently in the household are too far apart economically, and the better-off conjugal unit wants to be freed from the obligation to share in a manner it considers asymmetrical;
- There is a feeling that the united household is underproductive, that not enough resources are being created due to lack of synergies or certain incompatibilities (which may be personality differences that will not be admitted as such). Separation is seen as an opportunity to release the productive energies of each conjugal unit. One household (G6B) qualified this as "results were not forthcoming, so we split, once results were forthcoming we reunited" to explain why the household split, then reunited, only to split again;
- The individual who has joined the household following marriage does not get along with the in-laws; separation becomes a way to save the marriage and stay in the *tanèan* while gaining a measure of needed autonomy;
- The young conjugal unit includes a young girl. If she has to share the household with another conjugal unit of her generation, or several male siblings, her parents often decide to find a solution that will place her in a *tanèan* household affording her more privacy. The solution adopted depends on the configuration of households already present in the *tanèan* or the possibility of having outside family move in. Male suitors and their parents will place value on a potential marriage partner that is a model of modesty and lives a sheltered existence, not one that is a large hodgepodge of a household with many dependents that could require support in the event of marriage. The need to separate may be felt soon after the birth, since virtually from that moment forward neighbours will begin considering the contingencies of marriages and alliances.

5.3 Household histories and strategies

This section will look at household histories, dividing the 36 sample households and eight offshoots into three or four groups: the well-to-do, the poor, and the intermediary group of those who "have enough," which I divide into a higher and lower group. The classification of the households into poor, "have enough" and wealthy classes is determined not by the dependency ratio or the ratio of resources to consumers, but by the scorings I made during each visit of the quality of their housing, and the scorings of their level of living, consumption, and health. Confirmation was obtained for most valuations in discussions with the village secretary and other villagers. The location of the households can be determined from the map in Figure 5.3.

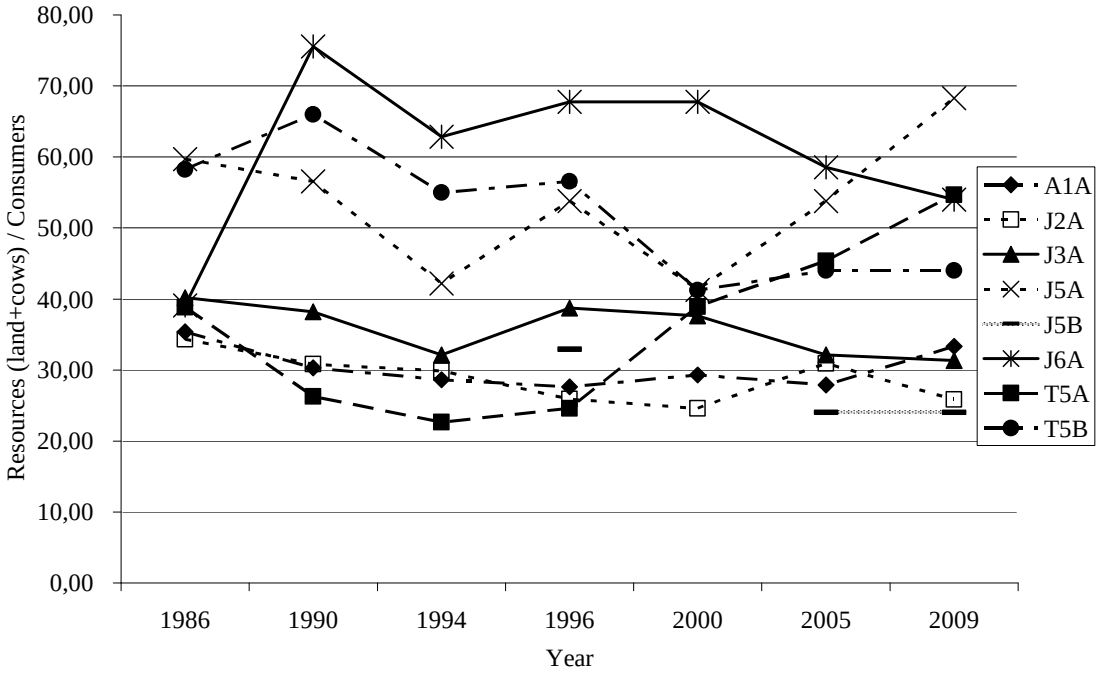
Figure 5.3 – Approximate location of Gedang-Gedang households, 1986-2009



5.3.1. Well-off households

The Madurese class people, families and households according to their economic situation. Well-to-do households are called *sè andi'* ("the haves"); the "have nots" are *sè ta' andi'*. Households that are considered neither rich nor poor but are getting by are classed in a broad category of "have enoughs" (*cokopan*).

Figure 5.4 – Resource-Consumer[184] ratio for selected wealthy households, Gedang-Gedang, 1986-2009



There is little secret to success for Gedang-Gedang households. The successful ones have ample resources in land and livestock, have quality housing, sufficient workers but not too many mouths to feed, and access to cash income when needed, preferably from multiple revenue streams. The cash means they can take advantage of investment opportunities as they present themselves and ride over the difficult times that inevitably come. They are usually united as stem families in a single household; at least that is the trend in the eight successful households I consider now.

The Mannan household (A1A) is an example of such a household based on the lineal stem family. Mannan is a respected *kiyaji tokoh* and aide to the village head, and the village secretary is in the next *tanèan*, positions that may provide certain benefits or facilities (though Mannan will only admit they give added

[184] The Resource-Consumer ratio divides level of land and cows controlled by the Consumer-Producer ratios (Hammel), the latter in turn based on the values provided by Hammel (2003:7044, Table 1: Schedules of Production and Consumption) under Hammel (H), and reproduced above in Table 5.1). Land is counted in ares (thus one *lagghu* will be given a value of 12.5). Landholdings reflect the total declared size of all parcels and can fluctuate over time as land is transferred or acquired. To this land value is added a fixed score representing the average livestock holdings of the household for the 24 years of the study. This score does not fluctuate over time, for reasons covered in the text. Each owned cow is counted as 12.5 (equivalent to one *lagghu* in order to correspond to the relative average values of land and livestock). A calf is counted for half (6.25) and sharecropped cows and calves are counted for half their value (6.25 and 3.125, respectively).

responsibilities). In 1952, when aged 16, he married Surat, 13, and came to join her father's *tanèan*. There was no economic difference between the two families, nor was Surat's household short on able-bodied workers (rather the opposite was the case); they simply reasoned at the time that it would be easier for everyone to get along at Surat's *tanèan.* At 16, Surat gave birth to a son, Bahir, and was not to become pregnant again. She said she would have liked to have two or more children, but "God didn't provide them." Mannan received four *lagghu* from his father and Surat inherited two. This gave them enough land so that during the dry season they could obtain enough fodder from their own land, and keep between five and eight cows, along with goats and chickens. When his son Bahir was 17, he married Mahniya, 12, and four years later had their only child, a girl Hayani. At this point, Surat decided she no longer desired any more children because she'd feel ashamed to be nursing a baby in front of her granddaughter. Mahniya said she, too, would have liked to have a second child, at least until her daughter married. Like her mother-in-law Surat, she never used any birth control methods, traditional or modern. In 1989 Zainal married Hayani and chose to join her *tanèan,* according to Hayani, because "there would not be enough family members" left behind should she leave. In 1990, at 14 years of age, Hayani gave birth to Moh. Hidayatullah. She received a birth control implant at 16, but Hayani still hopes to have another child eventually, in order to "have enough help." Hayani, her parents and her grandparents all chose their marriage partners themselves. All have contributed to a single cooking unit, and shared the returns from the household land. When Zainal arrived, he was still sharing harvests with three of his four other siblings on five *lagghu* set aside for them, and help his parents cultivate their own three *lagghu.* By 1994, he was given one *lagghu* outright in inheritance and in 2000, he purchased an additional *lagghu*. Hayani's mother died in 2005, and her grandfather slowly lost his sight. He was completely blind in 2009, and his wife unable to walk without a crutch. Now the household is composed of the two elderly grandparents, the father, the young couple and their 18-year-old son, who is in senior high school. The young family has a good deal of land and livestock, as well as a motorcycle in the name of the father, but has to care for ageing grandparents. Like for her mother and grandmother, Hayani's wish to have a second child has not been fulfiled, but by having just one child, Zainal and Hayani can ensure him a good inheritance and hope that his future spouse will join them in their *tanèan*.

Similiarly, the J6A and T5A and B households have remained unified, and with even more comfortable economic positions, their unity is in the interests of both older and younger generations.

Matraib's household (J6A) owns two hectares of land, and sharecrops out many cows to local farmers, as many as 63 head at one point during the study, giving one of the consistently highest resource to consumer ratios for a large household,[185] a ratio that leaves out a truck owned by Matraib's grandson. Matraib claims his position was earned due to his own hard work, because his parents were "ordinary farmers who had to sell their calves to buy food." Matraib and his wife Mua had two boys, Sahrum and Misna. Sahrum married Satmè who came to the *tanèan* and gave him a son and daughter. Misna married and joined his wife's *tanèan,* receiving eight *lagghu* in inheritance. Mua died in 2006. The two grandchildren of Matraib both brought their spouses into the *tanèan,* and by 2009 the household was an unusual lineal sibling joint family: one conjugal unit in the senior generation (Sahrum and Satmè, with the father Matraib) and in the junior generation the children and their spouses, i.e., two CUs headed by siblings. It is

[185] The 1986 ratio for this household is low almost certainly due to underreporting of assets.

uncommon to find two CUs of the same generation sharing a household and kitchen, but the economic force of Matraib is sufficient to overcome the centripetal tendencies that usually cleave same generation CUs into separate households after a while.

Abdurachman is head of household T5A and an important figure on the coast, where he has been farming and trading in livestock and motorcycles, and his step-daughter has intermittently sold general goods. Abdurachman came from a modest family and only brought one *lagghu* when he married Hawa in 1979, divorced with a two-year-old daughter, and joined her *tanèan*. It included two other households composed of a brother, his wife and their children's family and a sister, her husband and their children. The siblings' father, Pak Rumahmu, had turned over most of his substantial land holdings to the three children, and shared the household with Abdurachman, Hawa, Zeina, her husband Mon (from 1990), and their daughter Wit until his death in the late 1990s. All households live comfortably from multiple revenue streams, which include trade and collection of milkfish fry on the nearby coast, and they were among the first to try tobacco cash-cropping in the late 1990s and possess motorcycles. Over the years, Abdurachman has used his skill in trading and obtaining work from others to build a small fortune. Before the study began, he profited from unpaid work by the household head of T6A (see Figure 5.7). The household, a lineal stem family, now consists of three CUs in three generations, Abdurachman-Hawa, Zeina-Mon, and Wit and her husband Zeini with their nine-month-old daughter Ariel. T5B, in the same *tanèan*, are the descendents of Hawa's brother, Sukan, who died suddenly in 1986, during my first field stay, leaving his wife, son and son's wife. The young couple soon added two boys, who are still unmarried. They supplement earnings from 1.5 ha inherited from the father and grandfather with trade, tobacco, and milkfish collection.

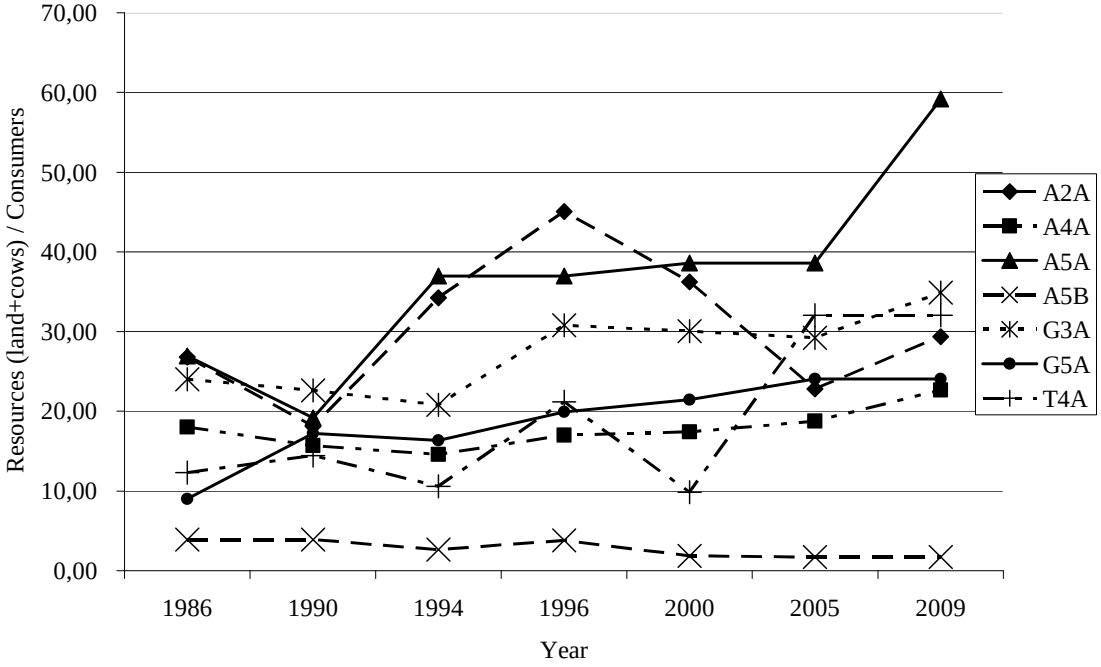
Household J3A is headed by Rikso, the son of Pak Enno, who was already mentioned in the last chapter (section 4.11) as an example of a work receiver. Similarities with the other households headed by respected, influential individuals or their descendents may be readily drawn. Carpentry skills and access to labour have allowed them to maintain their economic and social standing through times of adversity. Households J5A and J5B are composed of, respectively, a senior generation (father, mother, son and father's mother) and a junior generation (daughter, daughter's husband, and their daughter). From her second marriage, in 1991 to Surahwi, until the birth in 1995 of a girl, Ismiatul, they remained in the household with the parents of Sus, her paternal grandmother, and her brother Rusdi. With the baby girl, they desired more privacy, so they set up a separate household (G5B), and Sus received three *lagghu* out of the parent's fourteen. Due to a temporary separation of the younger couple, Sus returned to the parent's household with her daughter from 1999 to 2001. Pak Susriani is one of the better off household heads due to his large landholdings earned from many years of hard work in Sumenep as a *becak* driver whenever there is a slack in work on his farm. His comfortable situation had one drawback in that it led Sus's teacher at the elementary school to demand substantial sums of him so she would pass exams. Surahwi is able to earn well himself, from Rp 40,000 a day (2009) on up, as a carpenter. Sus sells in her house tofu soybean cakes she buys from a supplier in Batuputih Laok, making an average of Rp 20,000 a day. They only have a half hectare of land for now, but are buying more and their perspectives are very good for the future.

A final Jaruddin household, J2A, merits being included in this group less for the ostentation of their *tanèan* or the expanse of their landholdings but because they are on the verge of achieving what very few in the sub-district have been able to offer a child: higher education. They have been able to achieve this as the

culmination of years of exercising leadership and negotiation skills, and accepting self-sacrifice. Bu Sunamria and her daughter Misnatun share the household with Misnatun's daughter Asnawia, husband Risto, and their two daughters Wiwin and Ainurida. Asnawia's brother Santoso and wife also share the household since their marriage in 2005, thus creating the same unusual lineal sibling joint family as found in J6A, which Risto jokingly refers to as "a two-couple, one kitchen household" (*dua' judhu, sa dhapor*). Bu Sunamria, the 90-year-old matron of the household has the rare skills of midwife and masseuse which have allowed her to contribute to the household throughout her long life. She left her parents *tanèan* at 12 to follow the man who would remain her husband for 45 years, Musappak, because it was "more harmonious" and her *tanèan* had enough hands to help her parents. With Musappak she bore seven children, five of whom are still alive. The two others died of illnesses at 30 and 22 years of age. The graves of Musappak and the two children near the house were identified in 1980 to be *bhuju'* and are cared for accordingly. Misnatun married Suhabi after a short trial marriage that was not consummated. She has sold fruit in Sumenep's Pasar Sorè over the years and Suhabi organized tobacco shredding operations in their *tanèan* and managed their fields until he left to marry another woman in Juruan Laok in 1987. The same year, their daughter Asnawia married Risto, who had no remaining family and brought one *lagghu*. He has always made decent money as a commissioned driver plying the BTP-Sumenep route or transporting tobacco and other goods for a pickup truck owner. Misnatun briefly married Daini for two years, and expressed hopes which were not to be fulfiled of having three more children. In 1990, they purchased a maize milling machine when people were beginning to move away from using a rotating grinding stone to hand mill the maize into small bits to mix with rice. Asnawia and Risto separated in 1992 for two years. Bu Sunamria, familiar with mystical and corporal traditions, sought a traditional healer (*dukon*) to address problems with the women's marriages and also some longstanding behavioural problems besetting Misnatun's son, Rasit. The boy refused to do chores, disobeyed his parents, and was undisciplined at school, resulting in his temporary dismissal—all this symptoms of a syndrome described by the term "*nakal*" (mischievous) or "*meller*" (lazy). He needed to be transformed into a child that was *rajin* (hard-working) and *tenang* (calm). Based on his divination books, the *dukon* instructed them to change Rasit's name to Santoso and, to treat the women's difficulties, dismantle their old house and change the orientation of the *tanèan*. They were able to build a new house with earnings from tobacco processing, though since the departure of Sahabi they were unable to continue leading the full operations. In 1994, they were still Rp 100,000 in debt for the house. The younger women Misnatun, Asnawia and Wiwin made a pilgrimage to Gunung Kawi, Sunan Giri and Sunan Ampel shrines in East Java to seek more spiritual guidance with 16 other locals and a Haji. Risto returned soon after to live with Asnawia and their daughter in the reconfigured *tanèan*. Santoso has grown into a responsible household member and husband. Land purchases, the 1999 opening of an in-*tanèan* store with Rp 1.5 million in inventory and the maize mill, made possible by access to cash income through trade and driving, have turned out to have been wise investments. Finally, they have invested in their first daughter's schooling successfully, at least so far. Wiwin, 20, graduated from Alia (senior high school) at the large Islamic boarding school in Guluk-Guluk and is planning with her fiancé from Lenteng to finish the *Sarjana Satu* (S1, equivalent to a Bachelor of Arts) before getting married, then prepare the *Sarjana Dua* (S2, equivalent to a Master's), either in Guluk-Guluk or in Java, depending on household finances.

5.3.2 Poor households

Figure 5.5 – Resource-Consumer ratio for selected poor households, Gedang-Gedang, 1986-2009



If we look strictly in terms of land and cow possession, we miss the real extent of the distance that separates the rich from the poor. Well-off households have other forms of wealth that do not show up on the graphs: nice homes, motorcycles, shop inventories, tools, etc., not to mention social and technical capital that facilitate if not virtually ensure high future earning capacity. Households remain or become poor usually because they have had to face multiple adversities alone or with few family or neighbours in a position to assist them to the extent needed. Any cash earned is quickly absorbed by daily consumption needs and debt repayment, leaving little if any for long-term maintenance and investment. Some cases can illustrate the types of difficulties these households face. Usually the challenges cannot be resolved one after the other, but are self-reinforcing, typifying the vicious circle of the poverty trap.

Household A2A is led by a single mother, Murawi and her second daughter, Harsisun, also a single mother with a daughter. When first visited in 1986, Murawi was coming off a divorce where her first daughter left with her father, and was living with her aged mother and handicapped and permanently bedridden sister in their small *tanèan* far from the main road. Cooking and removing cantala fibre were about the only jobs the mother could do until she went blind in 1994. Murawi's own father died soon after she was born and her only brother left to join his wife's *tanèan.* He helped with the plowing of their land, but since Murawi was the only one who could do the strenuous farm work they usually were unable to plant all of the four *lagghu*. At best just a *lagghu* of tobacco could be planted, with the hope it would survive. Water was very far and expensive, requiring up to four kilometres round trip in the dry season, one in the rainy season. Murawi married Dumahwi in 1989. Though he brought no land, he could do woodworking every day. Murawi soon had a second girl, named Sufiyatun until a *dukon* proposed her name be changed to Harsisun to end a prolonged illness. In 1993, Dimahwi left Murawi and Harsisun for another woman in another subdistrict. The handicapped sister died

about the same time. A third marriage could have turned things around, but it ended when her husband died forty days after the birth of her third child. The same year, 2000, her mother died. When I visited that year, Murawi was alone caring for the three month old boy and her nine year old daughter. The boy would die before the next visit in 2005. Harsisun married, had a son, and divorced between 2003 and 2009. The household looked in 2009 exactly as it did in 1986. The dwellings and structures of bamboo lattice, alang-alang and tiles were identical and the household had almost the same composition of three: a weary mother, her daughter, and a dependent boy of five.

On the north face of Gunung Papan, household A5A has faced similar challenges of isolation, low productivity, labour shortage and untimely death. In 1986, the household was composed of a couple and three young sons. The eldest and most industrious moved nearby to Batuputih Daya that year following his marriage, but died of a stomach ailment in 1993. The youngest was a clever, mischievous boy who followed his wife to Dasok in the mid-1990s and was rarely heard from thereafter. In early 2000, the father left the family for another woman, taking his land with him and leaving the mother and remaining son with two *lagghu* of poor hilltop land. The son, with little prospect of marriage on the horizon, is now left to care for his cantankerous mother, trying to eek out a living on their land, supplemented with shrimp fishing and bird trapping.

With even less land to start with (two *lagghu*, a third purchased in 1989), household T4A has done a little better by being less isolated near the coastal wells, and near family and helpful neighbours. The couple was respected because the husband gave religious lessons every Saturday at his *langghar batu.* The husband's death in 1995 came just two years after the eldest of their two sons had followed his wife, and two years later the second son left. The first son returned with his wife in 2000 "to replace the father" for four years. Each son received one *lagghu*, so the mother is now living alone on just one *lagghu* and occasional help from the sons and neighbours. Any regrets for her situation are balanced by satisfaction for her children: "they just followed the woman directly; lots of land, lots of housing, just follow."

Returning south to Gunung Papan near the border with Tengedan and Badur, is a household, G3A, that is difficult to class in terms of economic situation. Clearly poor for much of the 1980s and early 1990s in terms of housing and apparent wealth, the family has a hard-working father who has consistently brought home cash from full time work as a porter in Sumenep. Home only two days a week, his sacrifice has enabled the family to increase landholdings, however unproductive and rocky, and supplement down the years by guarding cows and goats belonging to others. They have sent all their four children to at least some schooling. Their eldest girl has brought a man to the *tanèan*, but their household is separate. The second girl has married away. In 2009, they were finally out of poverty, with a used motorcycle and four cows of their own. But their future is still uncertain because they have remaining children—a girl of 17 and boy of 11—which require the father to give a final spurt of coolie work as he approaches 60. The quality of their old age may well depend on whether one of these children remains in the *tanèan* with the eldest daughter's family. As the mother replied when asked why she had four children when so many other villagers had less: "If you don't have children, there's nobody to cover your losses, nobody to help out when you're old, nobody to go fetch water."

Household A4A, in Arestengga, is headed by the *nangke'* (assistant to a livestock trader) referred to in the last chapter (section 3.12). The many years of low or inexistent earnings and their small landholdings (3.5 *lagghu* in 1986, one *lagghu*

in 2009) kept them so poor they qualified for housing relief in 2008. Perhaps had the wife's sister stayed rather than leaving upon marriage and the *tanèan* had been able to grow, other synergies might have emerged; this was not to be and the household fell into the rut of low productivity. The silver lining is that one of his two sons has become a successful livestock trader and remains in the *tanèan* with his family, though in a separate household.

There is little in the way of silver lining apparent for the next two households, which share a *tanèan.* Muslam and Sahrumo (A5A) had three children. The eldest boy moved to his wife's *tanèan.* The second child, Mar, was married to Buzaini (A5B). He fathered three boys and two girls but was utterly incapable of providing for them, and sold most of their land before 1986 to buy food. He left in 1990, only to return in 1996 and die that year. They have a half *lagghu* at most now aside from the land on which their house sits. Lack of capital means they can almost never plant tobacco. The upside of the many children should be experienced now that they have grown up. But the eldest son followed his wife. Their eldest girl, who was taken in by Muslam's household from when she was little, died two months before my visit in 2009, purportedly of beriberi (I could not confirm the cause). The youngest boy seemed to be seriously ill when I visited, perhaps with hepatitis because he described having experienced mild jaundice in the eyes. One boy, 28 and unmarried, is working land belonging to Muslam and watering tobacco in season. That and weeding by Mar on other people's land is what is keeping this household afloat, just barely. Muslam, who is now blind, has to assist helpless as his *tanèan* falters through the years of poverty and illness next to the relatively successful *tanèan* of his brother. The only positive element, and it is for him and his wife alone, is that they will be able to survive in their last years by calling on the labour of his grandchildren eager to make a living from farming his remaining land. The lesson is that while an ageing grandparent with land may be assisted by many descendents, growing old without land is much more risky. The latter is the future awaiting Bu Mar, unless she can forge new alliances in the coming years or if one or more of her children can build economically successful lives. These may have to be in the spouses' *tanèan* because theirs has little to offer at present. Pak Muslam, in the meantime, has sequestered the remaining land, perhaps as long as he is alive, to ensure his household's subsistence and that an equitable succession can still take place down the road between the eldest son, Mar and youngest son, Mudahlan. Consequently, the resource-consumer ratio improves for Muslam's household following the death of the girl in 2009, though production from part of the land is going to A5B via the 28-year-old grandson.

5.3.3 Households "with enough"

Figure 5.6 – Resource-Consumer ratio for the high-*cokopan* households, Gedang-Gedang, 1986-2009

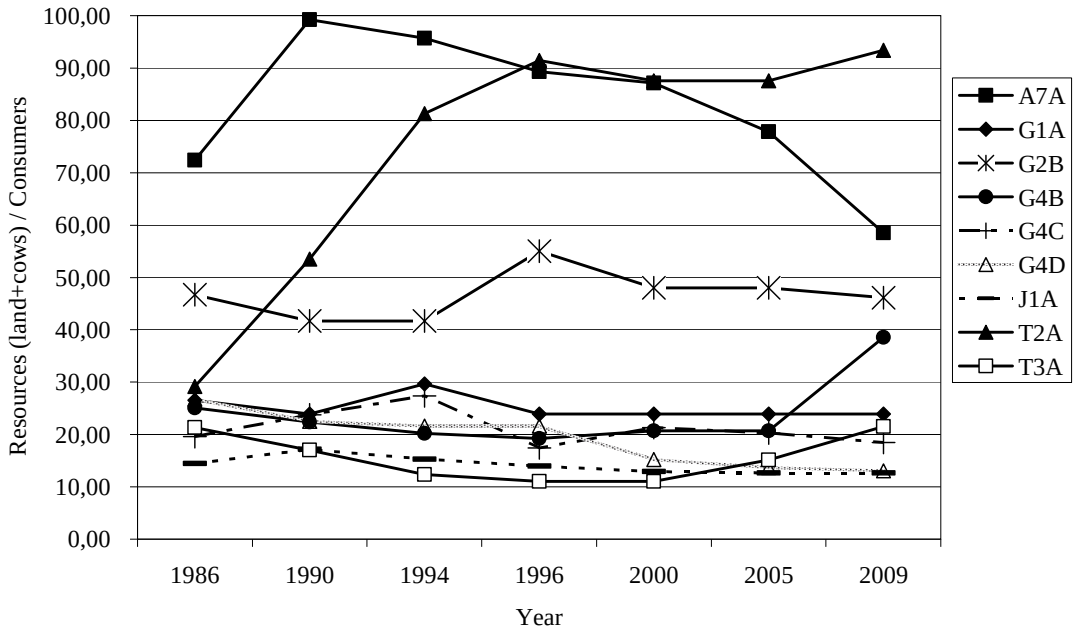
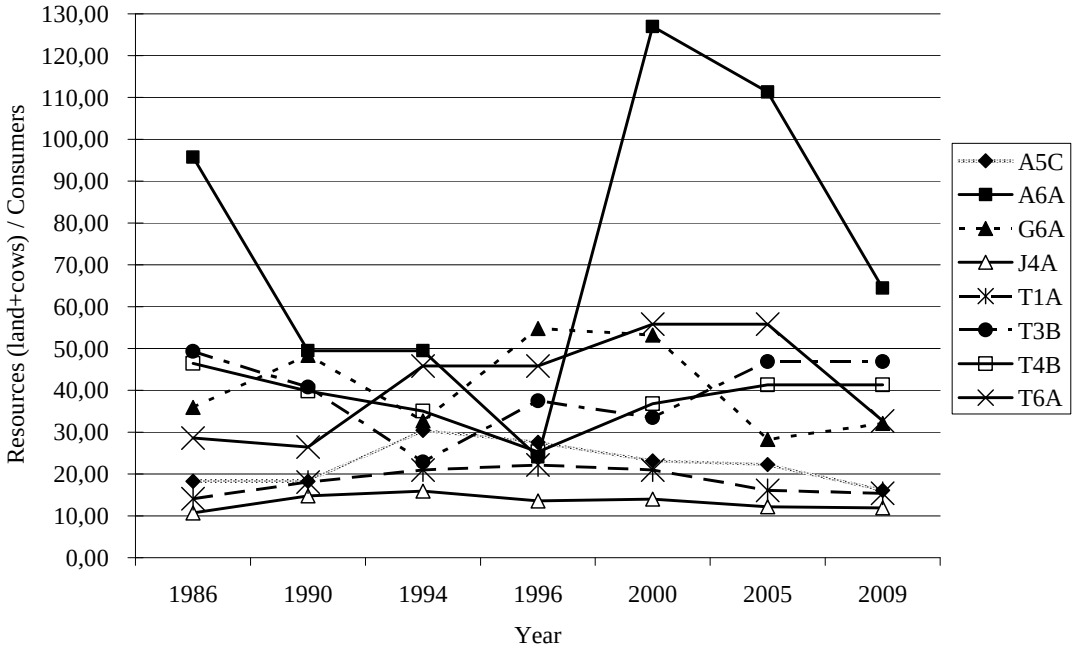


Figure 5.7 – Resource-Consumer ratio for the low-*cokopan* households, Gedang-Gedang, 1986-2009



Muslam's third child, Mudahlan (A5C), has been able to avoid the same fate as his sister Mar. He did this by accepting to do the heavy work of *becak* in Sumenep and water delivery in the village. He and his wife physically moved (30 men required to carry the bamboo lattice house) from the *tanèan* in 1994 to occupy inherited land on the other side of the relatively well-to-do neighbouring *tanèan* belonging to Muslam's brother. Though he would not admit as much, I always felt this move was to distance himself from obligations to share with the Mar household.

Households G6A and J4A were among the least advantaged households in 1986, but by 2009 their situation has improved to where they have moved into the lower *cokopan* category. Both reside far from amenities: G6A at the very top of the north-south path in Gunung Papan and J4A deep in southern Jaruddin in a remnant teak grove. The head of the G6A *tanèan*, Pak Muni'at, was a respected *tokoh* with almost a hectare of land, but productivity was low and he supported his family largely from making charcoal from his trees. Sometimes he or his son-in-law had to sell a calf to buy maize. His daughter Muni'at and her husband lived in a separate household in the *tanèan* with her adopted daughter (related as FZD) and her daughter's husband and son until Muni'at's husband died in 2004. His death, most likely from liver cirrhosis was, as typically for symptoms of a bloated stomach, attributed by villagers to black magic. The two households became one at this point. The following year, Pak Muni'at died. The two ceremonies required the slaughter of four cows in all. Muni'at's adopted daughter's husband, who was sharing their household then left for another woman. These three major setbacks in rapid succession were compensated by the return of Muni'at's brother and his wife and two children from Dasok. In stepping into his father's and father-in-law's shoes, he provides the nine-person household with a steady income from working in Temberu (60 km west) unloading timber arriving by boat from Kalimantan (Borneo). A stroke of luck for G6A has been the placement of the hilltop outlet for pumped drinking water virtually on their doorstep, freeing Munahyu from a chore that otherwise would require hours each day.

Household J4A headed by Pak Sahiya was barely surviving in 1986 on two and a half *laggu* of *tegal* and a tenth of a *lagghu* of *sawah*, with only sharecropped cows. Three daughters were with their parents, the eldest of the three reintegrating with her daughter following her husband's death. Fortunes began to change when the two younger daughters and the granddaughter married. Two brought in men and the third married the son of Pak Enno' (J3A), good situations for all. Land acquisitions brought the ownership level to six *lagghu* by 2009. The *tanèan* size has risen steadily from seven to twelve members over the years, always in one household. Land and cattle are owned individually, and dwellings are separate. At one point a daughter and her family were living temporarily on their land 500 meters away but still participating in the life of the *tanèan.* Before he died in 2009 after a four year illness, Pak Sahiya could know that his *tanèan* was safe.

Status, skills and education are enough capital to allow a number of households to maintain an acceptable level of welfare through difficult transitions. In 1986, the respected *tanèan* patriarch, Moar, and his grandson put on a big marriage for the latter's only son, Nayo, but the marriage in which he followed the wife failed a year later. Nayo married a second time, following the wife again, but that only lasted six months longer. For the third marriage in 1990, this time his wife followed. The two households of *tanèan* G1 watched their land holdings drop from one hectare to 75 ares over the years due to the requisite ceremonies for the deaths of the great-grandfather and his wife and more marriages that failed (Moar's daughter's husband left and Nayo's sister returned home). Strapped for cash, the succeeding head (his grandson) had to accept to practise his carpentry skills for a middleman rather than remain his own boss, though he has succeeded in passing on the skill to his son in a separate household. Their strategic location near the Gunung Papan mosque and former village head's complex, the fact that the sister's husband is a *kiyaji*, and recognized craftsmanship abilities will probably ensure they get by in the near future. The changing composition of this *tanèan* shows one way households can be remodeled over time (Table 5.4). After the great-grandson (who I use as ego in Table 5.4) married for the third time, his FMF and FMM left their son's

household (including ego's unmarried sister) to join their grandson's household. This was done in order to make the other household more attractive to a potential suitor for his sister. This way each household had two conjugal groups of different generations, which is considered a normal setup. In 1995, the sister married a *kiyaji*, who moved in to their household with her parents.

Table 5.4 - Household composition of *Tanèan* G1, 1986-2009

Year	Household G1A	Household G1B	Household G1C	Population *tanèan* G1	*tanèan* land (ares)
1986	F=M-Z-ego, FMF=FMM	FM=FMH	-	7	150.0
1990	F=M-Z, FMF=FMM	FM=FMH	-	7	112.5
1994	FM-F=M-Z	-	ego=W, FMF=FMM	8	100.0
1996	FM-F=M, Z=ZH	-	ego=W-D, FMF=FMM	10	100.0
2000	FM-F=M, Z=ZH	-	ego=W-D, FMM	9	87.5
2005	FM-F=M, Z=ZH	-	ego=W-D	8	75.0
2009	FM-F=M, Z=ZH	-	ego=W-D-S	9	75.0

The four remaining households in the large G4 *tanèan* have invested in their children's local boarding school education for years, and this has given them recognition as a contact for the important *kiyai* of Sumber Tombet when they come to the area. One of the boys from G4B has been working in Malaysia and sending home money. After marrying his daughter to a carpenter, the head of G4D moved to a spot nearby on their land to build together with the son-in-law an impressive row of houses. The son-in-law subsequently had to undergo intestinal surgery, but they had just enough to finance the operation and he was recovering in 2009, and eager to get back to work. One opportunity that made life easier for this *tanèan* was the Sumenep housing boom of early 2000, fueled by high tobacco prices several years in a row and the petroleum sector. This had repercussions on the price of limestone bricks mined nearby and power saws made an appearance, allowing workers to cut 500 bricks a day when 1000 were selling for Rp 130,000. After paying for the saw rental and electricity (one-quarter of the sales), one could clear Rp 50,000 a day.

Nearby, Pak Musappak's household (T1A), though poor in 1986, has profited as well from the bricks over the years, as well as a finally stable marriage for the daughter to a man who works regularly in Sumenep driving *becak*, allowing them to move into the *cokopan* category. The daughter's son from an earlier marriage is also married, and since 2000 has been unloading boats in Pasean (50 kilometres west), earning enough to buy a motorcycle. This lineal stem family is one of the more fragile cooking units in the sample due to the tension between the mother and son (and daughter-in-law), accused by the mother of not sharing enough with the others. The need to care for Pak Musappak, now unable to walk, is perhaps the reason the household is still united.

Like the households in G4 not far away, household T3A has invested heavily in religious boarding schools for their children. The head, Pak Salim, is one of the main *kiyaji* in the north of the village. The household's consistently low resources to consumer ratio is a result of the large family being supported by the couple: five

boys and a girl (four other children died between one week and three years of age). Their capital is almost exclusively educational, and it is impressive. All of the children have received religious education, all but the eldest in boarding schools. The second oldest received a *Sarjana I* from Guluk-Guluk, has taught in Kalimantan, and upon return has started up a fledgling cooperative store in Temberean with his wife. In 2009, another boy was completing a *Sarjana I* at Guluk-Guluk and another was there giving lessons and waiting for funds to start a *Sarjana II.* Pak Salim's daughter finished *Alia* (senior high school level) and is now home looking to marry. His younger brother in the other household (T3B) is looked upon as a failure because he insisted on choosing his only child's wives over the wishes of the son, causing three failed marriages lasting three, one and two months respectively. Following the mother's death in 2003, the son and father live alone. I am unaware of any other household in Gedang-Gedang that has survived longer than a few weeks without a female around to cook. Here, the son does the cooking, a hitherto impossible setup. That this father could become an object of ridicule in 2009 while thirty years earlier most marriages were arranged by parents shows the depth of changes that have arrived in the village. About a quarter of marriages in the north of the village are still decided by the parents; what seems to shock people in this case is that the father stubbornly persists in dictating marriage partners to his son following an initial failure, when other parents would have relented and just let the child choose the second.

At the top of the high-*cokopan* scale are families with relatively large landholdings and/or other forms of wealth. Childless, the couple in T2A have lived simply but never stopped acquiring land and now own over a hectare. They took in the son of the wife's elder sister's daughter when her mother remarried and the new husband preferred he not follow. He grew up and became a successful builder of mosques in Kalimantan, with two wives. He sends money to his foster parents from time to time, and sold them some land at under market value.

Pak Dahlan (G2A) was one of a few World War II *romusha* from Gedang-Gedang who was able to return home alive. He hid from his taskmasters in Sulawesi and after the war found his way back to Madura. He died in 1993, leaving his wife, son and son's wife some eleven *lagghu* in addition to other land already given his daughter in the other household of the *tanèan,* G2B. When her husband died of lung problems after my visit in 2000, the two households became one, commanding a total of over two hectares. The head is now Marto, son of Pak Dahlan's daughter. Marto, like a number of young men who grew up educated in the 1980s and 1990s, is passionate about improving the lot of the people, but stymied by the isolation of his homestead and the inability to intensify production on the land. The main problem in 2009 was the shortage of chemical fertilizer, particularly urea, caused by chronic underproduction of government-subsidized product, leading to illegal repackaging and resale on the black market or abroad (Poultry Indonesia Online 2009). Marto was searching for information on how to produce organic fertilizers locally. This is not easy in Madura because farmers already process almost all waste and crop residues into livestock feed, manure and mulch. His difficulties exemplify the predicament many in the infertile highlands face. One season, he will get 50 kg of kernels per *lagghu,* the next it could be a quarter of that. Lots of cassava plants die, and *oto* and *arta* do not produce at all without rain. They often have to buy a *pèkol* of water and fetch another themselves in the dry season. And their home-gardens give little. But he still has enough land to get a decent income, and enough for a motorcycle to get out of his isolation when needed.

Outwardly, the *tanèan* of Enek and his mother Wisnati always gave the impression of a desperately poor family inside. The small and simple bamboo lattice

house in which they lived had old terracotta shingles and a dirt floor, as did the *langghar*. The cowshed had only a grass roof and palmyra leaf walls. Nothing suggested the slender Enek and his old and feeble mother shared one of the most land-rich households in the village. They owned at one point 2.4 hectares (19 *lagghu*) of *tegal* and at least three *lagghu* of *sawah*, some of which was on the irrigated plots rare in Gedang-Gedang. Not all the land could be planted, since Enek did much of the work himself, and he would only plant from a half to two *lagghu* in tobacco each year. But one advantage of having all this land was they never lacked for firewood, fodder, and food.

Enek was the sole surviving heritor. Born around 1918, his mother's had a first trial "marriage" at eight years of age to a boy of ten that was never consummated in the two years they were together. At 14, she married a boy of 16 and they had a girl, Hamima, before their marriage ended after four years. At 22, Wisnati married for a third time to a man of 25. Following Hamima's death from stomach illness at five, Wisnati had a boy and then a girl, but both died before they were two of *tombuwan*, a class of feverish ailments believed to erupt from the body and manifest themselves on the skin (Jordaan 1982:13). Enek was the only child surviving from the three pregnancies she had with her fourth husband. Enek's first marriage ended in divorce in 1981. In 1988 he married Timona; it was her third marriage. She followed Enek to his *tanèan* because Enek's mother was unable to work, and because Enek's household was much better-off economically. At her parents', there was no pressing need for her labour, and by following Enek, her land could stay under the control of her parents. They had a boy, Rafi'è, in early 1990, and continued to live as before in the same small *rumah gedek.* Seasonally, they would set up a small tobacco shredding operation in their *tanèan*, and their earnings from that and their fields they invested in more land and in their son's education.

In 1999, Wisnati died and two *lagghu* of *sawah* were sold to pay for the ceremonial expenses. In 2006, Enek died, and more land was sold. The wife and son sold still more land to build an impressive *rumah bato'* and buy Rafi'è a motorcycle and cellphone, and to prepare for his immanent marriage. By 2009, only five *lagghu* from the original 22 were left. It is not clear whether the son is prepared to work as hard as the father did putting land under cultivation. Time will tell if they will be able to maintain this higher standard of living they have chosen to display at the cost of liquidating assets. Much will depend as well on the wife Rafi'è has chosen.

Asbiya (A6A) is a very special case of a woman trader and farmer who, living next to the main road and Labung Dua' market, entertains and depends on a wide social network. As the case sheds light on female agency it is described here in some detail. Asbiya's economic situation has had dramatic ups and downs over the years, but she has never fallen below the poverty line and has often done quite well. After a marriage at 15 which lasted 10 years, in 1988 she became the second wife of a man who traded fruit and beans and carved furniture. He would divide his time between her and his "old wife" in the hills of north Batuputih Kènè'. Her fondest memories are of when her husband moved his furniture shop next to her house to be near the road, and his son, son's wife and their boy of six months also moved in with her. Their return to the "old wife" following the death of the husband's brother left Asbiya regretting her situation of childlessness. But she has kept busy and high-spirited with her regular market and home trading and many friends.

Her livelihood strategy is heavily dependent on maintaining a high level of social interaction. Usually, farmers in need of money must go to the rich market people and shop owners and borrow store items or cash paying high interest. Avoiding the traditional credit system, Asbiya has cultivated a number of village contacts from whom she may borrow gold. Following the harvest, she simply

returns the gold to them without interest, adding a gift of rice or sugar only. If she has to borrow cash, she will have to pay 15 percent interest at repayment, much less than the 50 or 60 percent charged by most lenders. She also lends to others, and at any given time has a few hundred thousand rupiah in outstanding loans she can call in if needed.

Asbiya has never been able to accumulate much wealth. Her home has always been of bamboo lattice, and though she had seven *lagghu* in 2000, in 2009 only three remained. But she feels relatively secure as she approaches 50. She says all extra money she has goes to buy rice and sugar to offer at baby showers, marriages and wakes, or when visiting a sick person. The links consolidated in this way she benefits from every time she borrows interest-free funds for planting tobacco. This is an important strategy—employed in her case to perfection thanks to an outgoing personality—and one that many other villagers use as well. It demonstrates how central to household economy ritual expenditures can be and refutes hasty judgments of their "irrationality" that pay no attention to long-term cost benefits.

When needed, Asbiya can also use a system known as *epagedhi*, to exchange items of similar value for mutual usufruct and return them after a predetermined period. An example would be if one party lends a yearling calf worth Rp 1 million in exchange for the other party lending a plot of *sawah* also worth about Rp 1 million. Asbiya works the *sawah* for a year and takes all the harvest from it. The other person raises the calf, using it for plowing if needed, and can even sell it. At the end of the agreed upon period, a yearling calf equivalent to the one borrowed is returned and use of the *sawah* is recovered. All these strategies depend on trust, which Asbiya has patiently cultivated.

To summarize the trajectories of all these households from 1986 to 2009 in a few words is a risky undertaking, so diverse are the paths taken by each. Even within each category there are striking differences in the strategies used. Some households have been more blessed by fate, some have been more fortunate than others to possess, attract or cultivate talented individuals who could seize the opportunities presented them. But fate and the capacity to attract or cultivate talented individuals is a variable that is at least partly determined by initial economic and social conditions. The burden of untimely illness or death can be devastating for a poor household, but shouldered by one in better shape economically. A household that is doing well, and is respected in the community will be better placed to attract new members from similar households. I will return to this discussion in the conclusion to the chapter, after examining two key aspects of household economy, namely consumption and exchange.

5.4 Nutrition

Putting food on the sitting mat is one of the most costly and inflexible expenditures households have to make, certainly in terms of work effort in the fields and kitchen. Whether it is the biggest drain on household budgets depends on a comparison of the amounts of cash resources spent on purchasing food (added to the value of staple crops sold) with the amounts spent on expensive items such as tobacco, fertilizer, clothing, education and durables like motorcycles, houses, and water pumps. A comparison for 1986 is possible using the data on consumption for the 36 sample households, and is presented in Table 5.5.

Table 5.5 – Average expenditures by 36 Gedang-Gedang sample household in 1986

Item or category:	average monthly expenditure	average yearly expenditure
rice and maize	Rp 1543	Rp 18521
eggs, meat	212	2542
fish	1514	18170
snacks, meals away	2688	32250
salt, *acan*	660	7918
sugar	2321	27849
coffee, tea	1846	22150
cooking oil	1511	18136
Food sub-total		*147536*
betel chew	214	2567
cigarettes	1769	21233
kerosene	1019	12233
transport	1664	19967
water purchase	504	6045
clothing		15125
school fees, books		2272
home furnishings		6139
tools		1583
kitchen utensils		4798
traditional medicine		1268
modern medicine		3531
building, repair		72379
ritual, feasts		97748
village taxes		2307
mosque donation		2787
other		1964
Non-food sub-total		*273946*
Total		421482

When the value of the portion of the maize, beans, rice and cassava crops consumed by the households (Rp 127596) is added to the sum of the first eight lines of the table (Rp 147536) the true cost of food consumed (Rp 275132) is shown to be equivalent, on the average, with the cost of all non-food items combined (Rp 273946). There is no reason to doubt that Engel's Law of 1857 would not hold for Gedang-Gedang, i.e., that as household income rises the proportion of income allocated to food will fall. Still, for all Gedang-Gedang households food is a major expense. Whereas families require cash for occasional purchases of fish, cooking oil, condiments, and so on, they can get by to a large extent by consuming the produce from their fields and gardens.[186]

From Figure 5.8, we can see that rice-maize is the primary staple, rice coming into many diets in the south of the village following rice harvests, as does cassava. From what village elders tell me, for much of the past before the cash economy became established households were able to get by on their own production of the staple crops of maize, beans, rice and cassava, supplemented with

[186] Notably, the value of garden vegetables and produce important as side-dishes is not taken into account in Table 5.5.

garden vegetables and unripe fruit used as vegetable (as many still do today), but with not much else.

As can be seen in Figure 5.9, meat and chicken is consumed very rarely, only as a treat during the Idul Fitri celebrations or when invited to a feast for a marriage or other special event. Less than half of the households reported having a sardine, a small piece of other fish or a little shrimp with their meal at least once a day in 1986. Depending on the season, as many would report consuming a shrimp-based condiment known as *acan* (*terasi* in Indonesian), which appears to be at least for half composed of salt. It is considered a "meat-fish" which (*jhuko*)[187] by everyone, though I would hesitate to guess its protein content. Indeed, many northern families, when asked what meals they had the day before replied "*nasè-jaghung ben jhuko acan*" (rice-maize with *acan* "meat") or even "*nasè-jaghung cuko buje*" (rice-maize with salt "meat", in other words salt alone). When I was offered meals in the village, invariably I would be told "we don't have any *jhuko*", even if there was, in fact, some on the plate. The hosts would seek to excuse the small portion of meat or fish, sometimes adding that in Sumenep (or in France) people were used to eating lots of it.

In March 1996, I collected data on food consumption in two *tanèan* near the eastern part of the road separating Jaruddin and Arestengga, one in each neighbourhood. One of the two was also part of the sample group (A7A in Arestengga) and was visited from 4-22 March. The second, in Jaruddin, was monitored from 4-15 March. All items consumed were weighed when possible, and each *tanèan* was visited several times daily by a research assistant to ensure as little consumption as possible was missed. The early results from the Jaruddin household were distressing: either meals were being missed or one or two meals a day were consisting merely of small bags of shrimp crackers (*krupuk*) or dry salty noodle snacks. The 14 month old boy was supplementing breastfeeding with coffee and sweetened milk twice daily along with assorted cracker snacks. After checking, it turned out that no data was missing. I did not calculate the nutritional value of the 25 grams of *krupuk* the baby was ingesting. The data coming in subsequent days showed families with a more or less "normal" pattern of two or three staple meals a day, and occasional fish or other protein supplements appropriate for the season and for *cokopan* households like these.

[187] *Jhuko* can also be loosely glossed as "protein" because it is also used to refer to the category of vegetable-based protein sources, such as soybeans, peanuts, green gram or rice beans, and preparations such as tofu soybean cakes (*tahu).*

Figure 5.8 – Staple food consumption for preceding day reported once weekly, as percentage of 36 households, Gedang-Gedang, March 1986 to February 1987 (exceeds 100 percent when more than one food reported)

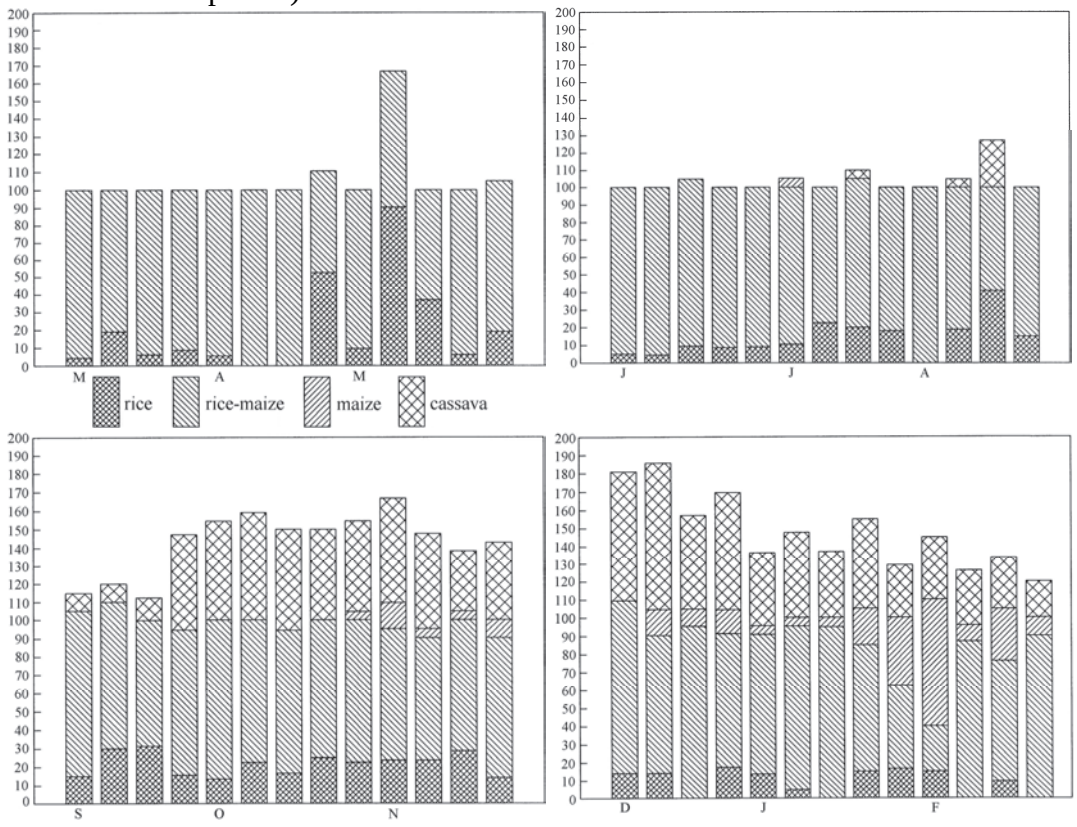
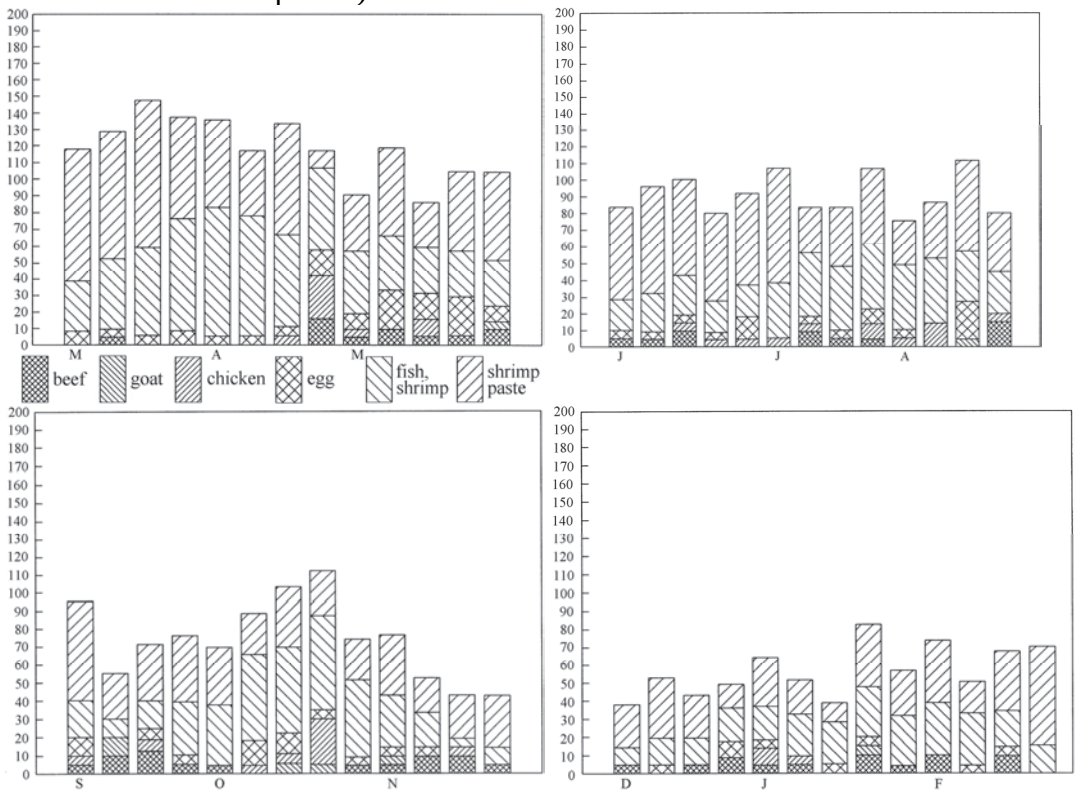


Figure 5.9 – Animal-based protein consumption for preceding day reported once weekly, as percentage of 36 households, Gedang-Gedang, March 1986 to February 1987 (exceeds 100 percent when more than one food reported)



The findings from this short trial, even combined with the weekly staple and protein consumption data, could not provide me with a solid basis for formulating an overall picture of household nutrition in Gedang-Gedang. Rather it impressed upon me the distance that separated my short-term ad hoc study of the subject from a more comprehensive long-term research program. Despite their shortcomings, the data collected did complement other data from formal and informal observations and discussions over the years, and mirrored the conclusions of other more ambitious studies carried out by nutritionists in Madura (Kardjati et al. 1977, 1978, 1979). First, because of the large proportion of the household budget that goes for food, in difficult times food is targeted for reduction, despite the deleterious effects this might have on the short and long term health prospects of the members, including the children. Second, for the same reason, food can be reduced in good times in order to redirect resources to other projects. *Tanèan* G4 members explained, for example, that for them the skyrocketing prices of the post-*Reformasi* period[188] were good, because they could earn a tidy sum from selling part of their crop and scrimp on consumption by relying on their cassava. Third, the food requirement of small children is generally discounted; as will be shown in the chapter that follows, parents feel children should be breastfed until at least two years of age, and in fact many children are breastfed until four. Fourth, haphazard feeding behaviour, such as giving or consuming what is at hand or what can calm an awakening appetite, including snacks or coffee or hot sugary water, might well be explained as a holding pattern to be employed when awaiting funds for shopping or more information to discern costs and payoffs (Ortiz 1991:239-240). Fifth, an understanding of nutrition in Gedang-Gedang cannot be complete without an accounting of the small-scale, intricate and frequent transactions of food between households, mediated by women as part of their daily strategy for feeding their families (Appadurai 1991).

5.5 Exchange

5.5.1 Food exchange

The importance of food cannot be measured merely on a nutritional basis, but must be apprehended also on the basis of its symbolic value (Garnsey 1999). In Gedang-Gedang, food is one of the primary currencies of exchange between households and *tanèan.* Meals are usually offered along with wages for day work carried out in or near the home. Until forty or fifty years ago, meals were usually sufficient compensation for farm work, because the work itself was carried out in a context of exchange labour. Cash wages are relatively new, at least on any large scale. In Temberean, a man of fifty recounted how in his childhood the only way to receive cash in exchange for work was to go to Pasean or Temberu to work unloading boats; people in his area did not use cash, but just provided meals in exchange for work. Earlier (Chapter 4.11), I presented the example of a family that, even today, can obtain work for food without obligation to reciprocate, although created by this asymmetrical form of exchange is a bond, an implicit contract of mutual assistance in a future time of need.

Ordinary households use a similar, though studiously symmetrical form of exchange to create or cement bonds of kinship, good-neighbourliness, indebtedness and trust. The exchange of food is almost always reciprocated, and done so in an almost exactly equivalent way, as I found in collecting information from neighbours

[188] Maize sold in the village for Rp 350 in mid-1996 reached Rp 2,000 by mid-2000.

of ours along the eastern part of the main road dividing Jaruddin and Arestengga in January and February 1996. Most of the data[189] was collected near the end of the month of Ramadan (Puasa) which ends with the Idul Fitri celebration, a time when families and neighbours pay visit to each others and have meals together or at least partake of coffee and snacks. Reciprocation is practically obligatory, as shown in Table 5.7, and the return visit takes place very soon after, sometimes within hours of the first meal.

Table 5.7 - Reciprocation of food exchanges by relation with giver, January-February 1996, Gedang-Gedang

Relation:	Neighbours	Direct family	Extended family	In-laws	Total
No. of cases	211	45	85	108	449
Reciprocated	96%	98%	95%	99%	435
Unreciprocated	4%	2%	5%	1%	14

5.5.2 Work and social exchange

In my time allocation study, as in most other similar studies (e.g., Johnson and Johnson 1987, Paolisso and Sackett 1988), I did not systematically differentiate at the moment of observation, or in coding the data afterwards, whether the work away from home was for payment of wages or was purely an exchange of labour and food, a deficiency I realized once it was too late and the study was well underway. Still, the data on the amount of time spent working with others away from home (Table 5.8) can suggest something about the occurrence of exchange between households.

Religious group activities and visiting comprise the main social exchange activities, and are presented in Table 5.9.[190] Social visits (*jang-onjangan*) encompass visits for life-cycle events such as births, marriages and deaths. One of the most common ceremonies (*molodan*) occurs after the death of an individual, because it is held on the third, seventh, fortieth, and hundredth day, on the one year day, and on the one thousandth day. Men go to these ceremonies in the evening to pray in the *langghar* for the defunct, and women go at various times to console the survivors (*alabat*) and assist with household tasks. They are fed by the grieving family and do not need to offer anything. Women wash and prepare the body for the burial, carried out by the men.

[189] One reciprocated exchange was discarded from the sample of 450 exchanges due to missing information on the relationship between the individuals.

[190] A variety of other activities not included here classed under Hygiene, Trade or other rubrics are done in groups and provide for social exchange. The average number of minutes per day (between 6 a.m. and 6 p.m.) devoted to individual activities or activity groups can be calculated by multiplying the number of observations by 720 and then dividing the product by N (total number of observations).

Table 5.8 – Occurrence of work exchange among 36 households, Gedang-Gedang time allocation study, February 1986 - February 1987

		All	M >15	F >15	M 6-15	F 6-15
Code	Activity N=	6606	2412	2466	1064	664
P5:	Exchange work Total obs=	422	380	13	23	6
P5AA	Plowing	17	16	0	1	0
P5AAA	Hoeing, field preparations	4	4	0	0	0
P5AC	Harvesting beans, other	5	2	1	1	1
P5ACM	Harvesting maize	3	2	1	0	0
P5ACR	Harvesting paddy	3	0	1	2	0
P5ACS	Harvesting cassava	1	0	0	0	1
P5AD	Watering tobacco	20	19	0	0	1
P5AF	Sowing grain	6	2	3	1	0
P5AGM	Transplanting rice shoots	4	2	0	2	0
P5AL	Planting tobacco	7	1	1	3	2
P5AM	Weeding tobacco	1	0	0	1	0
P5AO	Weeding maize	5	5	0	0	0
P5AT	Tobacco processing	10	10	0	0	0
P5AY	Harvest maize for leaves	13	8	3	2	0
P5B	Carpentry	78	77	0	1	0
P5C	Other construction	86	84	0	2	0
P5CC	Making cement	7	7	0	0	0
P5CK	Cowshed construction	1	1	0	0	0
P5CL	Mixing, pouring cement	9	4	1	4	0
P5CM	Cutting limestone bricks	4	3	0	1	0
P5D	Driving pedicab, town	46	46	0	0	0
P5E	Porter for goods, town	24	24	0	0	0
P5EG	Porter for goods, village	1	1	0	0	0
P5FD	Seeding, pitting crops	2	0	1	0	1
P5FN	Extract fibre from cantala	2	2	0	0	0
P5FS	Select crop (to sell, keep)	1	0	1	0	0
P5G	Digging a well	7	5	0	2	0
P5I	Cutting, sawing trees	51	51	0	0	0
P5J	Other woodworking	3	3	0	0	0
P5K	Seeking employment	1	1	0	0	0

Table 5.9 – Occurrence of social exchange among 36 households, Gedang-Gedang time allocation study, February 1986 - February 1987

		All	M >15	F >15	M 6-15	F 6-15
Social exchange activities:	N=	6606	2412	2466	1064	664
RC:	RELIGION Obs=	75	45	7	11	10
RCA	Attend prayer group	21	9	0	3	8
RCB	Religious trip, Kalimantan	2	2	0	0	0
RCC	Mosque collective work	6	5	0	1	0
RCD	Religious chant group	16	10	0	5	0
RCDP	Perform sacred tomb ceremony	6	2	2	0	2
RCG	Pray at the mosque	9	8	0	1	0
RCH	Perform daily prayers	9	5	3	1	0
RCI	Honour, clean family tombs	3	3	0	0	0
RCK	Do propitiatory rite for house	1	0	1	0	0
RCL	Propitiatory rite for pregnancy	2	1	1	0	0
RD:	SOCIAL / FAMILY Obs=	300	123	97	24	54
RDA	Visit a sick person	2	0	1	0	1
RDC	Visit family	68	26	22	3	17
RDD	Visit neighbours, friends	127	60	39	14	14
RDE	Care for sick at home	6	0	6	0	0
RDFF	Ceremony following death	50	16	22	2	9
RDG	Revolving credit assn. meeting	4	1	1	0	2
RDGD	Female religious credit assn.	6	0	0	0	6
RDGR	Male religious credit assn.	4	2	0	2	0
RDH	Help household/*tanèan* member	3	1	0	1	0
RDHN	Help outsider	3	1	1	1	0
RDI	Attend marriage	14	7	3	1	3
RDJ	Cooperative work for village	5	3	1	0	1
RDJR	Help build village road	1	1	0	0	0
RDP	Festivity preparation, clean up	7	5	1	0	1

Marriage ceremonies can be simple ceremonies conducted by a *kiyaè* at the *tanèan* attended by a few neighbours and family who bring rice, sugar and coffee in small quantities and receive meals. A chicken or goat might be slaughtered if possible. If the family has greater means, a more elabourate marriage will be held, with the slaughter of goats or a cow or two to feed many guests. Anyone from the area can attend, though usually the people who go have a kinship or other link to the family. The family will ask neighbours and kin to help out in organizing the festivities, and perhaps hire a performing arts group to do poetry reading (*mamaca*), play female religious music (*samroh*), put on men's religious dance/chant (*haddrah),* female alternated dance and song (*tanda' binè'*) or even a full-blown theatre performance (*loddrok* or *topeng*) on raised proscenium stage.[191] The events just listed from least to most expensive also attract correspondingly increasing numbers of onlookers; the theatre performance costing Rp one million or more in 1986 being sure to attract hundreds and set a milestone in the household and neighbourhood history. The motivations of families contemplating a big marriage as opposed to a small one are a mix of obligation (or desire) to validate (or claim) status and prestige in the community, as well as a belief that a big marriage will help ensure the young couple get off to a good start (or make it more difficult for them to dissolve the "perfect union" decided by the parents). Families also reckon that they can pull off a big

[191] These and other forms for Batuputih and Sumenep as a whole are described in detail in Bouvier 1995.

marriage that will be attended by so many people bringing rice that they will be able to defray some or even much of the cost, and the notoriety will be worth the investment over the long haul in one way or another. Once or twice a year, a very well-to-do family will hold a grand marriage in the sub-district to which hundreds of people will be invited.

In 1996, the principal of the Gedang-Gedang elementary school celebrated a grand marriage for his daughter. He was from a well-to-do Batuputih Laok family descendent of a line of village heads. Married to a woman from Gedang-Gedang, he also possessed land there that he sharecropped out or paid workers to take care of. The ceremony lasted four days and consisted of many segments, including the wedding ceremony and for the men an evening of *tanda' binè'*. At this event, also called *konjengan rokok* (cigarette social visit), the men provided envelopes filled with cash for the newlyweds, money that was counted and the total entered into a ledger book. In the future, each of the donators will in turn invite the family to attend their child's marriage and expect them to offer exactly the same sum of money in return. The cost of this marriage, estimated at Rp 11 million, was more than made up by the Rp 14 million received in donations. This included, among other items, four cows and a goat, two tons of rice, 200 kg of sugar, 5000 eggs, 350 coconuts, Rp 750,000 in spices and four pick-up trucks of firewood. The helpers, 199 men and 116 women from both the bride's and groom's party, divided up the numerous tasks required: building the kitchen and fireplaces, hanging decorations, preparing the seven changes of traditional costumes required to be worn by the bride and groom, receiving and seating guests at their arrival, serving food, coffee, cakes and cigarettes, and collecting the donations. Men took care of most construction, transport, and the needs of male guests. Women did the cooking, baking of cakes, most decoration and cared for female guests. The origin of the helpers is noted in Table 5.10. The privilege of greeting the guests on arrival was entrusted to high status individuals, including the Kecamatan head (*camat)* and village heads.

Table 5.10 - Origin of helpers at a large four-day marriage (Batuputih Laok, 1996)

	male tasks	female tasks	Total
groom's family	17	9	26
bride's family	53	34	87
related to bride and groom	1	4	5
neighbours of groom	14	12	26
neighbours of bride	66	42	108
friends	31	4	35
local government	17	11	28
Total	199	116	315

Although the marriage of the grandson of the G1A household head in October 1986 pales in comparison to an "elite" marriage, it was one of the largest marriages that took place among the sample families and constituted a major expense for the family concerned. Among the main expenditures, two cows were bought and slaughtered (Rp 460,000 at the time) along with one goat and five chickens, 100 kg of rice were purchased, as were 50 kg of sugar, 100 coconuts, spices (Rp 30,000), 40 cartons of inexpensive *Oepet* cigarettes, and Rp 75,000 was needed for two nights rental of a generator including gasoline. Four *kiyaè* from Sumber Tombet officiated (cost of Rp 500 and a pack of premium *Gudang Garam* cigarettes each). Four *mamaca* poetry readers performed, and also received Rp 500 and a pack of *Oepet*. The family estimated that in all, including the traditional gifts of clothing and

jewelry given to the bride,[192] the family laid out Rp 1.8 million in all, some of which came back in rice, sugar and coffee brought by each guest family. It appears the primary motivations behind making it a big affair were a desire to validate the *tokoh* status of this *tanèan* while its patriarch was still alive and to discreetly showcase the groom's unmarried eleven year old sister.

Tomb ceremonies (*rokat bhuju'*) at Asta' Juruan, Asta' Muncar, and Lanceng were also an occasion for a large mobilization of helpers to cook and organize for the festivities that, in 1986, attracted villagers into the hundreds bringing offerings of maize and other gifts for the tomb guardians.[193]

5.5.3 Ecology and social exchange: the *kerrabhan sapè* and *sapè sono*

Village bull racing (*kerrabhan sapè*) and cow beauty and agility contests (*sapè sono*, *sapè pajhangan*, or *sapè kammrat*) provide examples of how ecology, household exchange, animal husbandry, prestige-seeking, and performing arts can interact as part of a system. The major competitive bull races and cow contests organized by the livestock services are standardized and held year round, whereas village races and cow contests are held mainly during the dry season when there are fallow fields available. Rather than go into the details of these competitions, which I have written about elsewhere (Smith 1989b, 1992, 1995b, 1996), I will focus here on the exchange aspects of these festivities at the village level and how the aforementioned system positively impacts on household livelihoods.

In the village context, the *kerrabhan sapè* and *sapè sono* are usually organized by a household that wants to fulfil a vow to hold such an event should a child recover from illness, or they receive something of great value. Such vows are taken privately or on advice of a healer in times of crisis. To fulfil the vow, they must prepare a flat empty field about 75 meters or more in length, and food for some honoured guests who will be invited to watch the event from a spot in the *tanèan.* Anyone from the area may bring their animals to take part in the event. Hundreds of spectators will usually show up, some of them to sell drinks or food alongside the track. Some participants will hire an ambulatory *saronèn* orchestra to accompany the household members, their extended family and friends, and the animal team from their own *tanèan* to the track. The exchange aspect is obvious for the household holding the event; it applies also to the participants, who provide their alliance partners with meals before an afternoon of entertainment and social interaction. Few other village events provide the level of exhilaration and social mixing found at these events, particularly the bull races, where boys can show off their skills as jockeys and daredevils or — where the experience of jockey and bull are less confirmed—create excitement as they run headlong into the crowds aligning the field.

Sapè sono competitions can take place on a smaller field (50 by 25 meters is enough). To the rhythms of the *saronèn* orchestra, the cow pairs with their ornate yokes advance slowly through a gate decorated with banners, ribbons and mirrors, demonstrating poise and the control of the owner or his delegate holding the reins.

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[192] This figure does not include the value of furniture the father carved for his son to bring with him to the wife's *tanèyan.* Together worth perhaps as much as the cost of the wedding, the dresser, four poster bed, table, four chairs, plough, and an additional store-bought hi-fi system were brought to the new home, but remained the property of the groom and were taken back when the marriage broke up a year later. Niehof (1985:105-145) has described in detail the varieties and intricacies of Madurese marriage ceremonies and the status of goods exchanged between the married couple and their families.

[193] The festivities surrounding the *bhuju'*are detailed in Smith 1998.

Following the races, there is a ceremony (*lok-alok*) to announce the names of the animals participating. For the *sapè sono,* this is done when the cows arrive and stand in the gate. The oratory is done by the owner or his designate. Ordinary cows are not named; the naming of these provides an excuse to stand in front of the crowd and make statements of friendship or camaraderie with the organizer or the people with whom one has come. Sometimes the public speech provides an opportunity to set the record straight or to settle scores; one speaker mentioned that the rumours making the rounds that he was on bad terms with the organizer are now shown for what they are: utter nonsense. Often this declaration is spiced with humour; always there are apologies made for any untoward words spoken, or for not participating before this opportunity.

> [...] In fact, I hadn't intended to participate in the bull races. Sunday, I met Pak Manè in this coffee shop and he offered me mangoes. I said to myself, he must really like me! In fact, he was just angling me like a fish with his mangoes, that Pak Manè. "Look, if you don't bring your bulls Tuesday that means you are disloyal to me. I'm a hill dweller; you, too, were a hill dweller before, weren't you? Ok, so let's meet again in the hills," he said. "Well, ok thanks," I said to Pak Manè. "But what am I to do? Only three days left and I've got no *saronèn.* The craftsman who could make one wouldn't finish in time, I reckon." "No problem, I have a *saronèn,* and I won't be using it."
>
> [...*after this introduction, the participant presented the names of his two bulls, "The Dancing One" and "The Hip Swayer," and made the usual request for forgiveness for any mistakes made. Often the participant will finish with a few dance movements, and receive money or packs of cigarettes as gifts. The recalcitrant participant continues*...]
>
> I hadn't vowed to race this year, it's because I was forced to by Pak Manè and I like Pak Manè a lot. That's what I have to say. Now if there is going to be dancing, I don't know how to dance. Well, if I'm forced to, if I'm dragged into it—even at my age—that can always serve as pocket money for an old man.

Another recalcitrant apologizes for having taken so long to assume his responsibility to participate by choosing appropriate names for his bulls:

> [...] No, I don't add anything to the fun, not sure my race was all that thrilling, either. No, I don't add any shame, not sure my race was all that pitiful either. In fact, I really want to weave a good relationship with Pak Masrabiya, if that may please you all today here and now. […] This one on the outside is called "The Disobedient"; this one on the inside is called "The Anti-Social." So, all together, "The Disobedient Anti-Social," my brothers. In fact, I named him "The Disobedient" because already twice Pak Masrabiya has organized races and me I haven't raced, only now, so yesterday I started to change my tune my brothers. […]

The *kerabbhan sapè* and *sapè sono* fulfil a key role in an area where artificial insemination and castration of livestock is not widely practised. It is believed that official races offering prices in money or clothes were inaugurated in Sumenep by Prince Notokoesoemo in the 1870s. After 1892, these events were regularly organized and financed by the administration with the express goal of improving the island's livestock (Merkens 1926, Munnik 1929). Official races were being held at the other side of the island by the beginning of the twentieth century (Léon 1901). In an article by the veterinarian Schoorel, published in 1889 (Schoorel 1889:273), a description of the *kerabbhan* is found indicating that the sport already is ingrained in Madurese culture. The author speaks of *krappan partij* or *krappan feest,* "very

important" occasions for the Madurese, where the best pairs changed hands for extravagant sums of up to 600 guilden.

The bulls being more difficult to control for ploughing, and consuming more feed,[194] farmers have a preference for females and tend to sell their male calves soon after birth. Bovine sex ratios bear this out: the ratio of females to males drops from a high of 4.9 in Sumenep to 2.5 (Pamekasan), 2.2 (Sampang) and 2.0 (Bangkalan), where they are fattened and sent to the abbatoires in Surabaya. The reglementation forbidding the export of females (Staatsblad No. 268 Gouvernement Besluit, dated 1 June 1923) is still in force, resulting in a premium price for males, which can be exported, and further incites villagers to send males from the area. Until recently, it was not unusual to find some villages in Sumenep with only one bull for 20 or 30 cows, resulting in shortage of studs and difficulty for farmers to arrive at the optimum of one calf birth per cow per year. Only in areas where hardpack soil requires the added power of males, such as on the island of Poteran, do we find large concentrations of males remaining in the district. Elsewhere, cows are perfectly able to plough in the loose rocky soil and are easier to control. Finally, cows produce calves, the importance of which for household solvency cannot be overstressed.

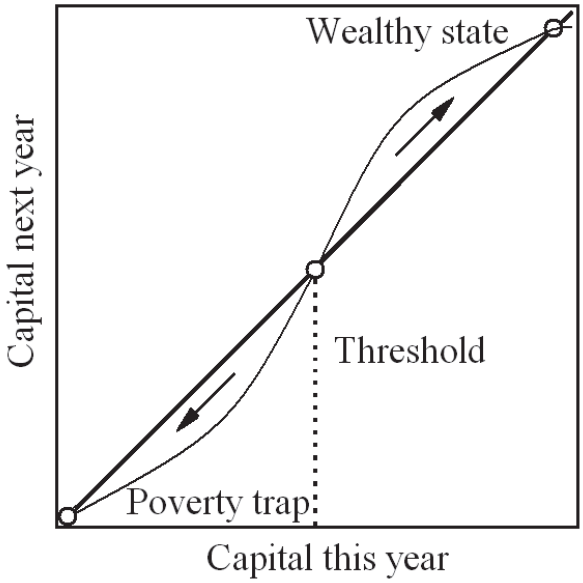
Kerrabhan bulls are selected and raised for high heat tolerance, massive muscles, endurance and of course speed; the *sono* cows are similarly selected, with the added trait of agility. These traits are all useful to have in the particular agro-ecosystem in which farmers in Madura operate, and particularly in Sumenep if they are manifested in a cow rather than a bull. As their raising comes at a cost for the farmers, the service they provide locally for households—and ultimately provide to the hybrid gene pool—is compensated by the prestige they can earn in competing. If the pair excels, it can even attain values commensurate with or exceeding all the work that must be put into their care.[195] The value of social interaction occasioned by the sports is, at the very least, a nice icing on the cake.

5.6 Concluding remarks: Conceptualizing poverty

This chapter began by describing household development stages, and the methods employed for calculating productivity and consumption over time, notably the consumer/producer ratio advanced by A.V. Chayanov. The methodological point was made that more accurate representation of the differential contributions of members of various age/gender groups is possible, and necessary in order to understand the strategies households employ. Household dependency ratios and consumer-producer ratios of the Gedang-Gedang sample families were found to be clustered in a low range for most families most of the time. Should these ratios rise dramatically and the resource-consumer ratio fall, we can suspect the family is falling into or is in danger of falling into a poverty trap. The level of the threshold is not the same for households with access to education, high wage employment, social networks, or healthy children with access to land or stable employment, since such households have immaterial if not material assets they can call upon to help them absorb economic shocks and perturbations. It is difficult to quantify all the parameters, and accurately value different parcels of land, social connections, and diplomas. We could try to quantify this threshold based on the resource-consumer

[194] Bulls consume an average of 17 percent more fodder than cows, the difference increasing in conditions of abundance (calculated based on Vink 1927-28:631).
[195] Champion *kerrabhan* bulls have been known to change for upwards of Rp 100 million a pair.

ratios presented in 5.3. Thus, for the poor households lacking sufficient household land, labour, special skills, or connections, values consistently under 30 on this scale could signal danger, while for others with other material or immaterial resources to call on can hold their own at such levels and keep alive hopes of prospering when opportunity arrives.



Source: Scheffer 2009:35, Figure 2.14. Simple graphical model of a poverty trap.[196]

Informed by economic models (Bowles et al. 2006), Marten Scheffer's graphical representation of the poverty trap (Scheffer 2009:33-35), reproduced here in Figure 5.10, provides a useful conceptual tool for understanding stability and change in household welfare. Gedang-Gedang household histories appear to support such a conception of poverty traps as the result of positive feedback of wealth that causes poor and wealthy states to be attractors.[197] The threshold can be rendered more concrete by considering the many mundane reasons that add force to the pull of the poor and wealthy states. For instance, when the household cannot come up with the resources to purchase fertilizer or water at critical periods of the growth cycle of maize or tobacco, future harvest will be affected, even approach zero in some cases. Early sale of calves due pressing cash needs prevents poor households from gaining the substantial added value of a yearling or older cow. Poor families lack manpower or health (e.g.: A2A, A4A, G5A), or land (A5B, G5A, T3A), and without outside subsidies from parents, children or others, are almost certain to slip further toward the poverty trap. Households that have emerged from the trap take measures (for G3A this means extra children and continued work in Sumenep) to ensure they do not step back over a threshold that is still visible and too close for comfort. Scheffer's critical transition theory predicts that escape from the poverty trap is possible when small perturbations give enough of a push that the individual or household comes under the influence of the opposite attractor. We see this in the cases of households that have stepped over the threshold. Two hard-working sons-in-law and a good marriage for a third daughter were enough of a push for J4A to

[196] "The diagonal 45-deg line shows stable situations in which capital at time *t* equals capital at the next time-step. The sigmoidal line represents a model in which below a threshold capital level, the capital next year (at time *t* +1) is smaller than the capital this year (at time *t*), implying a progression toward the stable poverty trap point. In contrast, if one starts above the threshold capital, growth toward the wealthy state will occur."

[197] Scheffer defines attractors as a state or a dynamic regime to which (given sufficient time) a model will converge (Scheffer 2009:14, 353).

escape the downward spiral seen in 1986. For G6A, a similar push was obtained by the return of a high-earning male and the placement of a pumped water outlet on their doorstep. Examples of public goods (such as roads and electricity) contributing to poverty alleviation are fortunately more common today, and have policy implications. The poor record of early attempts at introducing cooperatives and microcredit might be improved if recent initiatives succeed. Certainly, the traditional institutions of exchange and revolving credit can also induce the kinds of "good" perturbations required.

In a very broad sense, the aggregate landholding data supports Scheffer's model, and suggest that in Gedang-Gedang as in many other places "the rich get richer, the poor get poorer." The seven poorest households control in 2009 only 79 percent of the land they controlled in 1986, the "have enoughs" control 130 percent and the wealthy 177 percent. Of course, there are exceptions in every group, but this trend points to the conclusion that initial conditions tend to predict future achievement. Roemer (1988) has argued that this is the predictable consequence of free actors acting rationally in a market system with unequally distributed assets: some hire others to work for them and others must sell their labour. For Roemer, the latter are "free to lose" due to the exploitative terms of the exchange. Such a characterization might be valid in a broad historical sense for Madurese villagers, in effect transposing the categories of work givers and work receivers identified in the last chapter into rigid socioeconomic classes from which escape is difficult. Indeed, in the not-so-distant past, many took advantage of the fact that they were "free to flee" to Java or Kalimantan. Such a perspective can provide a counterpoint to some of the social anthropological scholarship on Asian societies that ignores wealth differences, denies the reality of class in village societies, or suggests that cultural meanings and values are all one needs to know to understand how households work. I wonder, however, if recent economic flux, increasing wages, and also increasing risk involved in agriculture have not introduced sufficient perturbations to alter this unequal exchange for some households at some times (though confirming the general rule for others). It is sometimes better now to be a wage earner than a wage payer in tobacco cash cropping, and *rosoro* labour is fast-disappearing as source of labour for the landed elite, suggesting that work givers are less exploited than before. On the other hand, the desperately poor are unable to keep up with the rising cost of cash cropping, and some are even unable to profit as high paid workers. They remain exploited by the "system" to process goods and services for low returns as long as their household has not passed the poverty threshold, something that usually requires a major push such as a favorable marriage and the arrival of additional labour. While not denying the determinisms weighing on the poor in most historical situations, this time of transition might provide some with more opportunities than usual for passing the thresholds of poverty, exploitation and class.

The chapter also considered the role of social exchange networks as part of household strategies and as a form of community redistribution. Social exchange is pervasive and between households is almost always symmetrical.[198] Social exchange can provide subsidies for weaker households, most prominently through the *zakat* alms for the poor, but also through meals provided work givers at various social events. In an area where food availability varies throughout the year and some crops are unevenly distributed, food exchange can even out overabundance or shortages of specific commodities. Social exchange and regulation has also extended to the distribution of some other commodities susceptible to shortages,

[198] An example of asymmetrical exchange would be that between household and sacred tomb guardians.

such as fertilizers and water for agriculture. The example was given of bull races and cow contests, showing how the social exchange they foster contributes to mitigating a crucial shortage of prime specimens for breeding purposes. In the next chapter, I will return to the families to see how a key remaining variable, fertility, fits into a model of Madurese households.

CHAPTER SIX
FERTILITY

6.1 Introduction

Histories of households, like the sketches in the last chapter, revolve around the central question of reproducing the unit so that it may continue to function as a life-support system for its members. Children are the life-blood of this system, from an early age sharing in production and maintenance tasks, and as adults providing the mantle of support for young and old dependents. While this much is self-evident, and as a result the desire for children is universally shared, the pathways through which fertility is regulated (if indeed it is) are less clear. It is not yet clear what latitudes of choice are available to Gedang-Gedang families in terms of the abilities and techniques they have to regulate family size, to space births, or to delay conception. And if the sample group histories are any indication, considerable variation must exist in the village and be accounted for.

The household histories left a number of questions unanswered. A first question from the household histories arises with regard to the frequency of divorce and separation, including the rapid dissolution of marriages soon after the wedding. The apparent fragility of the institution, at least in relation to an ideal conception, requires further explanation. Similarly, a number of the conjugal units and households in the sample group were crippled by untimely deaths during the period 1986-2009. Many of these were children, struck down in infancy or once having reached their prime. This suggests a second question, whether the seemingly high mortality frequency for the sample group is reflected in high child mortality rates for the village as a whole. The answer to that question leads to another: to what extent is expected child mortality factored into fertility behaviour? Although additional children could release the parents from a larger share of the household productive work, families choose to have fewer children, even less than the two children per family goal advocated by government family planning. There is a need to look at village fertility patterns to see how this "shortfall" arises, and if conscious decisions go into creating it. Is this proof that family planning is working in Gedang-Gedang, and that behaviour is being driven by new ideologies and symbols such as the government family planning slogan *Dua Anak Cukup* ("two children are enough")? Or that the value of children is somewhat less than it might appear from the evidence presented earlier on that children make important contributions to household production and reproduction? The questions are not easy ones to answer based on informant reports, because all families overtly value children quite highly. One has only to talk to long-childless couples to appreciate how deep their desire for at least one child can be. But perhaps the data presented here can provide indications on the relative weight of ideology and economy in fertility behaviour, and how the value of children factors into it.

Very recent changes over the course of this research – such as the expansion of tobacco cash-cropping and its concomitant need for labour, the increasing youth preference for extending education, delaying marriage and choosing one's own

partner, working off-farm, or acquiring new consumption items – might also have effects on reproductive choices, though lack of hindsight will hinder any definitive conclusions. Such questions might best be reserved for a re-study down the road.The overall aim in this chapter is to understand how fertility fits in with household strategies, to determine the extent to which fertility behaviour constitutes a response to environmental and social constraints, and to evaluate concordances or discrepancies between conceptions of fertility and fertility behaviour. To address these issues, I will draw on a fertility survey conducted in 1996 on the entire village of Gedang-Gedang, specifically all 1101 village women who have experienced at least one pregnancy. The survey methodology does not constitute a full-blown KAP (Knowledge, Attitude, Practice) survey, but it includes all the elements found in similar studies in Madura and Java, and allows for direct comparison with most of them. The ethnographic data for the social and ritual aspects of marriage and child-bearing in Gedang-Gedang being largly isomorphic with that of North Central Madura, covered by Niehof (1985, 1987), so to avoid repetition I will just make succinct reference to them when required, this in order to concentrate on village fertility behaviour and situate it in comparative perspective.[199] The chapter will conclude with some proposed explanations for Gedang-Gedang's fertility levels.

6.2 Marriage

Table 6.1 – Marriage status according to present age expressed as percentage of all Gedang-Gedang men and women in 1996.

Age in 1996	Men				Women				
	Married	Never Married	Divorced Widowed	(N)	Married	Never Married	Divorced Widowed	(N)	Total
0-9	0.0	100.0	0.0	196	0.0	100.0	0.0	169	365
10-14	0.0	100.0	0.0	87	8.9	88.9	2.2	90	177
15-19	8.5	90.6	0.9	117	41.4	57.5	1.1	87	204
20-24	51.8	47.0	1.2	83	75.4	19.0	5.6	126	209
25-29	89.0	7.1	3.9	154	86.5	7.1	6.4	156	310
30-34	94.1	3.9	2.0	102	92.2	1.7	6.0	116	218
35-39	98.2	1.8	0.0	113	86.8	2.5	10.7	121	234
40-44	92.7	0.9	6.4	110	87.4	0.8	11.8	119	229
45-49	97.1	2.0	1.0	102	88.9	0.0	11.1	108	210
50-54	97.7	0.0	2.3	87	82.4	4.4	13.2	68	155
55-59	93.6	1.3	5.1	78	74.7	0.0	25.3	83	161
60-64	92.5	1.5	6.0	67	68.7	0.0	31.3	67	134
65-69	86.7	2.2	11.1	45	46.6	1.7	51.7	58	103
70-74	100.0	0.0	0.0	15	18.8	0.0	81.3	32	47
75-79	73.3	0.0	26.7	15	15.0	0.0	85.0	40	55
80 +	40.0	0.0	60.0	10	10.0	0.0	90.0	10	20
Total				1381				1450	2831

[199] Unless otherwise noted, all tables in this chapter are based on data collected in Gedang-Gedang in 1996 from a sample of 1101 women having experienced at least one pregnancy and (in all but one case) at least one marriage.

Roughly following the survey questionnaire, and chronologically, I begin with marriage history. A few men and women manage to arrive at late adulthood without ever being married; exceptions that confirm the rule that marriage and the conjugal family are the norms in Gedang-Gedang. Table 6.1 gives the breakdown of marriage status by age and gender group.

The young age of girls at first marriage has been noted by many observers, and is a recurring topic of concern for government officials in the health services. Although 39.9 percent of the ever-married women were married for the first time before reaching the age of 15, and 11.9 percent before reaching 12, in 1996 less than nine percent of village girls under 15 were married (an additional 2.2 percent were already divorced or widowed; see Table 6.1). The phenomenon of child brides has virtually disappeared in the last fifteen years since this study, as increasing numbers of children extend the length of their schooling and choose their partners independently (though still with some parental input or acquiescence). All female villagers were asked in 1996 to give their age and the age of their spouse at the time of the woman's first marriage (see Table 6.2).

When asked why they married their child at a young age, parents will say *tako' ta' kacapo' omor*, meaning the fear they will not live long enough to see their child's partner or offspring. Although early marriage provides insurance, in a way, against future inability to marry off an "ageing" daughter, this fear no longer seems to be an overriding one in Gedang-Gedang. Over one-fifth of marriages occur between 20 and 30, and no particular stigma is attached to marrying "late." Though one occasionally hears talk of the "poor daughter" in her twenties and not yet married, the fact that so many quite normally marry late suggests that here as in other domains of Madurese culture, beliefs and conceptions can exist quite independently of behaviour. During and soon after the Second World War, however, such fear was probably quite real, due to the shortage of men of marriageable age. Memories of this time passed down still influenced parents (particularly fathers) in the early 1980s. There would still be a shortage of men of marriageable age today going by the figures in Table 6.1, which show that for every age group from 25 on up men are more likely to be married than women. Most girls today are less than eager to contemplate early marriage and prefer to continue school to junior and high-school levels or higher, opportunities offered to a scant few just decades ago. For many, fear of not finding a partner is the least of their worries.

From the parents' standpoint, assuming matrilocal residence, they stand to benefit from procuring a son-in-law for the household or at least for the *tanèan* to augment available labour resources. Even if the son-in-law sets up a new household, he will exchange labour with his father-in-law and other members of the *tanèan*, thus improving labour allocation to cope with periods of intense labour demand. The young couple soon receives land near the homestead as a further way of anchoring the husband in the wife's compound. The parents are also relieved of part or the entire burden of her support. To put it bluntly in a way most parents do not (though some do), the daughter unable to pay her way by earning income for the household or caring for younger children would be less costly or more valuable married than single. In societies such as the Javanese studied by White in 1972-1973 (White 1976), the high value of children as income gainers leads parents to the opposite strategy: to retain the children unattached in the parents' home as long as possible. Each of these strategies can conflict with the wishes of the children themselves. In Gedang-Gedang children seek the parents' continued support, but in the Javanese example they yearn for independence.

By 2009, increasing numbers of families were supporting their daughters and sons to obtain degrees in higher education. Whereas in 1985, less than a third of the

village children (most of them boys) would go to junior high school (*SMP*), and almost none would finish senior high school (*SMA*) it is not uncommon for children today to complete SMA and begin a *Sarjana* (*S1* or *S2*) level, though for financial as well as cultural reasons almost exclusively in the Islamic boarding schools and *pesantrèn* of Madura.

Polygamous households are virtually unknown in Madura,[200] but some wealthy men have two or more wives living in separate households and almost always in different villages.[201] The rate has probably decreased over the years throughout Madura as education has increased. One relatively well-off Gedang-Gedang man who makes a living trading and transporting goods has a second and younger wife in Batuputih Kènè'. Besides the A6A household led by a second wife, no other declared polygynous relationships were recorded in the 1996 survey, though non-reporting of secondary wives might have occurred.

6.2 Marriage

Table 6.2 – Age of wives and their husbands at first marriage[202]

Age	Wives	Husbands
7-9	24	-
10-11	107	17
12-15	412	193
16-19	325	345
20-25	196	439
26-30	26	80
31-40	8	21
over 40	1	4
Total	1099	1099

For the 1100 ever-married women in the village, an estimated thirty percent of first marriages end in divorce (including a few due to death of husband). Table 6.2 provides data on 500 marriages terminated by divorce or death in terms of length of union (mean duration: 41 months). The reasons for divorce are usually vague, the most frequent being *ta' pasthe* (literally: "not certain") and *baji* ("hatred," "aversion"). Other reasons given include *belum lebur* ("not yet consummated"), *todus* ("timidity"), *ta' rokon* ("didn't get along"), *ta' neser* ("didn't feel anything for him/her") and *ta' becè'* (literally: "no good," usually indicating consummation was prevented by one party). Marriages planned by the parents can be extremely short-lived if one or both of the children are opposed.

Records on divorce registered at the religious affairs office in Batuputih provided the following reasons for divorces registered between 1994 and 1996: wife refused to move to the husband's house; husband provided insufficient money to run

[200] I was told that one *kiayè* in the Lenteng subdistrict had such strong magical powers and charisma that men were known to spontaneously arrive at his compound to offer their own wives to him. The *kiyaè* kept the wives together in the compound, where allegedly the women got along fine. Success in getting two Madurese wives to share the same compound would indeed be seen by people as proof of a man's supernatural powers.

[201] Men are entitled in Islam to have up to four wives if the first wives do not object and if the husband can support them all.

[202] Two women could not recall their ages at first marriage.

the house; husband was often jealous. In fact, few Gedang-Gedang couples bother to go through the office of religious affairs, considering that if the marriage is officiated or dissolved by the *kiyaè* that is sufficient. In my survey, only one case was reported of remarriage with a former spouse, though we know from the sample group and other observations that many couples have periods of separation that are followed by reconciliation and reunification.

Table 6.3 – Duration of marriages ended by divorce or death of husband, excluding final or current union

	Marriage						
Duration	1st	2nd	3rd	4th	5th	All	percent of total
< 12 mos.	114	31	15	7	2	169	33.8
12-23 mos.	67	33	4	0	0	104	20.8
24-47 mos.	63	18	6	5	2	94	18.8
4 - 9 yrs.	60	15	3	2	0	80	16.0
10 - 20 yrs.	34	6	4	1	0	45	9.0
> 20 yrs.	6	2	0	0	0	8	1.6
(N)	344	105	32	15	4	500	100

Moving into a new *tanèan* and household can be the beginning of a difficult adjustment period, particularly for the young bride or groom who has always lived with her or his parents. The new physical and social environment of neighbouring *tanèan* can be quite alien to people whose prior knowledge of the village has been limited to navigating between the home turf, school, the main road, and the markets.

When asked about the usual post-marital residence practice, villagers usually respond *noro binè* ("follow the wife"), meaning that the young couple will set up housekeeping in the wife's family's *tanèan.* This is the most common practice, and perhaps a tradition in this area, but village data (Table 6.3) shows that a significant number of women (36.9 percent) follow their husbands (*noro lakè*). The data further suggests that when women follow the men the marriage has a better chance of succeeding (Table 6.3).

Table 6.4 – Percentage of married couples residing with family of husband (*noro lakè'*)[203]

	All marriages			Failed marriages
Marriage order	*noro lakè'*	*noro binè'*	Percentage *noro lakè'*	Percentage *noro lakè'*
1st	377	696	35.1	22.0
2nd	118	217	35.2	29.1
3rd	42	6	87.5	30.3
4th or subsequent	17	28	37.8	37.5
All	554	947	36.9	24.5

[203] Data included only for marriages for which residence was reported or could be established with some certainty. Where residence changed during the marriage, the last or most significant arrangement is counted. Number of marriages for all 1101 ever-pregnant women, including: 0 marriage: 1; 1: 749; 2: 244; 3: 73; 4: 19; 5: 11; 6: 4. One woman had to be removed from the database following her refusal to answer any questions.

6.3 Pregnancy

Data were collected on all pregnancies, whether they resulted in live-births or not. Following the methodology developed by Niehof (1985), each woman was helped to construct a marriage and pregnancy history, including intervals between marriage and first pregnancy, between onset of pregnancy and delivery or termination, length of lactation, interval between its end and the onset of a subsequent pregnancy, and so forth. Women were encouraged to jog their memories for any pregnancies or incidents that might have gone unnoticed, particularly when the intervals seemed longer than usual. When data coming in suggest underreporting of pregnancy or birth incidents, a re-visit was made to the household to seek clarification.

As in all direct field surveys of this kind, some underreporting of mis-carriages, stillbirths, and neonatal deaths are to be expected. Part of the underreporting is due to the desire many feel to put the unhappy experiences behind them. Also there is a blurring of the categories Madurese women use to speak of pregnancy and childbirth. Signs of early pregnancy are sometimes not noticed until one or more menstrual periods are missed. Menstrual regulation (MR) is often used, consisting of massage or herbal concoctions to "make the period return," a practice that is usually explained as an act of simple routine hygiene, though women are of course aware that a missed period could mean a state of pregnancy. It appears that, as in the words of Whittaker (2010:28), "use of ambiguous terms enables a conceptual space in which the act of abortion can be more easily accepted." The enumerators were reminded of these conceptualization problems and trained to encourage the subjects to recall every pregnancy experience, if necessary rephrasing questions to help spur any recollection. Data was collected on practices that might constitute MR.

Table 6.5 – Pregnancy wastage for pregnancies terminated within the last five years prior to interview (Gedang-Gedang 1996)

	Number of pregnancies	Pregnancy wastage	Percentage of pregnancy wastage
1st pregnancy	121	2	1.65
2nd pregnancy	42	2	4.76
3rd pregnancy	22	3	13.64
4th or later pregnancy	11	0	0
All pregnancies	196	7	3.57

N for 4th pregnancy: 7; 5th : 2; 6th : 1; 10th : 1.

The calculation of pregnancy wastage (termination of pregnancy by other than by live birth, including by abortion, miscarriage or stillbirth), is a difficult measure to make in traditional societies. As Niehof states (1985:227-230), most studies on fertility in Indonesia give no figures on pregnancy wastage.[204] If we take all reports of failed pregnancies, we can arrive at a percentage of pregnancy wastage (the number of failed pregnancies divided by the total number of pregnancies times 100), which for Gedang-Gedang would be (63 / 2188) x 100 = 2.88 percent. The difficulty arises when trying to interpret the product of this simple calculation as multiple sources of bias lead to under-reporting. One way to minimize the bias due to simple failings of memory is to base the calculations on a short reference period that ends

[204] Notable exceptions are Niehof 1985, Hull 1975 and Zuidberg 1978.

at the point of the interview. Table 6.5 gives data concerning pregnancies terminated within the last five years before the interview. The rate of 3.57 percent for all pregnancies within then reference period is lower than the 2.88 percent for all pregnancies in the village fertility study. This is an expected outcome of questioning the women soon after the events. The rates in the reference period must still be taken as minimum estimates, due to ambiguities of delayed menstruation mentioned before, though the availability of information on family planning and reproductive health was best closer to the interview date than at any time before. Comparisons with other sources from the 1970s and 1980s show higher percentages: over 10 for Madura samples, 8 for Central Java and 6.4 for West Java (Niehof 1985:229-230, Hull 1975:293, Zuidberg 1978:91). I was surprised the rate for the village was this low. In dealing with family histories over the years I had heard many reports of miscarriages or stillborns, not to mention the many more reports of children lost in early childhood or women who were unable to conceive.

It is difficult to determine if the discrepancies are due to different cohorts having differentials in access to information and medical attention, recollection, or enumerator effectiveness. What is clear in Madura is that the term pregnancy wastage cannot encompass the lost pregnancies terminated before the pregnancy is acknowledged, by whatever means. What can be crucial factors in lowering fecundity are the level of menstrual regulation and beliefs about conception. Niehof's (1985:223-227) analysis of MR and abortion speaks of beliefs and practices in North Central Madura that parallel those found in Batuputih and specifically Gedang-Gedang: women highly value a regular menstrual cycle, potions and massage are used for MR and may be intended to induce abortion, and beliefs about conception are at variance with biological patterns of fecundity. Many women in Gedang-Gedang were unaware that the menstrual cycle was composed of fertile and infertile days, and those who did believed they were most fertile around the time of their menstruation rather than in the middle of the cycle. This reversal is due to the association between dry and sterile and between wet or moist and fertile (Niehof 1985:224). My wife was able to verify this in discussions with women who had been trying unsuccessfully to have children. In explaining how they might use the rhythm method to increase their chances of becoming pregnant, she realized the women had been oblivious to the method or confused about where the fertile portion of the month was situated.

Having been alerted to the effect of MR from Niehof's work, I added a question on it to the fertility survey. Before beginning any questions about use of birth control measures, I asked the subject if she had "ever used (potions), (massage) or (other means) when menstruation was late?" This formulation avoided attributing a function or value judgment to the acts. The responses are in Table 6.6.

Table 6.6 – Traditional methods of menstrual regulation used by Gedang-Gedang women

Methods:	Number reporting use	Average age at first use	Average number of live births at first use
potions	71	24.3	1.3
massage	94	26.8	1.2
both, other	3	17	1

A little over fifteen percent of the women (168 out of 1101) admitted using traditional methods of MR. The actual prevalence is of course higher, after accounting for those reluctant to admit *abortus provocatus.* Twenty-nine percent of

those admitting MR (48 out of 168) also said they were using modern methods of birth control.

Gedang-Gedang women differentiate between KB, the program and methods provided by the government health services, and the traditional practices of massage and herbal concoctions. The preference for the traditional system has weakened over time as the *Puskesmas* has made contraceptive solutions available. These solutions were generally provided free at first, in time they would have to be purchased. IUD and condoms were available but not adopted. Though plastic blisters still could be found among rubbish, the pill disappeared from the village as soon as it had to be purchased in town. Thus, the two most popular contraceptives in Indonesia at the time of my study (pill and IUD[205]) were not used at all. Implants were gaining favor in 1996 because they provided protection for up to three years or more and the receptor would only pay for the operation. Depo Provera three-month injections were still used in 1996 for several reasons. They gave women flexibility to change their reproductive strategy on short notice. The injections remained available in Batuputih Laok and relatively low priced considering its three month of protection. However, the *Puskesmas* was receiving directives by 1990 to encourage new acceptors for the implants and for an unsuccessful male vasectomy program (called MOP) but not for other solutions. The rationale, according to the health workers, was that villagers were unable to manage short-term contraceptives and that long-term (implants) and definitive (MOP) solutions were best for them and to be more or less imposed through economic incentives.

Gedang-Gedang women use birth control to manage their pregnancies, even some beginning before the birth of the first child, but usually following the birth of the first. Modern birth control methods have come to supplement, and sometimes replace, traditional methods. A common pattern is for women to begin taking birth control following the birth of their first child, or following the return of the menstrual cycle, in order to wait until the child had grown several years; birth control is then suspended to have a second child and resumed following the second birth. The methods used are noted in Table 6.7 and the timing in Table 6.8.

Table 6.7 – Modern methods of birth control used by Gedang-Gedang women in 1996

Methods:	Number reporting use	Average age at first use	Average no. live births before first use
Suntik (injection)	63	25.0	1.2
Susuk (implant)	74	26.9	1.6
other unspecified	1	-	-

[205] See Gertler and Molyneaux 1994:39, Table 1. Descriptive Statistics, Indonesia.

Table 6.8 – First use of modern birth-control methods by birth rank and age in 1996

In relation to births	Percentage[206]	In relation to woman's age	Percentage
before first birth	5	15-19	19
following first birth	82	20-24	26
following second birth	22	25-29	23
following third birth	7	30-34	10
following fourth or subsequent birth	3	35-39	7
		40 and above / not sure	8 / 7

The number of women reported using modern birth control is again likely underestimated for several reasons. Interviews were often carried out in the presence of the husband, thus women using birth control without the knowledge of their mates would not have been counted. The question was framed so as to include any past usage ("Have you ever used…") but some could have still formulated their response on the basis of their present usage. Nonetheless, the responses provide a broad minimalist picture of efforts of traditional and modern efforts to control births. Most of the women reporting adoption of modern methods did so over the last four years before the study, in the early 1990s. However, a few dated their first use to the mid-1970s, and by the mid-1980s during our first fieldwork some women were using a form of modern birth control, or seeking to obtain it.

6.4 Birth and birth-spacing

Having dealt with the efforts to control pregnancy and birth, we can move chronologically to look at the fertility data for Gedang-Gedang and compare them to data from similar village studies elsewhere in Madura and Java. I begin with the data from Gedang-Gedang for live births and surviving children based on the age of mother (Table 6.9).

The studies of Niehof in Patondu and Tambeng, North-Central Madura, and two studies cited by Niehof conducted in the mid-1970s in rural Central Java as part of the World Fertility Survey, in Mojolama (Singarimbun and Manning 1974) and in Maguwoharjo (Hull 1975) can be directly compared to the Gedang-Gedang data by adding the latter to the table presenting these four villages in Niehof (1985:263; Table 8.1) (see my Table 6.10). Unfortunately, I cannot add the data collected for Kali Loro, Java (White 1976:406; table A.10), as the latter study is not representative of the population's fertility as a whole (see White 1976:Appendix I). Were the two comparable, they would surely demonstrate veritable polar opposites in terms of village demography due to the very high fertility rates in White's village.

[206] The percentage exceeds 100 because more than one answer was allowed.

Table 6.9 – Average number of children ever-born, still living, and deceased according to the current age of women in 1996

Age Group	Live births	Women	Average number of children		
			Ever born	Still living	Deceased
<15	1	10	0.1	0.1	0.0
15 - 19	14	36	0.4	0.4	0.0
20 - 24	79	101	0.8	0.7	0.1
25 - 29	144	145	1.0	0.9	0.1
30 - 34	176	114	1.5	1.3	0.2
35 - 39	172	118	1.5	1.3	0.1
40 - 44	215	118	1.8	1.6	0.2
45 - 49	252	108	2.3	2.0	0.3
50 - 54	183	65	2.8	2.4	0.5
55 - 59	257	81	3.2	2.7	0.5
60 - 64	203	67	3.0	2.4	0.6
65 - 69	174	57	3.1	2.4	0.6
70 - 74	105	32	3.3	2.4	0.8
75 - 79	122	39	3.1	2.4	0.7
80+	27	10	2.7	2.1	0.6
	2124	1101			

Table 6.10 – Average number of children ever-born according to current age of the mother for Gedang-Gedang, Tambeng, Patondo, Maguwoharjo and Mojolama[207]

Age-Group	Ged.-Gedang 1996		Tambeng 1979		Patondu 1978		Mojolama 1969-1970		Maguwoharjo 1972-1973	
	Women	mean	Women	mean	Women	mean	Women	mean	Women	mean
15-19	36	0.39	56	0.82	56	0.61	25	0.4	44	0.5
20-24	101	0.78	78	1.87	82	1.80	55	1.3	143	1.8
25-29	145	0.99	56	3.06	53	2.53	97	2.4	167	2.9
30-34	114	1.54	48	3.98	53	2.91	112	3.5	187	4.0
35-39	118	1.46	55	5.16	57	3.16	114	4.5	213	5.0
40-44	118	1.82	52	6.31	51	3.89	94	4.6	177	5.4
45-49	108	2.33	46	5.87	47	4.04	275	4.8	159	4.6

Even without the Kali Loro comparison, the contrast between Gedang-Gedang in 1996 and these four other sites several decades earlier is nothing less than dramatic. A caveat must be issued right away, however. My data from 1996 is some two decades older than the other data collected in Madura (1978-1979) and in Java (mid-1970s), so the data is not exactly comparable. During this period, a demographic transition was underway in Indonesia Asia following the introduction of family planning services from the 1960s,[208] accompanied by a rise in school attendance and

[207] Following are the sources for the data presented in this table. For Tambeng and Patondu, see Niehof 1985:263, Table 8.1. For Mojolama, see Singarimbun and Manning 1974:27, Appendix 15; 35, Table 14. For Maguwoharjo, see Hull 1975:239, Table 6.4).

[208] A strong Indonesian family planning program providing access to contraception was in place by 1968 (Niehof and Lubis 2003).

higher education among the youth, particularly girls. Indonesia's total fertility rates (TFR) declined 22 percent from 5.6 in 1970 to 4.1 in 1980, then another 23 percent in the five following years to 3.2 in 1985. Although family sizes on the whole were and still are smaller in Sumenep compared to the rest of Madura and to Java, the decline in the other areas probably made up some of this difference. On the other hand, Gedang-Gedang has always been relatively isolated in comparison to Patondu and less well served by government structures (Tambeng is perhaps more like Gedung-Gedang in this respect). Since 1986, subdistrict KB officials have always lamented the poor levels of acceptance of modern contraceptives. While the other areas in Madura and Java likely experienced fertility reduction, this came at a time when Gedang-Gedang women were still controlling their fertility largely with traditional methods.

Tables 6.11, 6.12 and 6.13 provide mean age at birth according to rank order. They are meant to demonstrate the characteristics of the reproductive careers and birth spacing of Gedang-Gedang women (Table 6.11), and compared them with the same data for Tambeng and Patondu combined (Tables 6.12 and 6.13). The tables are based on 975 Gedang-Gedang women and 691 Tambeng-Patondu women. Women who have borne twins have been excluded from the calculations for GG and PT. For GG this represents 4 women and 10 live-births (including 4 pairs of twins), and for PT 4 women and 22 live births (including 4 pairs of twins). Four women and their 11 live-births were also excluded from the GG sample as a result of unclear or missing age data.

Table 6.11 – Mean age of the mother at birth according to rank number (R) of the birth and total number of live-births per woman for Gedang-Gedang[209]

	Total number of live-births per woman										
R	1	2	3	4	5	6	7	8	9	10	11
1	21.4	20.8	20.1	19.4	17.8	16.8	17.0	16.4	14.0	16.5	15.0
2	-	27.2	24.8	23.8	22.6	21.4	21.5	19.2	16.8	20.2	16.8
3	-	-	30.2	28.5	26.5	25.2	25.4	22.3	20.5	23.0	20.5
4	-	-	-	33.6	30.6	29.6	29.6	25.8	24.3	27.2	24.3
5	-	-	-	-	35.3	33.5	34.5	29.2	28.0	29.5	28.0
6	-	-	-	-	-	37.3	38.8	32.4	32.8	33.2	31.8
7	-	-	-	-	-	-	43.0	36.3	36.5	37.0	35.5
8	-	-	-	-	-	-	-	39.7	42.3	40.7	39.3
9	-	-	-	-	-	-	-	-	47.1	43.5	43.0
10	-	-	-	-	-	-	-	-	-	48.2	44.8
11	-	-	-	-	-	-	-	-	-	-	48.5
N	449	246	128	71	38	17	14	8	1	2	1

[209] Given the small sample sizes for nine or more births, the results in the three right columns must be interpreted with caution (the same applies to Tables 6.12, 6.13 and 6.14).

Table 6.12 – Mean age of the mother at birth according to rank number (R) of the birth and total number of live-births per woman for Gedang-Gedang (GG), compared to the same data for Patondu and Tambeng (PT)[210]

R	Total number of live-births per woman											
	1		2		3		4		5		6	
	GG	PT	GG	PT	GG	PT	GG	PT	GG	PT	GG	PT
1	21.4	17.7	20.8	17.5	20.1	17.6	19.4	17.3	17.8	17.4	16.7	16.9
2	-	-	27.2	21.3	24.8	20.8	23.8	20.7	22.6	20.4	20.8	19.7
3	-	-	-	-	30.4	24.2	28.5	24.1	26.5	23.6	24.4	22.3
4	-	-	-	-	-	-	33.6	27.6	30.6	26.9	28.5	25.0
5	-	-	-	-	-	-	-	-	35.3	30.2	32.6	27.5
6	-	-	-	-	-	-	-	-	-	-	36.4	30.5
7	-	-	-	-	-	-	-	-	-	-	39.9	32.8
8	-	-	-	-	-	-	-	-	-	-	40.0	34.8
9	-	-	-	-	-	-	-	-	-	-	44.3	36.3
10	-	-	-	-	-	-	-	-	-	-	47.1	36.5
11	-	-	-	-	-	-	-	-	-	-	48.5	36.4
12	-	-	-	-	-	-	-	-	-	-	-	38.4
N	449	148	246	152	128	117	71	87	38	55	Table 6.13	

Table 6.13 – Sample sizes for Table 6.12 (last row, column 6)

Live births	GG	PT	Live births	GG	PT
6	17	38	10	2	11
7	14	28	11	1	2
8	8	22	12	-	5
9	1	26			

The same caveat is in order for Tables 6.11-6.13 as for Tables 6.9-6.10. The comparison is for different years. Still the comparison is instructive in that it shows different strategies being employed in each location. In Gedang-Gedang, onset of child-bearing is postponed until after 21 years of age on average. Spacing of births thereafter is also relatively long resulting in the average Gedang-Gedang women being over 35 years of age in the unlikely event she has a fifth child, whereas the average Central Madurese woman would be barely 30 at that point. Birth spacing can be appreciated by looking at the intervals between live births, in Table 6.14.

[210] Refer to Niehof 1985:267, Table 8.3. A weighted mean of the ages given for Patondu and Tambeng is presented in columns PT above.

Table 6.14 – Average interval between live births, according to birth-order

Birth-order	No. of live births in sample (974 women)	Mean interval (in months)
Marriage – 1st birth	974	54.2
1st – 2nd	526	65.0
2nd – 3rd	280	57.1
3rd – 4th	152	54.8
4th – 5th	81	51.9
5th – 6th	43	46.5
6th – 7th	26	48.5
7th – 8th	12	43.9
8th – 9th	4	42.0
9th – 10th	3	45.0
10th – 11th	1	45.0
Marriage – 1st birth and all birth intervals	2102	56.9
All birth intervals	1128	59.3

The average birth interval between marriage and 1st birth is subject to bias in the case of pre-marital conception. Pre-marital sex is disallowed and appears to be uncommon in the village. When it does occur, precipitated marriage is a solution to avoid social stigma. Inconsistencies regarding dates of marriage and birth were settled by the time the enumerators got to the fertility part of the questionnaire, which explains why only one self-report of pre-marital conception was forthcoming. Responses indicating conception in the first few months of marriage might therefore include a few covered up instances of conception before marriage, and introduce error, though slight, in the figures for length of the first birth interval as presented in Table 6.14.

Gedang-Gedang parents regard an early conception following marriage in a very positive light. They hope this will cement their children's marriage and contribute to the economic viability of the entire family. A conception incident if followed by marriage will not be allowed to disrupt this larger picture, and the child will be remembered as auspiciously conceived on the wedding night or soon after.

Despite the Madurese ideal for young couples to have a child soon after marriage, the evidence shows that this scenario is not the one generally followed. Most couples try to put off the arrival of the first child, if we go by the interval of over 4 years average between marriage and first child.

Following birth, and often for extended periods thereafter while the baby is being nursed, the husband will sleep in the *langghar*, and the couple limits sexual activity. Measures of the efforts to prevent closely-spaced births were obtained from mothers who were asked to recall both length of post-partum amenorrhea and length of breastfeeding following live-births of surviving children. The durations were put on the pregnancy and birth history and inconsistencies were worked out. Post-partum amenorrhea (Table 6.15) was found to have remained at close to 2.5 years in the two cohorts between 1971 and 1990. Virtually no difference in length of breastfeeding (Table 6.16) was found for boys or girls, indicating no degree of preference for one over the other in as much as length of breastfeeding can provide such an indication. Interestingly, there is no perceptible reduction, nor increase, in the average length of breastfeeding between the 1971-1980 and 1971-1990 birth cohorts. For most infants, mother's milk remains virtually their only nourishment

through the second year. Though formula preparations or supplemental dairy solids are available in town, their cost has put them out of the reach of local women.

Table 6.15 – Length of post-partum amenorrhea according to birth cohort

	Length of post-partum amenorrhea (in months)			
Birth-cohort	Minimum	Maximum	Mean	Median
1971-1980 (N=361)	4	80	29.4	28
1981-1990 (N=366)	5	72	29.0	28

Table 6.16 – Length of breastfeeding according to birth-cohort and sex of child

	Length of breastfeeding (in months)			
Birth-cohort / sex	Minimum	Maximum	Mean	Median
1971-1980 / all	12	84	29.8	25
1971-1980 / fem	12	61	29.3	25
1971-1980 / male	17	84	30.3	25
1981-1990 / all	12	75	29.6	25
1981-1990 / fem	15	70	29.3	25
1981-1990 / male	12	75	29.8	25

Length of breastfeeding and length of post-partum amenorrhea correspond very closely for most women, the termination of breastfeeding preceding the return of menstruation by about one month for the majority of women. The effect of breastfeeding in lowering fertility has been recognized since Aristotle and by demography since 1978 when John Bongaarts showed that in the absence of contraception the duration of the post-partum infecund period is primarily a function of breastfeeding behaviour, and the length of the birth interval is a key determinant of marital fertility (Weis 1993:100). The mean length of breastfeeding in Gedang-Gedang is six months longer than the average for Indonesia and just above the highest average value (Bangladesh) for countries participating in the World Fertility Survey (Jain and Bongaarts 1981:83). Cultural notions also discourage pregnancy in rapid succession or as long as an earlier child is being breastfed. It is also considered shameful for a mother to be breastfeeding a child when one of her own children has already given birth, resulting in a form of social pressure that discourages long reproductive careers.

6.5 Food and reproduction

Another indication of the rich traditional knowledge Madurese have of pregnancy and conception can be seen in the responses to the question of what foods are good and bad during pregnancy. Following the discussion of pregnancy history, women were asked which foods are good during pregnancy, craved during pregnancy, and bad during pregnancy. They were also asked which foods were good and bad during lactation. Besides providing interesting insights into consumptions practices during and after pregnancy, the questions provided a moment of relaxation, even amusement, in between parts of the questionnaire demanding more concentration. Hundreds of responses were collected, in many cases with explanatory comments noted for specific foods. A detailed analysis of the responses would take the discussion too far afield; however a list of the most common responses is presented in Tables 6.17 and 6.18.

Though there is some ambiguity for marginal foods, broad agreement exists on which foods are positive or negative. There is a consensus, for example, that meat and fish should not be consumed during pregnancy or lactation, as the baby could be stillborn, have fetid blood, smell rancid or the mother's milk could be spoiled. This does not prevent some pregnant women from craving a dose of concentrated protein. Meat and fish are not often consumed in most Gedang-Gedang families anyway, and substitutes like soybean cakes and beans are available. Interestingly, however, *bakso* (reconstituted meatball soup) is permitted if the mother's craves it, and even beef, chicken, goat or fish will be provided if a future mother expresses a craving. The cravings of a pregnant wife must be honoured, and in discussions some men recount trips made in the middle of the night to Sumenep in search of a rare fruit or delicacy. Consumption of vegetables and tart or citrus foods is encouraged through local knowledge and "craving," leading women to consume more vitamin-rich foods than would otherwise be the case. During lactation, women report they increase their consumption of vegetables even more. Foods high in clean or boiled water content are also represented in the "good" and "craved" foods: soups, fruit and vegetables. There is some ambiguity for *rujak*, the spicy and tart unripe fruit dish, during lactation, with differences of opinion over the relative benefits of such craved foods versus the fear of rendering the mother's milk unpalatable to the baby. Interestingly, this dish is thought to be good during pregnancy in Gedang-Gedang, but was strictly forbidden in Patondu (Niehof 1985:230).

Table 6.17 – List of foods women consider good, often crave, or consider harmful during pregnancy (XX often mentioned; X sometimes mentioned)

Foods during pregnancy:	Good	Craved	Harmful
rice or rice-maize and leafy vegetables	XX		
vegetables (various leafy, boiled, raw)	XX		
unripe fruit and spicy peanut sauce	XX	XX	
bakso, chicken noodle soup	XX	XX	
fruit: mango, papaya	XX	X	
cow's milk	X		
beans	XX		X
chili pepper			XX
sweet or salty condiments		X	XX
sardines, other fish and crab			XX
beef, mutton, chicken		X	XX
golden, otaheite apple fruit		X	XX
flavoured ice preparations		X	XX
pineapple			XX
fish paste			XX
vinegar			X
"no special foods"	XX	XX	XX

Table 6.18 – List of foods Gedang-Gedang women consider good and harmful during lactation (XX often mentioned; X sometimes mentioned)

Foods during lactation:	Good	Harmful
herbal potions	XX	
salt, tamarind	XX	
vegetables	XX	
rice	XX	
fish paste		X
fish		XX
meat		X
chili peppers		XX
unripe fruit and spicy peanut sauce	X	X
vinegar		X

6.6 Desired family size

The fertility survey opened with several questions which from different angles tried to obtain knowledge of how reproductive decisions are made. The women were asked if they wished to have a child or another child, and how many more. They were then asked why they did not desire more than that number, then less than that number. Finally, the women were asked to provide the ideal number of children for her family, and justify that number. A detailed analysis of all the data would be too fastidious here, but answers to the question "In your opinion, it is best to have how many children?" are presented in Table 6.19.

Table 6.19 – Women's responses to the question "In your opinion, it is best to have how many children?" according to current number of living children

Living children	0	1	2	3	4	5	6	7+
"ideal":								
1	11	30	3	-	-	-	-	-
2	63	248	126	4	2	-	-	-
3	4	68	42	45	1	1	2	-
4	8	37	16	18	22	2	2	-
5	2	13	6	4	10	6	-	2
6	-	1	-	-	1	1	2	-
7+	-	-	1	-	-	-	2	1

An analysis of the responses teaches little about how fertility decisions are made. One can respond in a variety of ways depending on mood, the setting and other persons present at the time. The answer is dependent on how many children the woman already has. The phrasing is important, but no matter how neutral is the question's formulation, the interpretation the subject gives to it is more important. The question "how many children do you desire" can be read as "how many children would you have if you could have as many as you wanted", just like it can be read as "how many children would you have if you could do it all over". The responses in each case could be radically different from the actual experience of choosing or not to have a child, a decision process over months or years rather than a single decision. Table 6.19 illustrates how the figures of the ideal number of children depend closely on how many children one already has; as children are added it tends to rise in tandem. Two is considered an ideal number for childless women and women with one or two children, but thereafter the ideal size matches current size.[211] This is common for such studies. Surprisingly, however, a few women gave ideal figures that were actually less than the number of their living children. A significant minority who have zero or one child declared that one was the ideal number.

6.7 Child mortality

A measure of child mortality is necessary to complete the chronological picture of Gedang-Gedang fertility patterns. If child mortality is found to be consistently high in the village, this could explain the small family sizes, or could incite couples to have more children than they would have otherwise to compensate for children that do not survive. To calculate child mortality—the number of children who die before reaching their fifth birthday, out of 1000 live-births—reference periods are also

[211] White also made this finding "that women 'revise'their preferences upward as more children are born" (White 1976:402). He further notes: "This tendency has the result that when aggregate "preferences" is computed irrespective of parity, and compared to completed fertility, "ideal" family-size appears always to be lower than actual (completed) family-size; such comparisons are often wrongly taken as the basis for the conclusion that women are having more children than they want."

useful, though for a different reason than to uncover bias. Below, I present child mortality for the 1981-1990 cohort (Table 6.20) followed by the earlier 1971-1980 cohort (Table 6.21) to shed light on trends in child mortality over time. Bias is less an issue in collecting data on child mortality compared to pregnancy wastage data because the painful memory of losing an infant or child and the accompanying rituals are less easily forgotten (though a few cases of oversight were still uncovered during the study).

When first asked how many children a woman has, the usual response is to say, for example, "three, counting the one that died" even before we have constructed the pregnancy history. In Gedang-Gedang, parents assume a teknonym (Needham 1954:416) or necronym (Lévi-Strauss 1962)—the name of the child produced by the first pregnancy arriving to term (or for men the first pregnancy by a spouse)—whether the child survives or not. I will show child mortality here rather than infant mortality (the number of infants that die before their first birthday) because counting up to the fifth birthday gives a more complete picture of the survival rate of Gedang-Gedang children.

Following birth, the child is kept indoors most of the first forty days, before a ritual presentation to outsiders. Despite the care taken, unsanitary conditions are often unavoidable and childhood illnesses are common. Neonatal tetanus, usually from a contaminated umbilical cord stump, used to be very common until the training of traditional midwives was introduced in the 1980s. Diarrhea is still a frequent cause of death, despite increased attention from village-based nurses and the sub-district health clinic. Their services are not free, so after weighing the cost-benefits of the alternatives some villagers decide to visit a local healer, who will offer incantations or a name change for less cost.

Table 6.20 – Child mortality (birth cohort 1981-1990)

Pregnancy order:	Live-births			Child death below 5 years			Child mortality rate		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
1	110	100	210	7	12	18	64	120	86
2	60	67	127	6	7	3	100	104	102
3	27	24	51	2	2	4	74	83	78
4	18	8	26	2	1	3	111	125	115
5	4	6	10	1	0	1	250	0	100
6	3	3	6	0	1	1	0	333	167
7	3	3	6	0	0	0	0	0	0
8	0	2	2	0	0	0	0	0	0
9 or later	2	2	4	0	0	0	0	0	0
Total	227	215	442	18	23	40	79	107	90

Table 6.21 – Child mortality (birth cohort 1971-1980)

Pregnancy order:	Live-birth			Child death below 5 years			Child mortality rate		
	Male	Female	Both	Male	Female	Both	Male	Female	Both
1	107	100	207	10	8	18	93	80	87
2	58	39	97	6	1	7	103	26	72
3	28	23	51	7	0	7	250	0	137
4	20	15	35	6	2	8	300	133	229
5	18	15	33	2	4	6	111	267	182
6	8	5	13	3	1	4	375	200	308
7	3	7	10	2	3	5	667	429	500
8	3	2	5	1	1	2	333	500	400
9	2	0	2	1	0	1	500	0	500
Total	247	206	453	38	20	58	154	97	128

In order to put these figures into some perspective we may compare them with data from the other Madura sites and with the overall figures for rural East Java, in Table 6.22.

Table 6.22 – Child mortality rates according to sex, per 1000 live-births, in Gedang-Gedang, Tambeng, Patondu, and Rural East Java

	Gedang-Gedang		Tambeng[212]	Patondu[213]	Rural East Java[214]		
Sex of child:	1971-80	1981-90	1957-72	1957-72	1955-59	1960-64	1965-67
male	154	79	332	338	-	-	-
female	97	107	257	293	-	-	-
both	128	90	296	317	192	143	117

From the data thus presented on child mortality, it appears that although the rates are depressingly high in every area, the rates in Gedang-Gedang are not higher than in the Central Madura villages (comparing the periods that just barely overlap, 1971-80 and 1957-72). It appears likely (though the dates do not match) that Gedang-Gedang lags but is not far behind the Rural East Java rate. In other words, small family size among the Madurese in Gedang-Gedang can only be secondarily attributed to high child mortality. The reason for lower mortality rates in Gedang-Gedang than in Tambeng and Patondu is difficult to answer, assuming data quality and the levels of subject recollection are the same in all areas. Some of the difference can be explained by the later period of study in Gedang-Gedang, particularly considering that in all other areas a distinct improvement in rates is noticeable over time. Differences in the respective health infrastructures might also explain part of the variation. Though Batuputih conditions could not have been significantly better than those found in the two other villages for the same period, five or ten years could have made a difference in health provision. Having fewer pregnancies and births, and larger birth intervals, must also figure into any improved prospects for child survival in Gedang-Gedang.

[212] From Niehof (1985:290, Table 9.2). Numbers of births during the period under study: males 416; females 385.
[213] From Niehof (1985:290, Table 9.2). Numbers of births during the period under study: males 290; females 266.
[214] From Niehof (1985:290, Table 9.2), citing McDonald et al. 1976:69, Table 5.8. Figures are not specified according to gender.

So far, the reproductive strategies used in Gedang-Gedang do not contradict, but rather support the low fertility rates found, through such measures as menstrual regulation, extended periods of breastfeeding, birth spacing, and cultural norms that frown on short birth intervals or extended reproductive careers. Even the ambiguous responses to questions of desired family size do not contradict the documented reproductive behaviour that results in small families. There is no evidence from the study of attitudes that Gedang-Gedang families on the whole desire significantly more children or are frustrated in their efforts to have more children. The exceptions are, of course, those women who have been unable to conceive. But the sterility rate (expressed as the percentage of women between 30 and 50 who have not experienced a live birth) is 4.37 percent for Gedang-Gedang, no higher than the 8.5 percent for Tambeng and 8.2 percent for Patondu (Niehof 1985:270). Sterility is not responsible for the low fertility in comparison with other villages any more than child mortality or availability of contraceptives are.

6.8 Conclusion

Gedang-Gedang women and families have to survive in a constrained environment. Children are of value, yet families avoid having many children and have done so at least from early to mid-twentieth century, before contraceptives were available. This we know from looking at the number of children ever born for older women (Table 6.9). Traditional practices existed and still exist to limit pregnancy, and are used by a sizeable number of the women. Until recently, women had little access to reproductive services and information, and as a result had to resort to often dangerous methods of ingestion or massage to terminate unwanted pregnancies. The general health situation has improved for some near the health clinic, but others cannot afford basic treatment, and fear the cost of doctors and hospitalization in town. In terms of reproductive services in the subdistrict, women still do not have a full range of services to choose from and too often are prescribed contraception solutions that are available but that may have unintended effects or that do not correspond with the woman's present or future reproductive plans. But many avail themselves of these anyway in an effort to avoid conception. For others, or as a supplement to modern methods, various cultural practices and traditional practitioners that are more accessible and more firmly grounded in the local belief system fill in for the absence, the deficiencies or the high cost of modern health service. Whatever the mix of technologies now being used, what is clear is that Gedang-Gedang women did not have to wait for the government to convince them that "two children are enough." They had been keeping to that rule for decades (see "still living" column, Table 6.9)

Early marriage normally leads to higher completed fertility than late marriage as a function of increased length of the child-bearing period. Fertility-inhibiting behavioural factors, however, keep Gedang-Gedang fertility levels lower than most other rural societies in Indonesia. Among these factors are the reproductive strategies mentioned at the top of this section and also for many couples, marital instability and divorce, which can disrupt childbearing. The decisions and risks people take to reduce fertility in the absence of readily-available modern birth control until recently demonstrates that Madurese women exercise a great deal of control over their fertility regardless of the length of the fertile period. The question is why this agency is exercised as it is in Gedang-Gedang, and to the extent that it limits fertility more than in, for example, Patondu, where female autonomy is an important part of the social organization (Niehof 1985:284). I

propose three reasons why fertility is low in Gedang-Gedang, all of them the result of feedback from the productive system.

In past chapters, children have been shown to be valuable contributors to the total work effort, both for productive work and for watching over younger children to free their parents for work. The value of children does not, however, rise to the high levels found, for example, in Kali Loro, Central Java (White 1976), where children can earn wages and harvest shares of such importance to their households that parents have an incentive to have many children and to postpone their dispersal from the household or the transfer of productive assets to them as long as possible, in order to take advantage of this period of "ease in life" (White 1976:370). In Gedang-Gedang, the opposite is generally the case. Parents prefer to marry their children young. If they cannot keep the child in the *tanèan*, as happens half of the time, they accept to provide some land and lose their presence and daily economic contributions. If the couple stays, they receive the best room in the house, or more often the best and often only house of the household, as the parents move to the *langghar* (for the men) or to a cot in the kitchen (for the women) if another structure is not available. Land and other assets are transferred if the couple wants to set up separate housekeeping, though often they will remain in a single household with the parents.

I believe herein lies the first of my reasons for the lower fertility in Gedang-Gedang: the relative paucity of on- and off-farm work for children in the village, something that exists in other parts of Indonesia or Asia[215] and that sustains high fertility. In Gedang-Gedang, until very recently with the advent of tobacco cash-cropping, there were few opportunities to profit from the labour of small children. Planting of non-intensive maize or cassava cannot absorb much labour. Of course, pre-teens and teens can be useful for many tasks, especially for collecting fodder and caring for goats, and for helping with another time-consuming task for most families in the village, fetching water. Interestingly, parents systematically underestimate the time their children work, and often will claim they are playing when they are out doing chores (Smith 2004a:206-208), not like a supervisor-type parent making sure the child remains productive.

The usefulness just mentioned of children helping with fodder and water cannot be realized effectively, however, until the child is about nine or ten years old. This leads me to suggest a second reason for the low fertility of Gedang-Gedang. The particular productive system in Gedang-Gedang appears unfavorable to large families with closely-spaced children because of the demands of the cut and carry fodder system in an area where fodder is often scarce, as well as the often great distance to sources of water. These two highly time-consuming activities (see Table 6.23; note that the figures are *per capita* not per household), particularly during the dry half of the year, must be carried out daily and neither job can be done efficiently with a child on one's back. The decision to have a child must take into account the household's ability to schedule fodder and water collection, tasks which normally are shared by the adults, and reconcile it with child care. In a way, cows and goats are like children: they need to be fed and groomed as well and cannot just be left alone for any period of time. Because cows are essential for agriculture, cows come first in a couple, whereas children can wait. Of course, farm families across Madura

[215] See Cain 1977 for an early study in Bangladesh of how "high fertility and large numbers of surviving children are economically 'rational'propositions" (Cain 1977:224) when children work long hours and are net producers from a young age.

keep cows; few areas, however, are as bereft of fodder resources as Batuputih, and the subdistrict regularly makes the news for its dry-season drought.[216]

Table 6.23 – Minutes per day spent gathering fodder and water, per capita, February 1986-February 1987

	Jaruddin	Arestengga	Gunung Papan	Temberean
fodder	64.1	46.6	117.7	62.0
water	12.0	7.9	13.7	23.0

A third factor is the concern couples express that an additional child will mean the land inheritance they can give each child will be correspondingly smaller, and barely sufficient for their self-sufficiency. Below a quarter hectare, a family can barely survive unless there are other sources of income. Two or three times that amount are considered necessary for a family to be able to withstand hard times. Parents worry that if land is insufficient for their children, their own survival as aged and dependent parents will be at risk.

Each of the three reasons above – paucity of income-earning opportunities for children, the cut and carry system of animal husbandry, and land fragmentation – have come up frequently in discussions with farmers as over the years I have tried to tie them in with low fertility. Most villagers would probably find little sense in linking fodder collection with child-raising (I have never asked for a native opinion on that). But many do speak of the necessity of limiting children so there is land left to pass down to them. Decisions to have a certain number of children are processes, in which husband and wife participate in various ways. Some couples communicate their family preference through a reasoned evaluation of alternative options; others leave the decision of family size "up to God" but through the struggles, frustration and joys of raising children in this environment they manage to create a consensus of how many children the family can afford to raise. Both husbands and wives in Gedang-Gedang seem to agree that two or three children is about as many as a family can handle, that one or two is often sufficient, and that two is usually the right number. Adopting in and adopting out among kin is a way for many couples to resolve a situation in which they find themselves with too few or too many children. The bottom line – but few in the village will admit it – is that the decision on family size is too important to leave up to fate.

[216] See, for example, the regional press for 8 June 2008 and 7 July 2009 (in Indonesian): http://us.surabaya.detik.com/read/2008/06/08/100119/952289/475/cari-air-bersih-warga-sumenep-jalan-kaki-sejauh-4-km; http://www.surya.co.id/berita_terkini/warga-mulai-krisis-air-bersih.html (accessed 12 January 2011).

CHAPTER SEVEN
CONCLUSION

7.1 Overview of research findings

The previous chapters have presented various aspects of my anthropological research on household adaptation in a village of Northeast Madura, Indonesia, carried out over twenty-five years, with the aim of bringing time-structured data to bear on key questions regarding the evolution of this rural community. The chapters presented the results of historical and archival research into the Madurese past, background information on the physical, demographic and agricultural setting, and detailed analyses of social and household organization and development, income generation, time allocation, fertility and other issues. In this closing chapter, I will summarize the main findings from this research, evaluate how well my initial hypotheses have fared in light of them, and consider what theoretical and methodological implications they suggest. I will end with some thoughts on where my research and anthropology should go from here.

This study began with an introduction of my chosen research strategy in ecological anthropology based on the premise that the need to make a living in the particular physical, historical, agricultural and social environment of Gedang-Gedang would determine the strategies households employ, essentially following the research strategy adopted by many ecological anthropologists since Julian Steward. The ecological approach (including such variants as cultural materialism and human ecology) having often been the subject of considerable controversy in Anthropology over the years, particularly in my home country of France, I devoted a great deal of the introduction to explicating the research strategy's theoretical underpinnings, and notably to addressing the contentious issues of functionalism, teleology, system and holism.

In Chapter Two, "Historical Ecology of Madura and Gedang-Gedang," I discussed the ecological and historical context in which Madurese communities on the island and in the local area of the field site village developed, particularly in light of the demands placed on rural communities by colonial and elite governments through taxes and forced deliveries. One of the effects of this structural violence, colonial wars and security force recruitment was the creation of the image of the violent Madurese, one that they are still trying to shake off.[217] This and the agro-ecological system of maize cultivation and animal husbandry in a savannah ecosystem contributed to the organization of village communities characterized by dispersed settlement of households and household clusters and the development of self-help social institutions.

[217] Following the ethnic clashes in West Kalimantan, where most of the victims were Madurese, surviving refugees, convinced their victimization was largely their own fault, sent approximately 1000 of their children to Java boarding schools between 1999 and 2002 with the express purpose of having them, as one refugee put it, "abandon their Madurese culture and Madurese language and all the negative aspects of it" so that "God willing, their [Madurese] character will disappear" (Bouvier and Smith 2008:246).

Chapter Three, "Organization and Exploitation of Domesticated Nature" explores the various ways that villagers in Gedang-Gedang and the subdistrict Batuputih perceive and exploit their natural environment. Modalities of access to land were first discussed before examining ways in which locals conceptualize the plant and animal resources at their disposal, and the various uses to which they are put (in appendices). Plant and animal taxonomies were found to be pragmatic and utilitarian, a departure from early ethnoscience theorizing (e.g. Berlin 1973), but congruent with more recent formulations (Hunn 1982, Hays 1982, Ellen 1993). The rest of the chapter dealt with the basic income-generating occupations available to villagers, calculating for each the returns to labour with the help of time allocation data and extensive interviews. An effort was made to chart diachronic trends, such as the finding that on the whole, returns to labour based on a standard rice benchmark have tended to rise between 1983 and 2009. This study found, however, that access to certain high-earning activities was not equal, and that a number of constraints – among them land access, gender, risk, capital requirements, access to social networks, skill and the like – limit the occupational choices available to individuals.

"Social, Political and Religious Dynamics" (Chapter Four) presented the household concept used in this study and the composition of Gedang-Gedang's conjugal units and the households they form based on a shared hearth. The typical *tanèan* layout, housing types and kinship terminologies were also described. Religious and ritual structures and practices provided a first look at the institutions of social interaction that rhythm daily life in the village, focusing on the economic and social aspects of sacred tomb worship and the growing opposition to such worship from Muslim clerics bolstered by the increasing number of village youths accessing religious education. Transitions also occurred in the political arena over the years, first before the study began a growth of bureaucratic presence and political control in the subdistrict, followed by a burst of political activity and new parties in the wake of the May 1998 fall of the Suharto regime marking the beginning of the *Reformasi* period. Village government and the key position of the village head was noted in relation to political changes and the management of incoming aid to the village.

The chapter ended with an extended discussion of social control, first within the family, then within the wider community. Control was found to be exercised more prominently, both in the village and in the town of Sumenep, in the practice of demanding and offering work, through asymmetrical exchange. The practice is dying out, but persists for the same reason that patron-client ties persist in many societies: it provides food and a promise of security to individuals who have idle time or reason that the returns will one day offset the lost wages. Work receivers and work givers both ostensibly support ongoing arrangements, but former work givers often deny having been a client of a patron. Whether these patron-client ties can be called exploitation is difficult to determine from the data I have, because it would require a complete balance sheet over the many years (even generations) such ties last. The fact that work for food, without wages, was the usual employment arrangement up until the 1960s and 1970s, and if with a patron (contrary to the practice with an equal) was not reimbursed in kind, the force of tradition and the lack of available alternatives with greater returns to labour explains why it survives. Once tobacco cash-cropping became widespread in the 1980s, the need for regular watering increased availability of wage labour and this contributed to a decline in this practice.

This brought me to Chapter Five on "Households and Process," a chapter finally dealing exclusively with households, the location where adaptation takes

place in concrete and observable ways. The goal in that chapter was to make the most of the longitudinal and comparative perspectives provided by the research to see through the analysis of actual cases how households developed over time, how they reproduced themselves, and how resilience and vulnerability could come to characterize them at different stages in time. I first sought to find an appropriate way of comparing household on the basis of their composition, productive capacity, and consumption, opting for a measure (Hammel 2005) that improves on Chayanov's classic study of peasant households while corresponding closely to the values determined by the village time allocation study. Simple dependency ratios and the Hammel consumer-producer values plotted over the 24 years of the study visibly demonstrate the low overall rates found for most households in Gedang-Gedang, though the rates would fluctuate of course over time for each household and at times could represent periods of hardship when households had insufficient productive workers to support many dependent children or elderly. A trend was noted for household headship to be retained later over the years, as increasingly children were receiving longer periods of education. It was possible to list the reasons for household consolidation or fission, depending usually on economic and reproductive (child-raising) factors, though in not a few instances conflicts, exacerbated by economic and other inequalities, played a role in fission (Hart 1992). Households were plotted on time scales showing progression (or regression) of landholding and livestock over time, and divided into groups of wealthy, poor, or "have enoughs" based on my grading of their welfare levels at each point during the research period. Here, the analysis shifted to examining individual household histories to obtain a more palpable idea of how they develop in specific ways over time. To use the language from the theoretical introduction to the thesis, this discussion of individual households was meant to examine the causal pathways or causal chain: the sum total of step-wise micro adaptations made by households and linked by positive feedback that composes the misnomer "long-term adaptation."

The analysis of such diversity is tentative due to the diversity of situations and adaptations and even a bit risky when the sample only includes about six percent of the village's households. Among the generalities that could be drawn is the importance noted of labour, particularly the retaining of one's child in the *tanèan* and the obtaining of a son- or daughter-in-law that will augment the household's productive capacity. This is important, even critical, as parents grow older and cannot contribute as much themselves. This ability to retain children and attract their spouses is one that is not equally shared; wealthy households are usually favoured in this regard and in the village in many cases the poor get poorer and as a result isolated alone in their *tanèan* as their children go off in search of greener pastures. The socially-enforced ethics of support for ageing parents remain nevertheless strong and most parents can expect support in some way and will generally retain land as a way of ensuring this is so.

Food and other consumption and exchange data augmented with interview data pointed to important variations in nutrition over the yearly agricultural cycle, with protein-rich foods consumed irregularly and in small quantities on festive occasions. Households adjusted their nutrition to availability and also to price fluctuations to take advantage of rising prices for grains, for example, leaving the traditional flint variety of maize they had cultivated and consumed for centuries to sell as caged birdfeed in favour of cheaper (and less-tasty) dent maize from outside the village. In times of perturbations, nutritional modification could be adopted as a

coping strategy,[218] shifting to cassava or in times of great stress other more unpalatable tubers.

Ecological studies have often shown food and other resources circulating in asymmetric redistributive systems that mitigate imbalances in regional or seasonal resource distribution (Piddocke 1965), regulate livestock populations (Rappaport 1984, Daeng 1988) or serve socioeconomic integration (Dove 1988). Exchange of food and other resources in Gedang-Gedang appears to serve principally to cement social relations among kin and neighbours, or to compensate for work done. The data from Gedang-Gedang points to highly symmetric exchange practices, except in the case of "work for food," religious and ritual exchange. The latter, particularly the rites connected to the main sacred tombs, serve chiefly as a means of accumulation by tomb guardians, since it is difficult to measure the energy equivalence of the prayers or flowers pilgrims receive in return. The usual symmetry of exchange is also found to a large extent in household lifecycle festivities on the occasion of a birth, death or marriage. The hosts usually receive enough in gifts to offset much of the immediate expense, though they incur an obligation to reciprocate in kind when a similar event will take place in their household. These exchanges have the effect of smoothing over the otherwise significant perturbations in the day to day lives of families when member enter and leave the household, be it the result of marriage, birth or death.

As it constitutes a form of exchange, the institution of raising prime cows and bulls for competitive purposes was treated in Chapter Five. The positive (and beneficial) feedback from these sports to village animal husbandry is what keeps them alive, in addition to the joy and community spirit they bring to a summer afternoon. At the district level, commoditization of champion bulls among the elite and well-connected, and charges of corruption in organized racing, have somewhat dampened enthusiasm for the sport, and there is concern over the effects this might have on animal husbandry at the local level. Carrying on the tradition of racing bulls and parading cows increases aggregate and per capita productivity (it is assumed, compared to a situation of shortage of stud bulls in the absence of the tradition) by the elimination of restrictions on the abundance and redistribution of resources in an environment (see Abruzzi 1993:194) that disfavours intensive raising of such animals.

In concluding the analysis of individual household economic trajectories, Marten Scheffer's model of the poverty trap (Scheffer 2009) was readily applicable. From economics, I could also use Roemer's (1988) notion of the resource-poor in a free market being "free to lose," though with some reservations. In effect, the ecological model of Scheffer is more powerful than the model derived from analytical Marxism due to the former's incorporation of evolutionary dynamics. While the latter appears to apply over a wide historical canvas of Indonesian (and likely global) history, it has more difficulty capturing the mechanics of certain critical transition points (see discussion in section 5.6).

My presentation of Gedang-Gedang households concluded with Chapter Six on "Fertility." The data showed very low average fertility for Gedang-Gedang in comparison with other villages studied with similar methods in Madura and Java. The conclusions and indicators from the fertility study in Gedang-Gedang strongly validate the findings of Benjamin White's well-known study of high fertility in the

[218] The purchase of stereo systems, high-priced competitive cows, bulls, and birds, or other consumption items for eventual resale was a technique used by some to cope with unexpected and oftentimes massive devaluations in the rupiah (cf. Wilk 1991:160-61, Maclachlan 1992:259).

village of Kali Loro, Central Java. In both contexts, the value of children as income earners is the key. In Kali Loro in the 1970s, children could become net income gainers from agricultural and off-farm work from a young age and their parents had an interest in retaining them in the household, delaying if necessary their marriage. In Gedang-Gedang in the 1990s, there was little young children could do to earn cash or harvest shares, since most exchange was reciprocal among adults. Until a few decades ago, children were encouraged to marry young, particularly girls; in so doing parents perhaps hope a young daughter can attract a boy who will move to her parent's *tanèan.* Although the average marriage age is rising (Jones 1994:75-80), families still hesitate to have more children once they have the one or two required for reproducing the household unit and supporting the parents in old age. Thus, the particular economic environment was important in both Kali Loro and Gedang-Gedang for encouraging the self-regulation of fertility, albeit in opposite directions. I added the additional factors of small landholdings in Gedang-Gedang that could hardly be subdivided further without endangering the resilience of the successor households, as well as the agro-ecological factor of cut and carry cow husbandry, which requires mobility that can interfere with childcare. Additional research is required on the decision-making process to identify precise microfoundations to causally link the decision to have fewer children with animal husbandry. The decision could be based on all three factors, probably not all at once but step-wise as selection by aspects (Tversky 1972, Gladwin 1989), though oftentimes the answers to questions of this kind are difficult to interpret. All attitudinal studies of fertility battle with this dilemma of interpreting responses. Sometimes one has to take risks and propose other explanatory frameworks that depend not on personal questionnaire responses but on behavioural stream observation, such as our measure of the time spent by different age and gender groups seeking fodder and water per day. If the livelihood scenarios that will likely result from the addition of an additional child are easy enough for the anthropologist to imagine and quantify, it is likely that the persons most directly concerned will also be thinking scenarios and receiving advice from those around them.

7.2 Ecological theories and households

7.2.1 Adaptive cycles

That households go through cycles is a truism; nevertheless the mechanisms have fascinated household scholars for decades (e.g.: Goody 1958, Wolf 1984, Pennartz and Niehof 1999:151-180). Could the adaptive cycles of the household correspond with the thinking that was useful for capturing the essence of the poverty trap? Could critical transitions be occurring in the household? An interesting avenue of analysis is the adaptive cycle model of change first developed by C. S. Holling (with Donald Ludwig) to model the dynamics of boreal spruce forests subject to budworm outbreaks (Ludwig et al. 1978 cited in Scheffer 2009:75-79, 362n42). The model, a closed loop in the form of a figure-eight racetrack, provides for the often observed tendency of living systems to cycle through four principle stages (from Scheffer 2009): a) exploitation (the slow "forward loop"), b) consolidation, c) destruction and d) reorganization (the often rapid "back loop"), which starts the cycle afresh. In natural systems such as a forest, one complete cycle can require hundreds of years to complete: a) growth from pioneer species, b) eventually forming a climax forest of tall trees and thick undergrowth, c) devastation from budworm or fire, d) release

of nutrients and sunlight filtering down eventually regenerates the forest. Plugging a household cycle into the adaptive model, based on what we know about how households often develop, might look something like this:
(a) Exploitation: a new married couple sets up a household and starts a family, slowly accumulating capital and goods;
(b) Consolidation/Conservation: as their two children grow, they increasingly participate in production, and eventually marry, their spouses (let's assume) joining them in their own household or *tanèan.* Their dependency ratio is low due to the added labour and lack of dependents. The household is at a high point.
(c) Destruction/Release: a series of setbacks occurs. Enmity having developed between the ageing mother and a daughter in law, the son agrees to move with his wife back to her *tanèan* taking a share of land with him. The household is now less two young workers. As the parents grow older and less mobile, the remaining young couple struggles to tend to the fields, all the more so because they now have a child of their own. Two successive years of ruined tobacco harvests devastate the family savings. A motorcycle purchased in a good year is sold to make home repairs. The following year gold and a cow are sold to pay debts and buy food. Then the mother falls ill and a few months later she dies. A *lagghu* of land must be sold to feed guests who arrive to give their condolences. The household is at its lowest point.
(d) Reorganization: The couple who had left years earlier decides to return with their pre-teen children. While away, they were doing satisfactorily (they were *cokopan*), and returned with furniture, three cows and a motorcycle. To the land the husband was "bringing back," plus an additional *lagghu* they had purchased together, the wife brings her inheritance of 2 *lagghu.* They set up a separate household in the *tanèan* along with the other couple, their child and the child's surviving grandfather. With the children's help, both families plant tobacco the first year and obtain a handsome profit which the poorer household uses to buy cows, goats and a motorcycle. The *cokopan* household buys a water pump in anticipation of the next year's tobacco planting. That year, they decide to set up a tobacco shredding operation of their own, the motorcycles serving to comb the village in search of farmers wanting to sell their leaves. They do well in most of the next five years of planting and shredding tobacco and can offer their children a decent start in married life. A new cycle is about to begin.

This simulation of a model household adaptive cycle is a composite of actual events from various households in my sample. But it cannot represent any one household any more than it can faithfully present an "average" cycle. This is because to begin with there is no single general development cycle for Gedang-Gedang households; there are a number of alternative cycles that can shift or abruptly halt due to death of a spouse, divorce, residential change, external employment or other events. In the simulation above, at (b) both of the children could have followed their spouses, leaving the parents alone and probably living less comfortably as a result. Had the *cokopan* family not returned at (d) the reorganization stage might have stalled. A model by definition simplifies reality. In the case of the household, any model one can come up with will likely reflect the experience of few (if any) actual households, and the aggregate model might fail to capture even the basic experience of a significant percentage of households. But as Scheffer notes (2009:79) the adaptive cycle is meant to be a heuristic model; unlike most ecological models it is obtained in an inductive way from observation of many case studies, the common method of the social sciences.

Despite the drawbacks of the model for the many anthropologists intent on seeing all their hard-fought data retained, there are good reasons for attempting to map household cycles, if only for heuristics. Particularly useful is the adaptive cycle

model's highlighting of the critical transition points during the cycle when structures are rigid (during the slow exploitation period) or when innovations can come about more readily (during the unpredictable but often rapid reorganization back loop). We saw, for example, how the death of the mother that allowed the o*ukopan* family to return gave impetus to the innovative decision to set up a shredding operation. Being aware of the key moments when transitions are most likely to occur can help anthropologists ensure they do not miss such occasions.

7.2.2 The stability-diverity debate

Elsewhere, I explained how the system of maize and intercropped bean and cassava cultivation represents a farming system with a high degree of diversity (Smith 1989a). Gedang-Gedang farmers in the 1980s and 1990s resisted attempts by agricultural extension services to introduce high-yielding varieties of maize that would necessitate monocropping, the import of increased fossil fuel fertilizers and, I learned since, the construction of raised beds as for tobacco to get around the problem of the relatively thin topsoil layer in most fields. This would demand a reduction in diversity and increased dependence on imported fertilizer, while lowering the quantity of stems and leaf residues so essential for dry season fodder. Those few who accepted or were coerced into planting trial fields found the new plants would topple over or die for lack of resistance to wind or pests thriving in the monocropped field, or lacked resilience during long dry spells. In ecological terms, farmers wanted the diversity and stability provided by their traditional intercropping system. In general ecology, as I explained in the article (Smith 1989a:31), there was a highly stimulating and productive debate underway over the link between diversity and stability, one that continues today. Ecological "wisdom" (Pianka 1978:299) has it that more diverse communities are more stable than simple communities, but whether this is a hard and fast law is still the object of controversy in general ecology, receiving over the years some support (MacArthur 1955, Margalef 1968), but also some criticism (May 1973, Watt 1968; for a recent review, see McCann 2000). Studies in human ecology, however, tended to confirm the diversity-stability link. In his research on the Mormon colonisation of the Little Colorado River in Arizona, Abruzzi showed how a system of redistribution unifying the production of separate populations independently exploiting diverse local habitats permitted the colonisation to succeed despite frequent and severe local perturbations, as the flow of separate and independent resources in numerous and distinct habitats furnished enough redundancy to offset the negative consequences of local environmental variability (Abruzzi 1993:201-203). Similarly, Vondal (1987) found that duck raisers in Kalimantan using diverse feed resources had developed a stable system; when the availability of one group of resources declined, other groups could be exploited until the first group recovered, avoiding the extinction of resource patches. The Madurese system of cut and carry cow husbandry exploiting separate and diverse fodder resources comes to mind as a further example. All these examples, from Gedang-Gedang and elsewhere, demonstrate strong support coming from anthropology for an important theory originating in general ecology. To paraphrase Abruzzi (1993:206), rather than "merely serve as a passive recipient of ecological ideas," the application of ecological theory enables ecological anthropology to make substantive contributions to the development of general ecological theory.

7.3 The fate of the hypotheses

7.3.1 General hypothesis

The fate of the initial hypotheses following the data collection and analysis is a mixed bag. Some have been confirmed, others need to be qualified. I consider them in order, beginning with the overall hypothesis.

> Differential adaptation of households in a Northeast Madura village can be accounted for by theories and principles from general ecology. Confirmation of this general hypothesis would provide validation for the use of ecological models in anthropology.

The general hypothesis is strongly supported by the many instances in which general ecological theory and principles can be applied successfully to explain Gedang-Gedang household and community adaptation. Ecological concepts can point the way to explanations for the cow and bull events, the decision of farmers to forgo high-yielding varieties of maize, why some have difficulty escaping the poverty trap and ways to model the household cycle. Although ecology is usually evoked in a metaphorical sense in anthropology, the findings here suggest there is room for somewhat more rigorous application of ecological principles and techniques in the conduct of anthropological inquiries and interpretation. As most models in general ecology, like in anthropology, are designed to simplify aggregate data to highlight general principles and critical transition points, they should be considered as an adjunct to usual methods rather than a replacement for them. Anthropologists should give more thought to how the concepts of diversity and stability as well as critical transitions might relate to the societies they study, and consider the material determinisms that weigh on and systemically interact with structural and superstructural elements of those societies. Development and transition can only be fully perceived, however, through diachronic and comparative study and the possession of time-structured data, requirements which may be difficult to fulfil within the constraints of much anthropological inquiry as it is practiced today. A further issue concerns the adequacy of focusing on culture and society for the analysis of social evolution and community development, when the selective forces generating community development operate primarily on local populations, including households.

7.3.2 Specific hypotheses

> It is incorrect to assume that the identification of a limiting factor in one specific ecosystem is equally limiting in another. As the village is laid out over at least two (North, South) and perhaps three (North, Hills, South) agro-climatic zones, it is hypothesized that household adaptation will be different in the north and the south.

This hypothesis is confirmed by the different limiting factors in each part of the village. Poor soil and sparse rainfall on the north coast have been the limiting factors historically; the same applies to the central hills with the added limitations of greater distance from water supplies and hilly, often outcropped terrain. In the

south, higher probability of rain during the dry season constitutes a high risk for the tobacco crop. The shift occurring in the late 1990s to planting tobacco in Temberean to meet buyers demands shows that a limiting factor can change from being a liability to an advantage. Other differences in livelihoods are the greater availability of wage labour in the south but the absence of fishing and brick making found in the north. Economic adaptation has usually been easier in the south and more difficult in the central hills and along the north coast (but changing now along the coast with the tobacco).

> Time allocation and the use of time-structured data will provide information about the behaviour of households and individuals that is not obtainable from classical ethnographic methods, with important implications for determining the value of children in the community. They will show high productive workforce participation by women and children.

Though little used in European ethnography, or in Indonesian societies, time allocation studies provide a useful method for the collection of unbiased, verifiable accounting of activities for all ages and both genders. The information gathered over a full year in Gedang-Gedang among 36 households was critical for the determination of returns to labour, exchange behaviour, and many other aspects of the local culture and society. High levels of productive labour were noted for men, women and children (particularly for girls, especially if child care is included). However, in comparison to the levels of child work found in Central Java in the late 1970s, Gedang-Gedang children worked somewhat less and received somewhat more education, a finding that had important implications for the value of children in the two communities.

> Peasant households will tend to eschew risky, but potentially high income-earning opportunities in order to avoid falling below a minimum survival level, even when this means continuing low income-earning but relatively low risk economic activities.

This hypothesis was only supported in part. In the case of poor families, if they cannot procure the loans necessary to engage in tobacco farming, the most common high income-earning high-risk activity, they will not plant. As it turns out, however, almost all other families located not too far from a source of water and with sufficient labour resources will plant at least part of their fields; if funds are lacking, fertilizer application will be minimized and all labour recruited from within the household. The reason appears to be that families have few other opportunities for earning large incomes, and reason that the “tobacco lottery” may be the only possibility available for them. The hypothesis was supported when applied to the refusal to plant HYV maize.

> The propensity of Madurese on the island of Madura to engage in violent interpersonal attacks is best understood in relation to struggles over material resources.

This hypothesis was supported in the historical discussion (Chapter Two) and in relatively brief commentary on conflict in the village. Extensive discussion of conflict and violence was purposefully limited in this thesis due to the need to concentrate on its primary topics, the household and village economy. However, extensive support for this hypothesis is obtained through a better understanding of

household dynamics in relation to physical, historical and social context, as I have attempted to provided here, and have presented elsewhere (Smith 1997, 2000, 2004b). Living "on the edge" (Mitchell 1991) sharpens the options perceived to be available to protagonists, and deemed acceptable to the wider community (De Jonge 2002). In Madura in general, and Batuputih in particular, this context has underwritten high levels of violence to defend access to valued resources, of which the wife and the child are primary examples. Since the fall of the New Order regime, the violence in Gedang-Gedang's local area is increasingly aimed at suspected black magic practitioners, following a similar pattern noted elsewhere in Indonesia during periods of national political uncertainty and explicit or perceived acquiescence on the part of local government and law-enforcement authorities (see Herriman 2006).

> "The rich get richer, the poor get poorer" as a general trend will find validation in the village, and the reasons will be linked to initial conditions of wealth rather than other personal traits.

This hypothesis is confirmed by the data showing that land and cattle holdings increased moderately (130 percent) between 1986 and 2009 for the *cukupan*, but increased most of all (177 percent) for those already well-to-do. The seven poor households in 2009 had only 79 percent of the holdings of 1986. Without a doubt, personal traits and household transitions do play a role in facilitating class mobility, and some farmers are just more talented than others. Whether one can assume personal traits, household transitions and farming talent are all unaffected by level of wealth is another question.

The ecology-anthropology interface continues to be a powerful attractor for philosophical reflection (Descola 2005, Ingold 2000), political ecological engagement (many authors), theorizing on complex systems and critical transitions (Scheffer 2009, Lansing 2003), theoretical syntheses (e.g., Harris 1979, Johnson and Earle 1987, Abruzzi 1993:10-15,55-78), and problem solving (also many authors). Exemplifying the latter, ethnoecology is today able to draw on advances in ethnoscience to understand and support local responses to political, economic and environmental crises (Ellen 2007, Johnson and Hunn 2010). Ideally, they all contribute to assuring the scientific bona fides of anthropology in this age of higher education cutbacks and global ecological crisis. This exchange need not be unidirectional, as I have shown in trying to apply anthropological field data from a village in Northeast Madura to the debates in general ecology over the relationship between diversity and stability, and critical transitions like passing the threshold of the poverty trap model or running through an adaptive cycle. Anthropology is ideally situated among the social sciences to provide the cross-cultural empirical grist for theoretical mills turning both inside and beyond its increasingly permeable disciplinary boundaries. Like Marx and Darwin, ecology and anthropology do seem to work better conjoined than either of them does alone.

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Appendix I
Time Allocation Methods and Sample Group Composition

Methods of the study[219]

Time allocation (TA) provides a systematic, quantitative and replicable method for reliably measuring human behaviour for use in synchronic, diachronic and cross-cultural studies. A growing body of literature has explored the uses, benefits and limitations of this research (e.g., Borgerhoff Mulder and Caro 1985, Gross 1984, Hames 1992, Johnson 1975). Asian societies have provided many of the primary data sets on which comparative and theoretical studies have been based, and at the same time, a stone on which TA methods have been honed. For Java, there are the classic studies of Arminius (1889) and modern studies by Hart (1978), White (1976) and others cited in Wigna et al. (1980). Cain (1977) focused on children's activities in Bangladesh, as did De Tray (1983) in Malaysia. Panter-Brick (1988, 1989) and Peet (in Nag et al. 1978) used TA techniques in their work on Nepalese communities.

The behavioural study was conducted from February 1986 to February 1987, with an average of one week between observations. The sample group consisted of 36 households (see note 1). The households were chosen by random draw based on lists of village households supplied by the subdistrict census officer. A 1983 census had divided the village into the four neighbourhoods and the latter into two or three census blocks each. It was decided to choose six households from each neighbourhood and of these an equal number from each census block to ensure a degree of geographical spread. A number of these households belonging to multi-household *tanèan*, it was further decided to include all households present within a given cluster. In a first visit, the planned study was explained to the families, their consent to go along with it was requested, and some preliminary data on household composition was noted.

The random spot check method of behavioural observation developed by Johnson (1975) was used to measure time allocation. As far as I know, this was the first use of this method in Indonesia. Unannounced visits were made to each household or household cluster; the days were chosen in advance, as were the routes to be taken. The order in which houses were visited from one day to another was varied, for example, by approaching each neighbourhood from opposite directions or by beginning at different points. For two pairs of *tanèan* (A1-A2 and T5-T6; see Table A.1. Gedang-Gedang sample group census, and Figure 5.3 for the village map giving the locations for all *tanèan*) their positions astride common pathways made it difficult to visit the second without alerting someone in the first. The first

[219] The information in this appendix is taken in large part from the discussion of methods and sample group composition published in my book *Time Allocation Among the Madurese of Gedang-Gedang*. Cross-Cultural Studies in Time Allocation, Volume XIII, New Haven, Connecticut: Human Relations Area Files Press, 1995, with updates. The reader is urged to consult the original publication for additional information on methods and applications, as well as basic information on the study community. The introduction on methods presented here draws also from Smith 2004a.

tanèan was therefore usually visited before the second to ensure that in both cases the observations could be made unannounced. Elsewhere in the village, unannounced visits could be made in any order. After a few weeks of the study, it became possible to visit the 24 *tanèan* within a single day, from 06:00 to 18:00, using a motorcycle to access the northern section and vary the route taken. Although motorcycles were becoming increasingly common in the village in 1986, the observer left his at a safe distance so the observations could be made unannounced.

Arriving at each *tanèan*, the observer noted in longhand the activities of those present at the moment before they became aware of his presence. Occasionally, the actor perceived the observer first, in which cases it was necessary to determine if her/his activity had changed in consequence, through questioning or material evidence.

Method of verification

The activities of absent *tanèan* members were obtained from those present, and in some cases from neighbours. The Madurese generally keep close track of people's movements; indeed, the question a departing person or passerby is invariably posed is "where are you going?" In order to judge the accuracy of informant reports, efforts were made to find the absentees if they were not too far away. In 445 cases, they could be located, and on only 31 occasions were the reports proven wrong. This represents an accuracy rate of 93%. As most of the verifications were made near the home base, it may be argued that informants have a better idea of the activities of one nearby. Nevertheless, the high level of accuracy justifies the inclusion of reported data, thus avoiding the more serious bias of including only those activities which can be directly observed by the researcher.

Where an actor was involved in two activities at once, or when the activity took place within the context of another activity, these were noted (see the introduction to Table A.3. Madurese activity and context codes, below). Other notations made at or soon after leaving the observation site included time, weather, food consumption, agricultural work in progress, and identities of informants. Inter-coder reliability was not tested during the first part of the study when the author and his wife made the observations together. Debatable codes were simply resolved on the spot through discussion.

Observational coverage

A grid was established for each neighbourhood to monitor variation in the day of the week and each of the four 3-hour time periods in the observation day; in so far as possible, equal numbers of observations were made in each block to control for possible bias due to market days, Muslim patterns of prayer, or over-representation of certain time blocks for different areas of the village. To assess the degree of observational coverage by day of the week, time block and hour for each household, as well as variations in the order of visits, the reader may refer to the observational grids in Smith 1995a:5-8.

Description of datasets

The datasets[220] are composed of 7287 observations made between February 1986 and February 1987 and presented in two forms: an original format I used to record data in the field, and a "standardized" format compatible with other datasets in the Human Relations Area Files Monograph Series for cross-cultural comparisons of time allocation. In choosing which dataset is more appropriate for a given research question, one must balance wealth of detail against ease of use and comparability. In general, since different activity coding schemes were used in the original and standardized sets, it is best to use only one database for a given study. I have used the more detailed original database for analyses presented in the body of this dissertation.[221] The data was first entered into the dBaseIV® database program and can be easily transferred to other database programs or to a text file. Each line of data constitutes a "record," representing a single observation of one individual. Records are divided into a number of variables, each occupying a unique range of data columns. The original dataset is structured as follows:

Table A.1 – Time Allocation original dataset (MADURA.TXT)

Variable	Columns	Description
OBSERVNO	1- 5	Observation number (range: 1-7393, excluding the observations for two subjects resulting in a total of 7287 observations in this dataset; see Note 1 and Table 2. Gedang-Gedang sample group census, subjects A1B037 and A2A043)
SUBJECT	6- 9	Identification number of actor (range: 1-151, excluding 37 and 43). For the household composition of the community sample see Table 1. Gedang-Gedang sample group census)
DATE	10- 17	Date of observation (day/month/year)
TIME	18- 21	Time of observation (range: 0600-1800 local military time)
SEEN	22	Data quality codes: Y: actor observed directly, usually in or around her/his residence; N: actor not observed directly
REPORTED	23	Y: hearsay data available from informant statements (see informant identity below); N: hearsay data not solicited or not available
REP_STAT	24- 25	Status of informant codes: HS: Actor her/himself (reports own activity unseen by fieldworker); N: Neighbour; T: Member of same household or *tanèan*; " " [blank]: Hearsay data not solicited or not available
REP_FALSE	26- 30	Actor's activity incorrectly reported by informant (see Table A.3 Madura activity and context codes). Activity subsequently observed by fieldworker is noted in ACTIVITY1 below

[220] The complete datasets may be obtained from the author (w.glenn.smith@gmail.com).
[221] The two datasets contain the same 7287 behavioural observations; they cannot combined into one spuriously long file.

Variable	Columns	Description
ACTIVITY1	31- 37	Actor's observed or reported activity (see Table A.3 Madura activity and context codes)
ACTIVITY2	38- 44	Actor's observed simultaneous activity (see Table A.3 Madura activity and context codes)
CONTEXT	45- 51	Activity context in which the actor was observed (see Table A.3 Madura activity and context codes). If blank, refer to ACTIVITY1 above
WEEK	52- 53	Day of the week codes: M: Monday; T: Tuesday; W: Wednesday; Th: Thursday; F: Friday; S: Saturday; Su: Sunday
SX	54- 55	Actor's age and sex group codes: M: male; F: female; I: infant (0- 1 year); T: toddler (2- 5 years); Y: youth (6- 15 years); A: adult (>15 years)

Analyzing time use data

The following general relation can be used to determine the average number of hours per day (T) spent by a given category of individuals in a given category of activity:

T = Length of day X Observations of activity / Total observations

For example, in 281 out of 2412 observations Madurese men were engaged in activities classified as "Social"; thus, we can say that on the average, Madurese men spend 281/2412 or about 11.7% of their observed time in social activities. Since the length of the observation day in this study was 12 hours, from 06:00 to 18:00 (overlooking a few late observation times, most before 1815, which were counted in the 17:00-18:00 time block), the average Madurese man spent about 1.4 hours/day (12 hours X 11.7%) in social activities.[222]

Calculated Madurese time budgets

Since only daytime activities could be systematically observed in the time allocation study, some explanation of evening and early morning time use patterns is in order. From informal ethnographic observations and questioning, differences in dusk-to-dawn time use appear depending on season and neighbourhood. Outside of the harvest or tobacco seasons, adult women spend an estimated 7 to 8 hours sleeping, 2 hours preparing and consuming food and drink, and the rest socializing or resting; men spend 7-8 hours sleeping, an hour or more eating and drinking, and the remainder socializing or resting. During the harvest seasons, women and to a lesser extent men and children often thresh maize or beans in the evenings, while socializing with family or neighbours. Keeping in mind that work habits vary from one house to another, this would average out to about 30 person-hours of evening threshing per year. In the tobacco season, field preparation is occasionally done at night to avoid the heat and protect the seedlings (in 1986, tobacco was only planted in the two southern neighbourhoods, Jaruddin and Aresetengga). This would occupy

[222] The average daily time use over the study period for pooled samples of Madurese men, women, youths, toddlers, and infants using the standardized format is presented in Smith 1995a:38-39.

a husband and wife three hours, three or four evenings a year. In 1986, a few groups in the tobacco area (including 1 household in the time allocation sample group for which observations of the activity were obtained) processed the local crop following harvest, doing much of the work at night: tobacco leaves were rolled, shredded, and laid out to dry by about 10 men and women who worked until dawn. A group would get together 10-20 times during the harvest season. Finally, a variety of performing arts existed in the village; taking place in the afternoons or evenings in the framework of revolving credit association meetings, they attracted onlookers from the vicinity.

Nearly all youths and adults are awake before 06:00; women have prepared meals or snacks, most have already eaten and many are preparing to go cut grass for the cattle or begin another productive activity by that time. It is unlikely, however, that a significant amount of economically important activity was missed by beginning the observations at 06:00.

To sum up, the limitation to daylight hours resulted in a slight underestimation of time spent in productive activity (more noticeable in the southern tobacco areas), food preparation and consumption, child care, and socializing. Notwithstanding the above, had it been possible to gather night time observational data, there is little likelihood that their inclusion would have influenced significantly the general patterns of daily time use, i.e., the comparative amounts of work done by different age/gender groups. However, inclusion of all time data would provide more accurate calculations of returns to labor, which, in the absence of such data will tend to show higher returns to labor than are actually earned, though this bias is limited primarily to tobacco cultivation and processing, sitting-mat weaving and palmyra sugar processing (TA data was not use to calculate returns to labor for the last two activities).

List of original activity codes

The following is a list of codes applied to behavioural time allocation data collected in the Madurese community of Gedang-Gedang from February 1986 to February 1987. The same codes are used for three variables or “fields” in the original dataset: ACTIVITY1, ACTIVITY2, and CONTEXT.

The ACTIVITY1 field describes the main observed or reported activity. This field is sufficient for most uses. It should be noted that travel time is counted as part of the intended or completed activity itself: someone directly en route to or returning from an activity was coded as doing that activity.

For some observations, the subject was engaged in two or more activities simultaneously, for example: milling maize and watching over a child. In such cases, two activities were recorded: the primary activity, or the activity apparently dominating the attention of the subject, was coded under ACTIVITY1, and the secondary activity under ACTIVITY2. Where both activities were equally dominant, it was decided that priority for coding as ACTIVITY1 should be given to activities linked with production, trade and the provision of services, followed by directly reproductive activities (such as home repairs, cooking or child care), then by social activities, and finally by resting.

Users may wish to consider the context of observed activities in determining time allocation. To give an example, a boy might be seen resting on the roadside or engaged in no visible activity (the activity therefore coded as “R1D” or “R1C” from the list below), but this could simply be a temporary break from another activity, which he is likely to resume. He might be taking a break from gathering forage for

cattle, evidenced by his oral report and the presence of a sickle and a half-full basket of grass nearby. The CONTEXT field here allows for further description of the conditions of the observed behaviour. In the case just mentioned, resting while out gathering forage would be noted as follows: "R1D" in the ACTIVITY1 field and "P2AA" in the CONTEXT field. Another use of the CONTEXT field would be in cases where an individual is doing one activity, but is in the midst of others engaged in a different activity. The individual's activity would then be coded in the ACTIVITY1 field, while the activity of the others would be coded in the CONTEXT field. Finally, the CONTEXT field is used to note if a person is sick ("S") at the time of observation.

Table A.2 – List of all time allocation codes and activities (original database)

I	Away
I1	Away, purpose unknown
I1TV	All occupants of house or *tanèan* away, purpose unknown, place unknown
I2A	At market, purpose unknown
I2D	In field, purpose unknown
P1	Agriculture
P1A	Plowing with cattle
P1AA	Hoeing and other field preparation
P1AN	Weeding with cattle between maize rows
P1B	Hand weeding
P1C	Harvesting (mainly bean varieties unless noted below)
P1CM	Harvesting maize
P1CP	Harvesting peanuts
P1CR	Harvesting paddy
P1CS	Harvesting cassava
P1CT	Harvesting tobacco
P1D	Watering tobacco plants individually
P1E	Inspecting, watching over fields
P1F	Sowing grain (maize and/or beans)
P1FS	Planting cassava
P1GF	Transplanting individual rice shoots
P1GM	Gathering bunches of rice shoots for transplanting
P1H	Applying chemical fertilizer to field
P1HA	Applying cattle dung to field
P1IM	Removing insects by hand from tobacco plants
P1J	Doing work related to irrigation
P1K	Preparing, selecting seed grain
P1L	Planting tobacco
P1M	Weeding, loosening soil around tobacco plants
P1N	Removing maize flowers
P1O	Weeding, loosening soil around maize plants
P2	Animal husbandry
P2A	Caring for cattle (except noted below)
P2AA	Gathering forage for cattle
P2AAG	Feeding cattle
P2AB	Fetching water for cattle

P2ABG	Giving water to cattle
P2B	Caring for goats (except noted below)
P2BA	Gathering forage for goats
P2BM	Leading goats to/from pasture
P2C	Constructing cow/goat shed
P2DAG	Feeding poultry
P2EA	Constructing wood beehive
P3	Gardening
P3A	Tapping palm sap
P3B	Gathering palm fruit
P3C	Harvesting trees, bushes, and vines for fruit and edible leaves
P3CN	Harvesting agave
P3E	Tidying up, inspecting garden
P3F	Planting garden crop
P3I	Cutting trees (for pruning, sale)
P3IB	Cutting bamboo (In CONTEXT field only)
P3XB	Weeding by hand in garden
P3XHA	Applying cattle dung in garden
P4	Transformation of harvests
P4A	Husking, threshing maize by hand
P4AA	Removing ears from cornstalks
P4BR	Removing paddy from stalks
P4C	Arranging or watching over drying of crops
P4D	Seeding, pitting crops
P4DR	Returning from taking paddy for mechanical hulling
P4E	Boiling down palm sap to make sugar
P4EB	Gathering wood for fire to boil palm sap
P4EC	Gathering bark used for additive in palm sap
P4K	Extracting kapok from envelope, extracting seeds from kapok
P4L	Selecting, “combing” alang-alang grass (Imperata cylindrica) for use as thatch
P4N	Extracting sisal from agave
P4OAA	Threshing bean plants
P4Q	Extracting oil from castor-oil plant seeds (Ricinus communis L.)
P4S	Selecting crop for sale, conservation
P4T	Transforming tobacco leaf to cigarette tobacco (various operations)
P4U	Making a basket with bamboo legs to store maize grain
P5	Exchanged or paid work away from home or household cluster
P5AA	Plowing with cattle
P5AAA	Hoeing and other field preparation
P5AC	Harvesting (mainly bean varieties; except crops noted below)
P5ACM	Harvesting maize
P5ACR	Harvesting paddy
P5ACS	Harvesting cassava
P5AD	Watering tobacco
P5AF	Sowing grain
P5AGM	Gathering bunches of rice shoots for transplanting
P5AL	Planting tobacco
P5AM	Weeding, loosening soil around tobacco plants

P5AO	Weeding, loosening soil around maize plants
P5AT	Tobacco transformations
P5AY	Harvesting maize in exchange for stalks for forage
P5B	Carpentry (house construction or furnishings)
P5C	Doing other construction work (except cow/goat shed)
P5CC	Making cement
P5CK	Constructing cowshed
P5CL	Mixing, pouring cement
P5CM	Cutting limestone bricks
P5D	Driving pedicab in town
P5E	Transporting goods in town
P5EG	Transporting goods in village
P5FD	Seeding, pitting crops
P5FN	Extracting sisal from agave
P5FS	Selecting crop for sale, conservation
P5G	Digging a well
P5I	Cutting, sawing trees for house construction
P5J	Doing other work with wood for house construction (preparing tools, carrying wood)
P5K	Seeking employment
P5O	Teaching at elementary school (activity only noted for Javanese teacher; see note to User's Guide, section 2)
P5P	Supervising extra-curricular sports or Scouting activities (activity only noted for Javanese teacher; see note to User's Guide, section 2)
P6	Fishing and Hunting
P6A	Fishing offshore in boat (net or line fishing)
P6B	Collecting fish, wading near shore (net fishing)
P6BN	Collecting milkfish fry (*Chanos chanos* Forskal)
P6C	Repairing nets (In CONTEXT field only)
P6M	Hunting birds for sale
P7	Preparation of food for sale
P7	Preparing various foods for sale (except shrimp paste)
P7A	Preparing shrimp paste for sale
P8	Transport
P8A	Repairing a bicycle
P9	Trading
P9A	Selling prepared food
P9B	Selling one's own animals
P9C	Selling one's own crops
P9CG	Selling one's own palm sugar at the market
P9CT	Negotiating sale of one's own tobacco crop in field with potential buyer
P9D	Trading in agricultural production and consumption goods, with the exception of animals
P9DA	Trading in cattle
P9DB	Trading in poultry
P9E	Selling plaited palm frond mats
P9F	Selling cut limestone bricks or lime

P9G		Selling wood or charcoal (In CONTEXT field only)
	PA	Craftsmanship for sale
PAA		Weaving plaited palm frond mats
PAAA		Weaving baskets
PAAB		Weaving other articles
PAB		Doing carpentry at home
	PB	Tool maintenance
PB		Sharpening or caring for tools
PBB		Making a tool
	PC	Stonework
PCA		Making lime (building kiln, gathering stone)
PCAB		Gathering wood for lime kiln
PCB		Cutting limestone bricks for sale
	R1	Resting, idleness
R1A		Receiving visitors (in general)
R1AL		Receiving visitors in resting/prayer house (*langghar*)
R1AM		Receiving visitors in house
R1B		Talking with member of household or household cluster
R1BA		Talking with outsider (not in *langghar* or house)
R1C		No apparent activity
R1CL		No apparent activity; in *langghar*
R1CM		No apparent activity; in house
R1D		Resting
R1DL		Resting in *langghar*
R1DM		Resting in house
R1E		Listening to radio or tape recorder
R1F		Child held by or following elder
R1G		Crying
	R2	Food preparation
R2		Preparing food
R2A		Milling maize
R2B		Serving food
R2C		Sifting, selecting staples
R2D		Mixing, pounding coffee, grains
R2E		Miscellaneous food preparation
R2F		Building a fire to cook food
R2T		Making plaited palm frond envelope to cook rice in
	R3	Child rearing
R3		Attending to or carrying infant or child
R3A		Nursing an infant or child
R3B		Giving food or drink to infant or child
R3C		Bathing infant or child

R4	House construction and maintenance
R4A	Constructing household building (except cow/goat shed)
R4B	Doing maintenance of existing structure
R4LA	Making, applying lime-water mixture
R4LB	Cutting limestone bricks for own house
R4P	Weaving plaited bamboo walls
R5	Food consumption
R5	Eating or drinking
R6	Play
R6	Playing (without toys, or type of play unknown)
R6A	Carving bamboo embellishment for cowshed roof
R6AM	Playing music
R6AP	Carving an ornament for plow
R6B	Playing a sport or playing with toys
R6BA	Organized, school-sponsored sports
R7	Hygiene
R7A	Bathing
R7BM	Seeking modern medical attention
R7BT	Seeking traditional medical attention
R7C	Getting dressed
R7D	Giving or receiving massage
R7E	Caring for own hair
R7EL	Giving or receiving care for hair, delousing
R7F	Personal hygiene, urinating or defecating
R8	Fetching water or fuel
R8	Fetching water
R8B	Fetching wood for kitchen
R9	Cleaning and domestic upkeep
R9A	Washing dishes
R9B	Washing clothes
R9BA	Sewing clothes
R9BB	Using a sewing machine
R9C	Cleaning house
R9D	Doing other domestic chores
R9E	Weeding courtyard
RA	School, education
RAA	Attending public schooling
RAB	Attending religious schooling locally
RABL	Attending religious boarding school in nearby village
RAC	Doing homework
RAD	Undergoing blacksmith's apprenticeship at Kolpo', 5 km east
RAE	Writing a letter to one's family (activity only noted for Javanese teacher; see note to User's Guide, section 2)

	RB	Purchasing
RBA		Shopping at market
RBB		Shopping in town
RBC		Purchasing from neighbour or nearby
RBD		Purchasing from itinerant trader
	RC	Religion, ritual
RCA		Taking part in prayer group (often during RDFF)
RCB		Making trip to Kalimantan (Borneo) with religious group
RCC		Taking part in collective work for mosque
RCD		Taking part in religious chant group (*dikkèr*) (often during RDFF)
RCDP		Taking part in sacred tomb (*bhuju'*) ceremonies
RCF		Taking part in Moslem holy day festivities (In CONTEXT field only)
RCG		Praying at the mosque (usually for main Friday 11 a.m. prayer)
RCH		Saying one of the five daily Moslem prayers
RCI		Honouring, maintaining family tombs
RCK		Taking part in propitiatory rite for house (*rokat bengko*)
RCL		Taking part in propitiatory rite for pregnant woman (*pelet kandung*)
	RD	Social and family
RDA		Visiting sick person
RDC		Visiting family
RDCA		Reading as a pastime, not for homework (activity only noted for Javanese teacher; see note to User's Guide, section 2)
RDD		Visiting neighbours and friends
RDE		Taking care of sick person at home
RDFF		Attending funeral or ceremony following death
RDG		Attending revolving credit association (*arèsan*) meeting
RDGD		Attending women's combined Moslem prayer group and credit association meeting (*arèsan diba'*)
RDGR		Attending men's combined Moslem prayer group and credit association meeting (*arèsan dikkèr*)
RDH		Rendering service to member of household or household cluster
RDHN		Rendering service to outsider
RDI		Attending marriage ceremony
RDJ		Doing cooperative work for village
RDJR		Helping build road for community
RDP		Preparing for, cleaning up after festivities
	RE	Craftsmanship for personal use
REA		Weaving palm frond mats and baskets
REB		Woodworking
REC		Knitting
RED		Other crafts
	S	Sick
S		Sick (In CONTEXT field only)

Gedang-Gedang sample group in 1986

Table A.3 – Composition of Gedang-Gedang sample group

ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
	Neighbourhood: Aresetengga (A)				
Household A1A[227] dr[228] 25					
042	M	50	53	---, ---	
041	F	50	53	---, ---	
040	M	30	53	041, 042	
039	F	25	53	---, ---	
038	F	9	53	039, 040	
(037)	F	25	0	---, ---	Javanese[229]

[223] ID# is the subject identification code. This code (range: 1-151) is sufficient to identify subjects in the original database (SUBJECT field). In the Standardized database (ID field), the ID# is preceded by the household code to facilitate computation by household, *tanèan* or neighbourhood. Thus, the first three characters are the household identification code: the first, neighbourhood (A=Aresetengga, G=Gunung Papan, J=Jaruddin, T= Temberean), the second, *tanèan*, and the third, household within the *tanèan*.

[224] Age is in years at first observation (approximate for adults). Weights and heights of subjects were not measured. For anthropometry of children and mothers in Sumenep, see Kardjati, Kusin and With (1978).

[225] Time obs. is the number of time allocation observations of each individual.

[226] Mo, Fa are ego's mother's and father's ID numbers, respectively (--- indicates that parent is either deceased or living outside of the sample group).

[227] For each household, the first entry is the household head. Male heads of households are followed by their wife (except A7A064).

[228] The household Dependency Ratio (dr) equals the number of household members under 15 + the number of household members 65 and over / the number of household members 15 to 64. Cases when a member entered or left the household (due to birth, death, household division, divorce, etc.) were taken into account and were counted on a pro-rate basis depending on length of participation in the household. For example, a person in the household for only 10 weekly observations is counted as 0.19 (10/52).

[229] Subject A1B037 was not considered in calculating the dependency ratio for this household. Time allocation data was also gathered for two female adult subjects living in two households, a Javanese teacher (A1B037) and a seriously disabled Madurese who was bedridden for the duration of the study (A2A043). In order to limit bias, accurately determine returns to labour, and enable cross-cultural comparison, the 106 observations of these subjects have been excluded from sample group, reducing the group to 149. No observations for Subjects 037 and 043 were included in this dataset. Besides being of non-Madurese ethnicity (an important criteria for cross-cultural studies of time allocation), there was justification for excluding observation of subject 037 because she occupied a vacant dwelling belonging to Household A1A, but paid no rent, took no meals, and had little intercourse with or impact on the household; in effect, she could be regarded as forming a separate household or *tanèan* herself. Subject 043 was mute, invalid and bedridden for the duration of the study, and was therefore dependent upon her mother and sister for care. Tests were made to see how inclusion or non-inclusion would affect calculations such as average dependency ratios and returns to labour, etc. Non-inclusion has a negligible effect on a sample group of this size. However, there is no doubt that for the mother and sister supporting the physically-challenged female, their lives were significantly affected as my analysis of this particular household shows.

Appendices

ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
Household A2A dr 200					
045	F	60	53	---, ---	
044	F	22	53	045, ---	
(043)	F	27	0	045, ---	invalid
Household A4A[230] dr 67					
050	M	40	53	---, ---	
049	F	37	52	048, ---	lactating
048	F	55	53	---, ---	
047	M	8	54	049, 050	
046	M	2	53	049, 050	
Household A5A dr 52					
061	M	50	53	---, ---	
060	F	46	53	151, ---	
151	F	65	6	---, ---	arrived Jan. 1987
053	F	4	48	056, 057	separated from brothers in A5B
Household A5B dr 184					
057	M	30	53	---, ---	
056	F	26	53	060, 061	lactating
055	M	6	53	056, 057	
054	M	5	53	056, 057	
052	F	2	53	056, 057	
051	M	0	35	056, 057	born June 1986
Household A5C dr 0					
059	M	26	53	060, 061	
058	F	21	53	---, ---	
Household A6A dr 0					
062	F	23	53	---, ---	
Household A7A dr 0					
064	M	30	53	063, ---	
063	F	55	53	---, ---	

[230] A3 was the second of the two household clusters drawn from the third census block of Aresetengga. When I realized that I had drawn the village head's household cluster, I drew a third household (A2) in the same third census block because I had misgivings about including the village head in the study. Considered a bit too independent-minded by the sub-district officialdom, he naturally had some doubts about my intentions in doing research in his village. It became clear that I could not continue "snooping" once a week for the time allocation study and allay his doubts at the same time. I had to limit observation to the other household in his cluster since it was difficult to observe or question the village head or his family to obtain reliable data on their activities. Their activities were in any case quite atypical for the village. The replacement, household A2, even considering the exclusion of subject 043, is more representative of the village. I dropped A3 after four observation rounds.

ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
	Neighbourhood Gunung Papan (G)				
Household G1 dr 50					
073	M	70	53	---, ---	
072	F	66	53	---, ---	
069	M	40	53	070, 071	
068	F	35	53	---, ---	
067	M	16	49	068, 069	1 mo. w/in-laws
066	F	12	53	068, 069	
065	M	15	4	---, ---	brief trial marriage to 066
Household G1B dr 0					
070	M	56	53	---, ---	
071	F	53	53	072, 073	
Household G2A dr 0					
078	M	60	53	---, ---	
077	F	50	53	---, ---	
Household G2B dr 0					
076	M	30	53	---, ---	
075	F	29	53	077, 078	
074	M	7	53	075, 076	
Household G3A dr 100					
082	M	35	53	---, ---	
081	F	30	53	077, 078	
080	F	9	53	081, 082	
079	F	6	53	081, 082	
Household G4A dr 100					
095	M	67	53	---, ---	
094	F	60	53	---, ---	
Household G4B dr 100					
093	M	50	53	094, 095	
092	F	43	53	---, ---	
091	M	12	53	092, 093	
090	M	9	53	092, 093	
Household G4C dr 100					
085	M	40	53	---, ---	
086	F	36	53	094, 095	
084	M	12	53	086, 085	
083	M	9	53	086, 085	
Household G4D dr 50					
089	F	20	53	092, 093	lactating
087	F	2	53	089, 088	

ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
Household G5A dr 27					
100	M	46	53	---, ---	
099	F	42	53	---, ---	
097	M	20	40	099, 100	moved Dec. 1986
098	M	16	53	099, 100	
096	M	10	53	099, 100	
Household G6A dr 100					
106	M	60	52	---, ---	
105	F	54	52	---, ---	
102	M	12	52	105, 106	
101	F	3	52	---, ---	106 is MoBr
Household G6B dr 0					
103	M	28	52	---, ---	
104	F	25	52	105, 106	
	Neighbourhood: Jaruddin (J)				
Household J1A dr 131					
006	M	66	53	---, ---	
005	F	40	53	007, ---	
007	F	70	49	---, ---	
004	M	18	53	005, 006	
003	M	17	53	005, 006	
002	F	12	53	005, 006	
001	M	6	53	005, 006	
Household J2A dr 25					
010	M	50	53	---, ---	
011	F	41	53	012, ---	
012	F	58	53	---, ---	
009	F	16	53	011, 010	
008	M	4	53	011, 010	
Household J3A dr 67					
014	M	65	53	---, ---	
013	F	58	53	---, ---	
017	M	45	53	013, 014	
016	F	36	53	---, ---	
015	M	8	53	016, 017	
Household J4A dr 83					
024	M	55	53	---, ---	
023	F	45	53	---, ---	
019	F	30	5	023, 024	arrived Jan. 1987
021	F	10	53	023, 024	
022	M	19	23	---, ---	brief trial marriage to 021
020	F	7	53	023, 024	
018	F	10	5	019, ---	arrived Jan. 1987

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ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
Household J5A dr 150					
029	M	35	53	028, ---	
027	F	30	53	---, ---	
028	F	65	53	---, ---	
026	F	10	53	027, 029	
025	M	4	53	027, 029	
Household J6A dr 26					
036	M	55	53	---, ---	
035	F	50	53	---, ---	
034	M	31	53	035, 036	
033	F	25	53	---, ---	pregnant, lactating
032	M	6	53	033, 034	
031	M	15	53	035, 036	
030	F	0	16	033, 034	born Nov. 1986
	Neighbourhood Temberean (T)				
Household T1A dr 29					
112	M	56	53	---, ---	
111	F	45	53	---, ---	
110	F	27	53	111, ---	
109	M	2	53	110, ---	
108	M	35	12	---, ---	brief trial marriage to 110
107	M	32	10	---, ---	brief trial marriage to 110
Household T2A dr 33					
116	M	41	53	---, ---	
115	F	39	53	---, ---	
114	F	41	53	---, ---	115 is sister
113	M	10	53	---, ---	114 is MoMo
Household T3A dr 100					
127	M	50	53	---, ---	119 is brother
126	F	45	53	---, ---	lactating
125	M	18	53	126, 127	
124	M	15	53	126, 127	
123	M	13	53	126, 127	
122	M	10	53	126, 127	
121	F	3	53	126, 127	
120	M	1	53	126, 127	
Household T3B dr 50					
119	M	45	53	---, ---	127 is brother
118	F	20	53	---, ---	lactating
117	M	2	53	118, 119	

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ID#[223]	Gender	Age[224]	Time obs.[225]	Mo, Fa[226]	Comments
Household T4A dr 100					
134	M	45	53	---, ---	
133	F	30	53	---, ---	130 is brother
132	M	13	53	133, 134	
131	M	7	53	133, 134	
Household T4B dr 39					
130	M	32	53	---, ---	133 is sister
129	F	29	33	---, ---	arrived July 1986
128	F	9	33	129, ---	arrived July 1986
Household T5A dr 100					
140	M	37	53	---, ---	
141	F	34	53	---, 146	
146	M	71	34	---, ---	
139	F	9	53	141, 130	
Household T5B dr 0					
144	M	57	20	---, 146	died July 1986
145	F	55	53	---, ---	
143	M	20	53	145, 144	
142	F	18	53	---, ---	
Household T5C dr 100					
137	M	37	53	---, ---	
138	F	27	53	---, 146	
136	F	7	34	138, 137	
135	M	4	53	138, 137	
Household T6A dr 9					
150	M	45	53	---, ---	
148	F	35	38	---, ---	wife from May 1986
147	F	13	9	---, ---	148 is Mo; arrived Jan. 1986
149	F	35	6	---, ---	wife until April 1986

Appendix II
List of plants found in the Batuputih area and their uses

Uses column code:
A: major food or beverage crop: (f) fruit, pod (bean, pea); (l) leaf; (n) grain, nut or seed; (r) root; (u) sap; (s) stem
B: animal fodder; (m) medicinal use for cows in *jamo sapè*
C: construction, building and woodworking materials
E: packaging materials: (t) temporary, discarded after one use
F: source of durable fibre for cords
H: ornamental
M: medicinal plants (including fortifiers and products used for hygenic and cosmetic purposes)
X: household energy source, firewood
-: not significantly used (but may have value as ornamental, hedge, shade, ground cover, to check erosion or for mulching)

Notes: Native classification often preceeds the Madurese species terms for the type or part of plant: *rebbha* (grass), *kaju* (wood), *perreng* (bamboo), *obi* (tuber), *katjang* (bean/nut), *geddhang* (banana), *bawang* (onion), *jeruk* (citrus), and others. For the systematics and identification, I have used many sources in addition to my informants, including Heyne 1927; Hildebrand 1950; Kalshoven 1981; Labrousse 1985; Maradjo 1976, 1983; Prawira n.d.; Purseglove 1974, 1975 ; Sastrapradja 1977-; Vorderman and Kiliaan 1900 ; Wijayakusuma et al 1992-1994, as well as recent Internet phylogenic resources. Sub-families are noted for Leguminosae as follows: (C) Caesalpinioideae, (M) Mimosoideae, and (P) Papilionoideae or Faboideae.

Table A.4 List of plants found in the Batuptih area and their uses

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
accem	Leguminosae (C)	*Tamarindus indica* L.	tamarind	tamarin	asam	AbfnBm MOX	Ointment obtained from pounding leaves *(obat seman)* is applied to treat *sem-seman,* an affliction marked by continual watering of the eyes. Leaves used sometimes to cover rice seedbeds. Seeded fruit *(longon)* is mixed with *gula jabba* to fatten cattle. Or *longon* may be soaked in water for a day, mixed with ashes from the hearth, and boiled 8-12 hours to make a concoction to aid childbirth or halt menstruation. Seed is edible following prolonged soaking. Bark can be cut in thin strips and fried without oil *(èssangar),* adding sugar; pregnant women are sometimes known to crave this food. O: traditional instrument for making fire requires black wood inside trunk.
amberta	Menispermaceae	*Tinospora coriacea* Beumée	snake vine		pancasona, ular-ularan	Bm	Fruit used in *jamo sapè.*
ambunten		(unidentified)				BCX	This tree produces an abundance of leaves even in the dry season.
angen-angen	Poaceae	*Spinifex littoreus* (Burm. f.) Merr.			rumput angin	B	Grass cover along the coast.
apokat	Lauraceae	*Persea americana* Mill.	avocado pear	avocatier	alpokat	AfBX	Government attempted to introduce the avocado in Batuputih Laok (early 1990s).

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
arren	Palmae	*Arenga pinnata* (Wurmb.) Merr.	sugar palm	palmier areng, aren à sucre	aren	XO	Found notably near Sumber Tumbet. Not used for sugar. O: Writing instruments were made from wood until 1960s.
arta’	Leguminosae (P)	*Phaseolus aureus* Roxb.	green gram, mungbean	gram	kacang hijau	AnB	
balading	Zingiberaceae	*Nicolaia speciosa* Horan.	kecombrang		honje, kecumbrang	H	
baloentas	Compositae	*Pluchea indica* Less.	marsh flea bean		beluntas	AlBmMXO	Leaves used in medicinal preparations *(jamo)* for humans and cattle. Infusion of leaves is applied to the temples to relieve headaches and other ailments. O: Branches often used for fences.
baringen	Moraceae	*Ficus benjamina* L., *F. benghalensis* L.	banyan	banian	beringin	BXO	O: Branch used in *rokat kandung*.
baru	Malvaceae	*Hibiscus tiliaceus* L.	mahoe, tree mallow, beach hibiscus	majagua	baru	BFXO	Unfit for most construction, the wood is valued for its elasticity in *nener* net frames and toys, such as the wind-propellor *(tran-tran)*.
beleta		(unidentified)				M	Fruit given to mothers following birth to stimulate lactation.
berige, bariga	Sterculiaceae	*Pterocymbium tinctorium* (Blanco) Merr.	papita		munung, beurih	MX	Sap is used to relieve toothache, and treat skin lesions. Charcoal used in homemade fireworks.
bhabang bombay	Liliaceae	*Allium Cepa* L.	onion	oignon	bawang bombay	ArBm	
bhabang mèra	Liliaceae	*Allium Cepa* L. forma *ascalonicum*	shallot	echalotte	bawang merah	ArBm	
bhabang potè	Liliaceae	*Allium sativum* L.	garlic	ail	bawang putih	ArBm	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
bhabang prei	Liliaceae	*Allium ampeloprasum* Linn. var. *porrum* Regel	leek	poireau	bawang prei	Arl	Used as vegetable, especially in soups.
bha'-kasumba'an, ngasrangasan (a)	Verbenaceae	*Stachytarpheta cayennensis* Vahl.	verbena (sort of)	verveine (esp.)	jarong (sm.)	B	
bhako	Solanacea	*Nicotiana tabacum* L.	tobacco	tabac	tembakau	M	
bhakong	Amaryllidaceae	*Crinum asiaticum* L.	wild lily	lis sauvage	bakung	H	
bhalimbhing bulu	Oxalidaceae	*Averrhoa bilimbi* L.	bilimbi, vegetable carambola	blimbing	belimbing asam, b. wuluh	-	
bhalimbhing leger	Oxalidaceae	*Averrhoa carambola* L.	carambola	carambolier	belimbing manis	Af	
bhengngok	Leguminosae (P)	*Stizolobium aterrimum* Piper & Tracy	Bengal bean	mucuna (esp.)	kara benguk	AnB	Most sold, local consumption limited except in times of famine. Requires boiling with many changes of water and removal of the testa.
bhentol	Araceae	*Xanthosoma violaceum* Schott.	tannias	chou-caraïbe	bentul	AlBm	Leaves fed to cattle to increase appetite.
bidhasarè	Convolvulaceae	*Porana volubilis* Burm.	white corallina		bidasari	M	
bidjhan	Pedaliaceae	*Sesanum indicum* L	sesame	sésame	wijen	An	
billa mace, billa gheddang	Rutaceae	*Aegle marmelos* (L.) Correa	Indian bael	bel Indien	maja	AfX	
billa pora	Rutaceae	*Feronia elephantum* Correa	wood apple	féronier	kawista	AfX	
binoa	Annonaceae	*Annona reticulata* Linn.	bullock's heart	cœur de bœuf	buah nona	AfBX	Rare.
bintaos	Apocynaceae	*Wrightia pubescens* R. Br.	wrightia		mentaos	AlBCX	Fine wood for light construction and carving. Used notably for plow yolk.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
bir-gambiran	Alangiaceae?	*Alangium villosum* Wang?	muskwood		kuniran	O	O: Leaves are chewed to produce red colouring for lips.
biya	Leguminosae (P)	*Mucuna pruriens* Dc.	Bengal bean (type of), itchy bean	mucuna irritant	kacang babi, kekara gatel	-	
bornè	Euphorbiaceae	*Antidesma bunius* (L.) Spreng.	bignay, currant tree	bignay, antidème	buni	AfX	
bhukol	Rhamnaceae	*Ziziphus jujuba* Lamk.	Chinese date	jujubier	bidara	AfBX	
bulangan	Verbenaceae	*Gmelina asiataca* L. var *Villosa* Bakh.	taluñgud		bulangan, wareng ketam	BmMX	Bitter seeds are crushed and liquid applied to breasts to discourage suckling during child weaning. Boiled in sea water, the seeds are force-fed to cattle to stimulate their appetite.
bulu adha'	Melastomataceae	*Melastoma polyanthum* Bl. or *M. affine*	blue tongue, native lasiandra	mélastome	senduduk	B	
bunga terrong, b. telleng	Leguminosae (P)	*Clitoria ternatea* L.	butterfly pea	clitore de Ternate	kembang telang	BM	Leaves used to treat asthma in infants.
cabai jamo, sèrè ghunong	Piperaceae	*Piper retrofractum* Vahl	Javanese long pepper	poivrier long de Java	cabbi Jawa	Af	
cabai lèteq	Solanaceae	*Capsicum frutescens* L.	bird chilie	piment de Cayenne	cabbi rawit	Af	
cabai rajha	Solanaceae	*Capsicum annuum* L.	chilie, red or sweet pepper	piment	lombok	Af	
ca'-lecceng	Leguninosae (P)	*Tephrosia candida* (Roxb.) DC.	white hoary pea	indigo sauvage	kapeping badak	B	Use as cattle fodder reported despite its toxicity.
camara	Casuarinaceae	*Casuarina equisetifolia* J.R. & G. Forst.	beefwood	filao de l'Inde	cemara laut	CX	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
campaka ghadding	Magnoliaceae	*Michelia campaca* L.	cempaka	michelie, champac à fleurs jaunes	kantil, cempaka kuning	BmHX	
campaka koneng	Apocynaceae	*Allamanda cathartica* Linn.	allamanda		lame areuj, alamanda	HX	
campaka maldja	Apocynaceae	*Plumeria acuminata* Ait. (*P. acutifolia* Poir.)	pagoda tree, temple tree	frangipanier	kemboja	HX	Rare.
campaka mèra	Apocynaceae	*Plumeria rubra* L.	red jasmine, frangipani	frangipanier rouge, frangipanier commun	kemboja merah	HMX	Ornamental. Sap used for toothache.
campaka potè	Magnoliaceae	*Michelia alba* DC.	white campaka	champac à fleurs blanches	cempaka putih	BmX	Stems of *campaka ghadding, c. mèra* or *c. potè*, with salt, are rubbed on the gums of cattle with loose teeth.
cang kaju	Leguminosae (P)	*Cajanus cajan* (L.) Millsp.	pigeon pea	cajan	kacang gude	AnBX	
cengkè	Myrtaceae	*Eugenia aromatica* O.K.	clove	giroflier	cengkeh	Af	Found locally in past times. Besides use as spice, bits of clove are added to cigarette tobacco.
coklat	Sterculiaceae	*Theobroma cacao* L.	cocoa	cacao	coklat	Af	Planting trials have been made in several villages in northeastern Madura recently, with some success.
cok-dangdang	Acanthaceae	*Thunbergia fragrans* Roxb.	white lady			BO	O: Children use the seeds for slingshot *(tibal)* ammunition.
congkel		(unidentified)				Af	
cong-lacong, sobek	Araceae	*Amorphophallus canpanulatus* (Roxb.) Bl.	elephant yam	pomme de terre de Telinga	iles-iles, bunga bangkai, suweg	Ar	Rotting smell of flower is detested, though root has been known to have been consumed in times of famine.
cor-cor		(unidentified)				O	O: Only use of this shrub is for birdseed.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
coretek, cocoretek	Crassulaceae	*Kalanchoe tomentosa* or *K. pinnata* Pers.	life plant (succulent)		cocor bebek marmut	H	
dhalima	Punicaceae	*Punica granatum* L.	pomegranate	grenade	delima	AfBX	
dhalima celleng	Punicaceae	*Punica granatum* L. (?)	pomegranate	grenade	delima hitam	AfBMX	Perhaps a cultivar of *Punica granatum* rather than a separate species.
dhadhap	Leguminosae (P)	*Erythrina variegata* L., var. orientale Merr.	Indian coral tree	érythrine des Indes	dadap ayam, d. laut	AlBMX	
dha'sadha'an		(unidentified)				BCX	
duri poka', ka'-poka'an	Capparidaceae	*Capparis spinosa L*, *C.* sp.	Caper bush	Câprier épineux		O	O: Spiny branches of this shrub are used to catch flying insects (*kelalawar*) which are subsequently used as fish bait, particularly when fishing for *senke*.
duri tongko', duri tepak, lenggem baja, tengkek	Cactaceae	*Opuntia nigricans* Haw.	prickly-pear cactus	cactus	kaktus lidah badak	M	Water from flesh is applied to fish or sea animal stings.
duri tongko' tolo	Cactaceae	Sp. of cactus without thorns (succulent)				-	
duwa'	Myrtaceae	*Syzygium cumini* (L.) Skeels	jambolan	jambosier des Moluques	jambelang	AfCX	
ganyong	Cannaceae	*Canna edulis* Ker.	edible canna, Queensland arrowroot	balisier comestible, tous-les-mois	ganyong	ArB	
ganyong alas	Cannaceae	*Canna indica* Linn.	Indian shot		bunga tasbih, ganyong hutan	ArBE	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
gelenggangsa		(unidentified)				B	Seeds are fed to song birds.
gel-janggelan	Amaranthaceae	*Celosia argentea* L.	silver cock's comb		boroco	B	Ornamental in town.
ghaddhoeng	Dioscoreaceae	*Dioscorea hispida* Dennst.	intoxicating yam	dioscorée	gadung	ArB	Soaked in salt water to remove toxins.
ghajam	Leguminosae (P)	*Inocarpus edulis* Forst.	otaheite chestnut	inocarpe comestible	gayam	AnBCX	
gha'-longa'an, po-seppo'an	Convolvulaceae	*Ipomoea fistulosa*	large stemmed morning glory		kangkung darat	-	Grows wild on tree and shrub boundaries between plots of land.
gha'-sagha'an, g. lakè', g. binè'	Leguminosae (P)	*Abrus precatorius* L.; or *Adenanthera pavonina* L.	jumbie bead, crab's eyes, Indian licorice; bead tree, coral pea tree	abrus à chapelet, liane réglise; bois de corail, condori commun	saga biji; segawe sabrang, saga utan	B	
ghambhir	Rubiaceae	*Uncaria gambir* (Hunt.) Roxb.	gambier tree	gambier	gambir	M	
gheddang	Musaceae	*Musa X paradisioca* L.	banana	banane	pisang	AfBEt	Varieties of banana found in the Batuputih area include: *(geddhang) balindang, bighi, bisum, bughireng, karepè', kosta, lomot, madhu, masan, osok, palotan, sabha* and *saèbu.*
gubis	Cruciferae	*Brassica oldracea* L. var. *capitata* L.	cabbage	chou cabus	kubis, kol	Al	
hing-hong	Balsaminaceae	*Impatiens balsamina* Linn.	garden balsam	balsamine des jardins	pacar air	H	Ornamental. Flowers are used by children to colour their fingernails red.
jabbau		(unidentified)				CX	Some used for bonsai.
jaribu'	Rhamnaceae	*Zizyphus talanai* Merr.	jujube	jujubier		AfBX	Small fruits eaten by children.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
je'buje'en						B	Bush growing near river banks, has red fruit.
jhaba	Poaceae	*Setaria italica* (L.) Beauv.	foxtail millet, Italian millet	panic d'Italie	jawawut	BO	O: Used also as source of birdseed for *mano' berkutut*.
jhaghung	Poaceae	*Zea mays* L. var. *indurata* Sturt.	maize, flint corn	maïs	jagung mutiara	AnB	
jhaghung bulir	Poaceae	*Sorghum vulgare* Pers.	sorghum	sorgo	gandum, jawaras	AnBMO	O: Used also as birdseed.
jhai	Zingiberaceae	*Zingiber officinale* Rosc.	ginger	gingembre	jahe	ArM	
jhambhu aeng	Myrtaceae	*Syzygium aqueum* (Burm.f.) Merr. & Perry	watery rose-apple	pomme de rose, jambose	jambu air	AfX	
jhambhu bighi	Myrtaceae	*Psidium guajava* L.	guava	goyave blanche	jambu biji	AfMXO	O: Unripe fruits are eaten in case of diarrhea.
jhambhu monyet	Anarcadiaceae	*Anacardium occidentale* L.	cashew-nut	noix de cajou	jambu monyet, jambu mete	AfnBX	
jhangger ajam	Amarantaceae	*Celosia cristata* L.	cockscomb	crête de coq, passe-velours	janggar ayam	H	Ornamental. Knowns also as *rebbha mangsor*.
jhangger jelè'		(unidentified)				B	
jharango	Araceae	*Acorus calamus* L.	sweet flag	jonc odorant	dringo	BmM	
jhariboeq	Rhamnaceae	*Zizyphus rufula* Miq.	Indian jujube	jujubier	bidara	AfB(mbi)X	
jhatè	Verbenaceae	*Tectona grandis* L.f.	teak	teck	jati	BCEt	
jhatè pasèr	Goodeniaceae	*Scaevola frutescens* Krause.	beach naupaka	sévole	subeng-subeng, pelampung	BX	
jherruk keprok	Rutaceae	*Citrus reticulata* Blanco	tangerine	orange tangerine	jeruk keprok	Af	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
jherruk manès	Rutaceae	*Citrus sinensis* L.	orange	orange doux	jeruk manis	AfX	
jherruk peccel, nipis	Rutaceae	*Citrus aurantifolia* (Christm.) Swing.	lime	citron vert	jeruk nipis	AfM	To relieve a cough, the fruit is heated a moment in a fire, then peeled and eaten, or the juice is mixed with hot water and consumed.
jherruk porot	Rutaceae	*Citrus hystrix* DC.	percupin orange	citron combara	jeruk purut	AflO	O: Flowers and leaves fetch good prices in the marketplace.
jho-tamanjho'an	Compositae	*Tagetes patula*	marigold	souci	tahi kotok	H	
jhila bhaja	Liliaceae	*Aloe vera* (L.) Webb.	aloe, crocodile's tongue	aloès	lidah buaya	O	O: Liquid from leaves used to make shampoo.
jor-joran	Solanaceae	*Physalis angulata, P. minima, P. peruviana* L.	cape gooseberry	coqueret, petite tomate du Mexique	ceplukan	Af	Wild fruit consumed by children.
juwar	Leguminosae (C)	*Cassia siamea* Lam.	yellow cassia, Thai copper pod	cassia, bois de fer	johar	X	
kacapiring	Rubiaceae	*Gardenia augusta* Merr.	Cape jasmine	jasmin du Cap	kacapiring	H	
kaceper	Leguminosae (P)	*Psophocarpus tetragonolobus* (L.) DC.	goa bean	pois carré	kecipir	AnB	
kadongdong	Anacardiaceae	*Spondias cytherea* Sonn.	golden, otaheite apple	prunier de Tahiti	kedongdong	AfB	
kaju apo	Araceae	*Pistia stratiotes* L.	tropical duckweed, water lettuce	pistie, ananas d'eau	kayu apung, apu-apu, kapu-kapu	O	O: It is believed that if placed in a recipient of water, hens drinking from that recipient will lay many eggs.
kaju candhana	Santalaceae	*Santalum album* L.	sandalwood	santal	kayu cendana	O	O: Rare; many of the trees were cut and sold in 1991 when a buyer came through offering to buy the product. Sandalwood rosaries are still found locally.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
kaju manès	Lauraceae	*Cinnamomum burmani*	cinnamon	cannelle	kayu manis	As	Rare.
kaju ojan	Mimosaceae	*Samanea saman* Merr., *Enterolobium saman* Prain.	rain tree	arbre à la pluie	kayu ambon	X	Rare.
kaju palembhang, k. jharan	Anacardiaceae	*Lannea coromandelica* Merr.	wodier, Indian ash tree	wodier	kayu kuda	AlBX	*Kaju palembhang* and *k. jharan* are sometimes considered separate species.
kaju potè	Myrtaceae	*Melaleuca leucadendra* L.	cajuput oil tree, paper bark tree	cajeputier	kayu putih	MX	Oil used most often for stomach sickness.
kaju potong	Euphorbiaceae	*Euphorbia tirucalli* L.	milk bush	tirucalli	kayu urip, patah tulang	O	O: Sap is used as poison in fishing.
kaju tobbha	Leguminosae (P)	*Derris elliptica* Benth.	derris, poison vine	tuba	akar tuba	O	O: Extract from the root is used as fish poison.
kalak	Annonaceae	*Uvaria purpurea* Blume	Chinese tree			F	
kalandéngan, lantoro	Leguminosae (M)	*Leucaena leucocephala* (Lam.) De Wit.	leucaena, lead tree	tamarinier sauvage	lamtoro	AnBX	Seeds dried, fried and pounded are mixed with coffee.
kalèkè dumik		(unidentified)				B	
kalèkè jarak	Euphorbiaceae	*Ricinus communis* L.	castor-oil plant	ricin	jarak	O	O: Seeds can be sold in the market for Rp 200/*kentang* (1995). Before replacement by kerosene, were pressed for lamp oil. Occasionally strung on a wire and ignited to provide long-lasting light.
kalèkè paghar	Euphorbiaceae	*Jatropha curcas* L.	purging nut	curcas noir, noix des Barbades	jarak pagar	-	
kalentheng	Sapindaceae	*Euphoria longana* Lamk. (?)			lengkeng	AfX	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
kalobur	Caesalpiniaceae	*Cassia fistula* L.	golden shower tree, Indian laburnum	cassier, faux séné, canéficier	tengguli	BCO	Wood is often used for the flooring of cattle sheds. O: *Kalobur* leaves are used to speed the ripening process of bananas.
kalompang	Sterculiaceae	*Sterculia foetida* L.	great sterculia	bois puant, sterculie	kelumpang, kepuh	AnBM	
kamoneng	Rutaceae	*Murraya paniculata* (L.) Jack	orange jasmine	buis de Chine	kemuning	HXO	O: The wood at the heart of the branch is fashioned into a pointer used by young children to guide their reading of the Koran.
kananga	Annonaceae	*Cananga odorata* (Lam.) Hook. *f.* & Thoms.	ylang-ylang	cananga	kenanga	BCHXO	O: Flowers are used for decoration and perfume.
kaneker	Compositae	*Cosmos caudatus* H.B.K.	cosmos		keniker	ABHX	Young leaves are used as vegetables.
kangkong	Convolvulaceae	*Ipomoea reptans* Poir.	swamp cabbage	liseron d'eau	kangkung	Als	
kanitu	Sapotaceae	*Chrysophyllum cainito* L.	saffron tree	caimitier noir, arbre de safran	sauh hijau, sawo duren	AfX	Began to be planted in the Batuputih area in early 1990.
kapo'	Bombacaceae	*Ceiba pentandra* Gaertn.	kapok	kapok	kapok	AnFBO	Kapok seeds *(kalenteng)* are fried without oil and consumed with sugar, or stone-ground *(agilis)* and eaten like rice. O: Most important use for *kapok* wool is as stuffing in mattresses, pillows and armchairs, as well as cigarette lighters.
karabistu	Poaceae	*Vetiveria zizanioides* (L.) Nash (*Andropogon muricatus* Retz)	khuskhus, vetiver	vétiver	akar wangi	O	O: A large necklace of *karabistu* blades is used in the collection of milkfish near the coast. Roots are placed between clothes as perfume and insecticide.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
karajep paghar	Nyctaginaceae	*Commicarpus chinensis* (L.) Heimerl	punarnava			B	
karato, karòpò, karokot	Leguminosae (P)	*Phaseolus lunatus* L.	lima bean	haricot de Lima, de Java	kratok, kacang roway	AnB	
kasambhi	Sapindaceae	*Schleichera oleosa* Merr.	Ceylon oak	kussam	kesambi	AfBCMX	*Kasambhi* is a preferred wood for furniture.
ka'-sèka'an	Euphorbiaceae	*Euphorbia hirta* L. or *E. reniformis* Bl.	asthma herb, hairy spurge	euphorbe indienne, mal-nommée	patikan	BM	Used to treat bronchitis and asthma.
ka'-semangka'an	Convolvulaceae	*Ipomaea pes-tigridis* L.	tiger's foot morning glory	pied de tigre	gamet	AnB	
kasembhoegan	Rubiaceae	*Paederia foetida* L.	skunk vine, stink vine	liane coup de pet	kasembukan	AlBM	"Healthful vine." A preparation of boiled leaves and cooking oil is applied to a distended stomach (*beghe*). Cuts can be treated with sap oozing from cut vines.
katapang	Tiliaceae	*Berrya cordifolia* Burret	trincomalee wood		sepat (sort of)	X	Found in Batuputih area since 1990.
kates	Caricaceae	*Carica papaya* L.	papaya	papaye	papaya	AfB	
katjòbong	Solanaceae	*Datura fastuosa* L.	datura, thorn apple	datura fastueux	kecubung	M	Rarely mentioned locally. Possible former medicinal, poison or magical use.
katombar	Umbelliferae	*Coriandrum sativum* L.	coriander	coriandre	ketumbar	Asl	
katopongan, katepeng, con-aconan, ret-karet	Leguminosae (C)	*Cassia alata* L.	candle bush, seven golden candlesticks	casse ailée, dartrier, bois puant	ketepeng cina	BF	
kedhelli	Leguminosae (P)	*Glycine max* L.	soybean	soja	kedelai	AnB	
ke'longke'en		(unidentified)				BX	

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kembili	Dioscoreaceae	*Dioscorea aculeata* L.	goa potato, lesser yam	cambare fine, igname afou	gembili	Ar	
kencor	Zingiberaceae	*Kaempferia galanga* L.	East Indian galangal	galanga de kempfer	kencur	ArBM	
kentang	Solanum	*Solanum tuberosum* L.	potato	pomme de terre	kentang	ArB	
kèrseng		(unidentified)				AfBX	
kesem		(unidentified)				BCX	Very tall tree often thought to be abode of sacred spirits.
khambhang car cèna	Meliaceae	*Aglaia odorata* Lour.	aglaia	aglaé	culan	HO	O: Flowers worn by women on ceremonial occasions.
khambhang kerttas	Compositae	*Zinnia elegans*	zinnia	zinnia	kembang kertas	H	
khambhang mabar	Rosaceae	*Rosa hybrida*	rose	rose	mawar	H	
khambhang mata arè	Compositae (Asteraceae)	*Helianthus annuus* L.	sunflower	tournesol	bunga matahari	AnH	
khambhang penthol, k. kanceng, ceng-kancengan	Amaranthaceae	*Gomphrena globosa* L.	globe amaranth	amarantine globuleuse	bunga knop, ratna pakaja	H	
koddho’	Rubiaceae	*Morinda citrifolia* L.	Indian mulberry, awl tree	mûrier de Java	mengkudu	AfBM	Roots and bark used for dyes (red, purple, brown).
koddhu’ alas						BX	
kokon	Tiliaceae	*Actinophora fragrans* R. Br.	East Indian wood	ki-séréh, kiterong	walikukun, lanji	CX	
kolat	Polyporus, Fungi	*Polyporus*, etc. spp.	mushroom	champignon	jamur	A	*Kolat* is the general category.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
kolor	Moraceae	*Artocarpus comansi*	breadnut	arbre à pain (avec graines)	sukun	AfBXO	*Kolor* is considered a seeded variety of *sokon*. O: Like *sokon*, sticky sap provides glue which can be used to trap birds.
kol-tongkolan	Compositae	*Synedrella nodiflora* Gaertn.	nodeweed	herbe à feu	rumput berak kambing	B	
koma’	Leguminosae (P)	*Lablab purpureus* (L.) Sweet	hyacinth bean	dolique d’Égypte	komak	AnB	
komandheggan	Labiatae	*Hyptis suaveolens* Poit.	pignut	balotte camphrée	ruku-ruku hutan	-	
komèrè	Euphorbiaceae	*Aleurites moluccana* Forst.	candlenut tree	bancoulier	kemiri	AnBXO	O: Seeds are pressed to obtain cooking oil.
kontjè	Zingiberaceae	*Boesenbergia pandurata* (Roxb.) Schlecht.	finger-root	curcuma rond	temu kunci	Ar	
konyet, temmo koneng	Zingiberaceae	*Curcuma domestica* Val.	turmeric	curcuma, safran des Indes	kunyit	ArM	
konyet ghoenong	Zingiberaceae	*Curcuma viridiflora* Roxb.				M	
kopi (I)	Rubiaceae	*Coffea canephora* Pierre ex Froehner	robusta coffee	café robusta	kopi	O	
kopi (II)	Rubiaceae	*Coffea liberica* Bull ex Hiern.	liberica coffee	café liberica	kopi	O	From time to time over the last century attempts have been made to introduce coffee (first *C. liberica* and then *C. canephora*), with no success.
korma	Palmae	*Phoenix dactylifera* L	date palm	datier	kurma	-	A few trees are said to exist in the area, but they do not bear fruit.
kornis		(unidentified)				BCX	Believed to cause stillborn calves, leaves from this tree are only given to cattle as last resort. Excellent furniture wood.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
kumeng		(unidentified)				B	
labing	Taccaceae	*Tacca leontopetaloides* (L.) Kuntze	East Indian arrowrooot	pia, arrow-root tahitien	kacunda, kecondang	ArF	
laboe poté, l. biru	Cucurbitaceae	*Lagenaria siceraria* (Molina) Standl.	bottle gourd	courge-bouteille	labu air	Af	
lalang	Poaceae	*Imperata cylindrica* (L.) Beauv.	alang-alang, cogan grass	herbe à paillotte	alang-alang	BC	*Lalang* is mainly used as roofing material; young shoots are fed to cattle, and a crude brush of *lalang* is sometimes used for whitewashing walls.
lambukeng		(unidentified)				AlB	*Lambukeng* grows under maize plants, and can be eaten as a vegetable side-dish.
lampojang paè’	Zingiberaceae	*Zingiber zerumbet* (L.) J.E. Smith	wild ginger	zérumbet, gingembre sauvage	lempuyang gajah	BM	
lampojang ro’om	Zingiberaceae	*Zingiber aromaticum* Val.	puyang, wild ginger	gingembre (esp.)	lempuyang wangi	BM	
lanas, l. balandha, bangkoang	Agavaceae, Amaryllidaceae	*Agave cantala* Roxb.	cantala, maguey	cantala	sisal, nanas tali	Fl	
landha	Acanthaceae	*Barleria priontis* L.	percufine flower		landep	B	
langker	Cucurbitaceae	*Luffa acutangulata* (L.) Roxb.	angled loofah, ridged gourd	papangaye, loofa anguleuse	oyong, petola	AfB	
lang-tolangan	Alangiaceae	*Alangium chinense* Harms			tjareuh	BX	Villagers distinguish *lang-tolangan* from *kaju potong*, which Kiliaans (1899:170) considers synonyms. Used as living fence.
la’ola’an	Euphorbiaceae	*Acalypha wilkesiana* Muell.-Arg.	copper leaf		akalifa	H	

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laos	Zingiberaceae	*Alpinia galanga* Sw.	galingale	galanga de l'Inde	laos, lengkuas	AlrM	
larut	Marantaceae	*Maranta arundinacea* L.	arrowroot	marante, arrow-root	irut	AB	Tuber eaten and used as ingredient in cakes.
las-polasarè	Apocynaceae	*Alyxia stellata* R. & S.		liane de pulasari	pulasari	H	Ornamental, exudes pleasant smell.
leb-dilebban	Compositae	*Ageratum conyzoides* Linn.	bastard agrimony, billygoat weed	célestine, eupatoire bleue	bandotan	B	
leng-malengan	Euphorbiaceae	*Excoecaria agallocha* L.		agalloche d'Amboine, géor	buta-buta	O	O: Children play with this plant. According to legend, the *leng-malengan* (*maleng* means "thief") was a human who stole goods from the king. Signifying the shame such an act inspired, the leaves close when touched. Before touching a leaf, children say, "He maleng, apa èkèco' ba'na" ("Hey thief, what have you stolen?").
les-talesan	Araceae	*Caladium bicolor* Vent.	caladium		keladi hias	H	
longghaj	Leguminosae (M)	*Acacia tomentosa* Willd.			klampis	AnBX	
lorkong	Araceae	*Amorphophallus variabilis* Bl.	voodoo lily		kembang bangkai, iles-iles	ArF	Rare; the root was consumed in times of famine.
mahoni	Meliaceae	*Swietenia mahogani* Jacq.	Spanish mahogany, Cuban mahogany		mahoni kecil daun	CX	Promoted for reforestation programs; still rare.
malakah	Euphorbiaceae	*Phyllanthus emblica* L.	emblic, Malacca tree	bois à enivrer	melaka	X	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
malatè	Oleaceae	*Jasminum sambac* Ait.	Arabian jasmine	jasmin d'Arabie	melati	H	Flowers are important decorations at marriages.
malatè tompang	Verbenaceae	*Clerodendrum indicum* (L.) O.K.	tubeflower	clérodendron, péragu	genjé	H	
malengan	Euphorbiaceae	*Excoecaria agalocha* L.	Blind-your-eyes	agalloche d'Amboine, géor	kayu buta	XO	O: In the event a cow or goat dies from sickness, in order to salvage and preserve *(esamak)* its hide for sale, the hide is boiled with bark from the *malengngan*.
mandhalika, khambhang songsang	Liliaceae	*Gloriosa superba* L.	superb lily	superbe de Malabar	kembang sungsang	HX	
mandjhalin, pandjhalin	Palmae	*Calamus* sp.	rattan	rotan	rotan	EF	
mangghis	Guttiferae	*Garcinia mangostana* L.	mangosteen	mangoustan	manggis	Af	
mantègi, santègi		(unidentified)			setigi (?)	X	Rare. Used for bonsai.
margisa	Passifloraceae	*Passiflora edulis* f. *flavicarpa* Degener	passion fruit	fruit de la passion	markisah	Af	Some fruiting vines existed until 1980.
marongghi	Moringaceae	*Moringa oleifera* Lamk.	horse-radish tree	ben	kelor	AlB	Commonly served as vegetable, to amazement of Javanese who reserve the plant for bathing cadavers.
membha	Meliaceae	*Azadirachta indica* A. Juss.	neem tree	mélia	mimba	BBmCM XO	To treat *sakè' koreng* (pustules between the fingers), or other skin ailments, leaves or bark are boiled and the bitter infusion is ingested. O: Planted in sawah areas, *membha* tends to ward off insects (due to repellent compound azadirachtin produced by seeds and leaves).

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
mennjan ampas, m. maddhoe	Styraceae	*Styrax benzoïn* Dryand.	benzoin	benjoin	kemenyan	O	O: Used for incense, most often to purify the *tanèan* on the eve of Fridays. More fragrant and longer-lasting, white benzoin from young trees *(mennjan madhoe)* is preferred.
merak ngègel	Leguminosae (C)	*Caesalpinia pulcherrima* Sw.	Barbados pride	fleur de paradis, poincillade	kembang merak	H	
moksor	Commelinaceae	*Commelina obliqua* Hanb.	water grass		gewor-geworan	B	
mondhu, mundu	Guttiferae	*Garcinia dulcis* Kurz	mangosteen (sp)	garcinie, mangoustan (esp.)	mundu	AfX	
motta' tasè	Cyperaceae	*Cyperus rotundus* L. (?)	nut sedge grass	souchet rond, souchet d'Asie	teki	-	
muntjes, buntjes, arcis	Leguminosae (P)	*Phaseolus vulgaris* L.	common, red kidney bean	haricot rouge	buncis merah	AnB	
nanas	Bromeliaceae	*Ananas comosus* Merr. (*Ananassa sativa* L.)	pineapple	ananas	nanas	AfM	Rare in Batuputih, but common in southeastern Madura. An abortive is made from grated unripe fruit, vinager, salt and large amounts of chili peppers.
nanggher	Bombacaceae	*Gossampinus heptaphylla* Bakh. (*Bombax malabaricum* DC.)	silk cotton	fromager	randu alas, randu agung	X	Fibre, of poorer quality than *kapo'*, is not used.
nangka balandha, n. ènglan	Annonaceae	*Annona muricata* L.	soursop	corossol	sirsak	AfB	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
nangka	Moraceae	*Artocarpus heterophyllus* Lamk.	jackfruit	jacque	nangka	AfnBCO	O: New-born babies are bathed in water in which a freshly-fallen *nangka* is immersed.
nang-penangan	Araliaceae	*Polyscias nodosa* Seem.	malapapaya		lanang, pucangan	X	
ne'mani'an	Scrophulariaceae	*Adenosma javanica*			ruku-ruku hutan	B	
ner-menneran	Euphorbiaceae	*Phyllanthus niruri* L.	stonebreaker, seed-under-leaf	herbe au chagrin	meniran	-	
nipa	Palmae	*Nipa fruticans* Wurmb.	nipa, marsh palm	nipa	nipah	XO	O: Fronds can substitute for cigarette paper.
njamplong, camplong	Guttiferae	*Calophyllum inophyllum* L.	Alexandrian laurel	bois canot	nyamplung	AfBC	*Nyamplong* is used in the construction of *prahu* and dwellings. Before the seeds were sold for their oil. A rudimentary lamp can be made from ground seeds rolled in kapok and set alight.
noja	Nyctaginaceae	*Mirabilis jalapa* Linn.	four o'clock plant	belle de nuit	kembang pukul empat	-	
nomi		(unidentified)				XO	O: Fruit is used in fish poisoning.
noribang lakè', bunga rèbhang	Malvaceae	*Hibiscus rosa-sinensis* Linn.	rose de Chine	Chinarose, shoe flower	kembang lampu, k. sepatu	H	
nyalateng		(unidentified)				-	Skin irritant.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
nyior, njijor, nyèyor	Palmae	*Cocos nucifera* L.	coconut	noix de coco	kelapa	AfBBmC EFMXO	O: Baskets for carrying or storing a variety of items, from cut grass and maize envelopes to live chickens and portions of beef from a freshly-slaughtered cow, are made from palm fronds. Young roots pounded with water yield a liquid that is ingested to treat internal ailements. Beehives are fashioned from sections of hollowed out trunk. Brooms are made from the frond nervures.
nyior-nyioran	Amaryllidaceae	*Curculigo capitulata* O.K.	palm grass, whale back		jongkok	AfBX	Fruit eaten by children.
obi, longga	Convolvulaceae	*Ipomoea batatas* (L.) Lamk.	sweet potato	patate douce	ubi jalar	ArB	
obi èlos, o. raddhin	Dioscoreaceae	*Discorea alata* L.	winged yam	dioscorée ailée	ubi kelapa	ArB	
obi kaburan, o. ata’	Dioscoraeceae	*Dioscorea bulbifera* L. (?)	air potato	hoffe, igname bulbifère, pomme en l’air	huwi buah, uwi kata, ubi singapura	ArBFM	
o-paowan	Anacardiaceae	*Buchanania arborescens* Bl. (?)	little gooseberry tree		pauh-pauhan	B	
opèlan, langay	Leguminosae (M)	*Acacia leucophloea* Willd.	white-barked acacia		pilang	BCX	
os-laosan	Zingiberaceae	*Hedychium coronarium* Koenig	white garland-lily		gandasuli, kembang laras	H	
oto’ dhabu’, oto’ cena	Leguminosae (P)	*Arachis hypogaea* L.	peanuts	cacahuètes	kacang tanah	AnB	*Oto’ dhabu’* (“pulled beans”) are harvested normally, by pulling up, while *oto’ cena* are pried out of the ground with a crowbar.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
oto' kalepat	Leguminosae (P)	*Vigna unguiculata* (L.) Walp.	catjang cowpea	haricot long	kacang panjang	AB	
oto' (k)arpis	Leguminosae (P)	*Phaseolus calcaratus* Roxb.	rice bean		kacang uci, endel	AnB	
pa'ala	Myristicaceae	*Myristica fragrans* Houtt.	nutmeg tree	muscadier	pala	Af	Rare.
padi	Poaceae	*Oryza sativa* L.	rice	riz	padi	AnB	
padi palotan	Poaceae	*Oryza sativa* L. *var. Glutinosa* Hack	glutinous rice	riz gluant	padi ketan	AnB	
pakes	Liliaceae	*Asparagus racemosus* Willd.	asperagus	aspèrge	asperagus	AsH	
pandan doeri bingkoang	Pandanaceae	*Pandanus littoralis* Jungh. or *Pandanus tectorius* Soland. ex Park.	screw-pine	pandanus	pandan pudak	BHXO	Young fronds can be fed to cattle. The flower of *pandan doeri (podeq)* is placed in the hair or linen to impart its perfume. The fruit is used for decoration at weddings.
pandan matabi	Pandanaceae	*Pandanus* sp.	screw-pine	pandanus	pandan	M	Essence of the leaves can be used to treat one who vomits blood.
pandan ro'om	Pandanaceae	*Pandanus odoratissimus* L. or *P. amaryllifolius* Roxb.	screw-pine	pandanus	pandan	O	Flowers are placed between folded clothes, or cut up in small bits and placed as an offering on graves. *Pandan doeri* and *pandan ro'om* fronds can be used in weaving hats or other handiwork (though *tarébung* is preferred) or gathered together to make a paintbrush.
pandhijang	Zingiberaceae	*Zingiber cassumunar* Roxb	plai	cassumunar	bengle	Bm	Poor appetite in cattle undergoing fattening is treated with a mixture of *pandhijang* and eggs.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
pao	Anacardiaceae	*Mangifera indica* L.	mango	mangue	mangga	AfnBX	Many varieties of *pao* exist in the Batuputih area, including *bental, gadung, gandi', ganès, ghendha, golek, kaini, kocor, madu, maghi', peghong, re-terra, serrat, tabhar, telor, tutul.* The seeds were consumed in the famine during and following the Japanese occupation.
parea	Cucurbitaceae	*Momordica charantia* L.	balsam pear, maiden's blush, bitter gourd, bitter cucumber	peparéh, momordique à feuille de vigne	paré, paria, peria	AflsM	
pas-pasan	Cucurbitaceae	*Coccinia cordifolia* Cogn. (*Coccinia grandis* Colgn. *var Wightiana* Cgn. or *Coccinia grandis* (L.) Voigt.)	ivy gourd		kemarungan, papasan	BO	*Pas-pasan* provides food for birds and cattle only.
pèlèh, pelle	Moraceae	*Streblus asper* Lour.	khoi, Siamese rough bush	streblus	kesinai, serut	BXO	Some specimens used for bonsai.
penang	Palmae	*Areca catechu* L.	areca nut, betel palm	noix d'arec	pinang	BCM	A *jamu* to treat impotence is made from ground *penang* nut, water, egg and honey.
perreng ampel	Graminae	*Bambusa vulgaris* Schrad.	bamboo	bambou	bambu tutul	BO	
perreng bulu	Graminae	*Schizostachyum blumei* Ness von Esenb.	bamboo	bambou	bambu tamiang	BO	O: Used for making flutes.
perreng duri	Graminae	*Bambusa blumeana* Bl. ex Schult.f.	bamboo	bambou	bambu duri	BC	Preferred for the construction of dwellings and fishing platforms (*bagan*), lattice walls (*gedek*), and tools requiring strong, hard wood.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
perreng kèlès	Graminae	(unidentified sp. of bamboo)	bamboo	bambou		BmC	*Perreng* and *kèlès* both mean "bamboo." *Perreng kèles* is not strong enough for most heavy construction. Split and woven, it is used for ceiling (*bitik*) materials. *Perreng kèles* leaves are given to cattle with diarrhea.
perreng talé	Graminae	*Gigantochloa apus* (Bl. ex Schult.f.) Kurz.	bamboo	bambou	bambu tali	BC	
poco'	Palmae	*Corypha gebanga* Bl.	talipot palm	palmier talipot, gebang	gebang	AfFO	O: Sago starch is prepared from the pith of the trunk and eaten by some in Aengmerah, and in the past was more widely consumed in times of famine. Fibres from the fronds *(kobal)* were used to make rope and sacks for salt (until replaced by plastic), as well as clothing during times of shortage.
pòlaj, polay	Apocynaceae	*Alstonia scholaris* (L.) R.Br.	white cheese wood	pulai	pulai	XO	O: The *polaj* is often revered as a sacred tree, and is rarely cut down.
pong-kapong	Apocynaceae	*Voacanga foetida* Rolfe.			rango-rango, hamperu	X	Latex does not appear to have been used.
potrè todhus	Leguminosae (M)	*Mimosa pudica* L.	sensitive plant, touch-me-not	sensitive	putri malu	B	Cattle and goats feed on young plants.
puring	Euphorbiaceae	*Codiaeum variegatum* Bl.	croton		puring	H	
rabet baladhing	Convolvulaceae	*Ipomoea gomezii* Clarke				M	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
rabet banar	Liliaceae	*Smilax* sp.				O	O: When a father brings his son to a Koran reading class (*penghajian*) for the first time, he presents an offering of rice placed on a *banar* leaf.
rabet mas-emasan		(unidentified)				BF	
rabet po-seppo	Convolvulaceae	*Argyreia mollis* Chois.				B	
rabet sonè		(unidentified)				O	O: Coarse vines are used for making loose mesh baskets *(peltong)* used most often to carry cut grass.
rabet tekkè'		(unidentified)				FX	Thick leaves are toxic to cattle.
ra-camaraan	Cupressaceae	*Cupressus funebris* Endl.	Chinese weeping cypress			HX	
rambusa		*Passiflora foetida* L.	love-in-a-mist, wild water lemon	passiflore fétide	rambusa	AfBFX	Fruits are eaten by children.
rang-aring	Compositae	*Eclipta alba* Hassk.	false daisy	éclipte blanche	urang aring, keremak jantan	BO	O: Leaves are boiled and the solution used as hair shampoo.
rantè	Solanaceae	*Solanum lycopersicum* L.	tomato	tomate	tomat, rangam	Af	
rebbha ata', r. benta	Poaceae	*Leersia hexandra* Swartz	rice grass		rumput kalamenta	B	
rebbha badjhang	Poaceae	*Themeda arguens* (L.) Hack. or *Andropogon aciculatus* Retz.	love grass	herbe platte	bajang-bajang, suket merak-merakan	BO	Called *rebbha ghenji* when young. Sometimes used for thatch.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
rebbha corre' koko	Poaceae	*Cynodon dactylon* Pers.	star grass, Bermuda grass, Bahama grass, dog's tooth grass, doob, Indian couch, wire grass	chiendent pied de poule, gros chiendent	rumput kawat	B	
rebbha dhilep	Labiatae	*Pogostemon cablin* (Blanco) Benth.	patchouli	patchouli	nilam	BO	O: Used as perfume and flavouring.
rebbha dhin-kamandhinan	Labiatae	*Coleus atropurpureux* Benth., *C. scutellarioides* Benth.	coleus		kentangan	B	
rebbha djam-adjaman	Poaceae	*Oplismenus* sp.			lamisan	B	
rebbha gadjha, r. jaba	Poaceae	*Pennisetum purpureum* Schumach.	elephant, napier, Uganda grass	millet (esp.)	rumput gajah	B	
rebbha gunggung, r. benggala, r. sabulan	Poaceae	*Panicum maximum* Jacq.	Guinea grass	herbe de Guinée	rumput benggala	B	
rebbha karpès		(unidentified)				B	
rebbha la'gula'an	Poaceae	*Digitaria decumbens* Stent., *D. eriantha* Steub.	common finger grass, pangola grass, slenderstem	digitaria			
rebbha leta	Poaceae	*Anastrophus compressus* Schlechtd.	blanket grass, carpet grass, Louisiana grass		rumput pahit	B	

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
rebbha padang	Poaceae	*Polytrias indica* (Houtt.) Veldkamp	java grass		lamuran, rumput embun, r. kasuran	B	
rebbha pangghu', r. mangghu'	Poaceae	*Eleusine indica* (L.) Gaertn.	rapoka, crowsfoot, wire grass	crételle des Indes	rumput belulang, jukut jampang	B	
rebbha rèd-karèdhan	Amaranthaceae	*Aerva sanguinolenta* Bl.			sambang colok	B	
rebbha sokobalang	Poaceae	*Chloris barbata* Swartz.	zèb-a-bab		rumput kembang goyang	B	
reng-perrengan	Poaceae	*Pogonatherum paniceum* (Lamk.) Hack.	golden hair grass, miniature bamboo	pogonathère faux-panicum, bambou miniature	rumput bambu	B	
rè-sèrè'an	Portulacaceae	*Portulaca oleracea* L.	purslane, little hogweed		gelang	B	
rokem	Flacourtiaceae	*Flacourtia rukam* Zoll. & Mor.	rukam	flacourtie, prunier café	rukam biasa, saradan	AfBX	
room-djarooman (a), lampo jangan	Poaceae	*Andropogon aciculatus* Retz.	love grass		rumput jarum	-	
room-djarooman (b)	Verbenaceae	*Stachytarpheta indica* Vahl	verbena (sort of), snakeweed	verveine bleue, queue de rat	jarong lelaki, pecut kuda	B	
rom-taroman	Leguminosae (P)	*Indigofera tinctoria* L.	indigo	indigo	tarum	-	Synthetic dyes now replace *rom-taroman.*

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
sa'ang	Piperaceae	*Piper nigrum* L.	black pepper	poivre noir	lada, merica	Af	Rare, but a bit reaches market where it fetches high prices.
sabbhrang	Euphorbiaceae	*Manihot esculenta* Crantz.	cassava	manioc	ubi kayu	ArlB	*Sabbhrang* varieties in Batuputih include *ambirikan, cekcek, karet, koprah, mandiga, mengnga'* and *jelleng.*
sabu	Sapotaceae	*Manilkara achras* (mill.) Fosberg	sapodilla, chiku	sapotille	sawo manila	AfCMX	Skin of fruit is thought to lower blood pressure. Latex is apparently not tapped.
sabu kecet, s. kecci', s. manila	Sapotaceae	*Manilkara kauki* Dubard	red, firm-flesh sapodilla	sawo	sawo kecik	AfCX	
sagha	Leguminosae (M)	*Adenanthera microsperma* T. & B.	bead tree	condori	saga pohon	AnX	
saladri	Umbelliferae	*Apium graveolens* L.	celery	céleri	seldri, selederi	Asl	
salak	Palmae	*Zalacca edulis* Reinw.	zalacca palm	zalacca	salak	AX	There are a few trees which do not bear fruit.
salam	Myrtaceae	*Eugenia polyantha* Wight	Indonesian bay leaf		salam	AfX	
salase ereng		(unidentified)				X	
samangka aeng	Cucurbitaceae	*Citrullus lanatus* (Thunb.) Mansf.	watermelon	pastèque	semangka	Af	
samangka balandha	Cucurbitaceae	*Cucumis melo* L.	cantaloupe	melon	belewah	Af	
sambiroto	Menispermaceae	*Tinospora crispa* (L.) Miers.	andawali		brotowali	MX	Woody vine is burned in lime kilns.
sawi (a)	Cruciferae	*Brassica chinensis* L.	Chinese cabbage, pak-choi	chou chinois	pecai, petsai, sawi putih	-	Occasionally planted near house, but rare.
sawi (b)	Cruciferae	*Brassica juncea* (L.) Czern. & Coss.	Indian mustard	brède moutarde	sawi-sawi, sawi hijau	-	
sébése		(unidentified)				BmX	Leaves used in *jamu sapè.*

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
sèccang, settjang	Leguminosae (C)	*Caesalpinia sappan* L.	sappanwood	bois de sappan, brésillet des Indes	sepang, sapang, secang	AbBMX	Boiling the lower branches in water obtains an infusion consumed as a refreshment or to treat stomach sickness.
sen-mangsenan, kandula	Basellaceae	*Basella alba* L.	Indian spinach, Malabar nightshade	brède d'Angole, épinard d'Amérique	gendola	AlH	
sèrèkaja	Annonaceae	*Annona squamosa* L.	sugar apple	pomme cannelle	serikaya	AfMX	Leaves are inserted in the nostril to stop nosebleed.
sèrè	Piperaceae	*Piper betle* L.	betel pepper	betel	sirih	M	Leaves are chewed with areca nut.
serè	Poaceae	*Cymbopogon nardus* (L.) Rendle var. *mahapengiri*	citronella grass	citronelle	serai wangi	Al	Used as seasoning and to make drink.
serre		(unidentified)				Als	Lower leaves or branches are used as seasoning.
sèrsèran		(unidentified)				HX	Can be used for bonsai.
sè-selasèjan, songot koceng	Labiatae	*Orthosiphon grandiflorus* Bold.	kidney tea	barbiflore, thé de Java	kumis kucing	BM	Tisane made from leaves is used to treat diabetes. Local people distinguish between *sè-salasèjan* and *songot kotjèng*, for which *O. spicatus* is sometimes given.
sokon	Moraceae	*Artocarpus altilis* (Park.) Fosberg	breadfruit	arbre à pain	sukun	AfB	
solangkeng	Labiatae	*Anisomeles indica* O.K.	cat mint		bandotan, slangking	-	
sondhel malem	Amarillydaceae	*Polianthes tuberosa* L.	tuberose	tubéreuse	sondel malam	H	
sri untung	Araceae	*Dieffenbachia picta*		canne de muet	balancing	H	
taghoeri	Malvaceae	*Sida retusa* L.	paddy's lucerne, jelly leaf	herbe à balai	sidaguri	B	Cattle only accept young shoots.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
tales	Araceae	*Colocasia esculenta* Schott.	taro	taro	talas	ArEt	
talpa' tana	Compositae	*Elephantopus scaber* L.	elephant's foot	tabac marron, pied d'éléphant	tapak liman	-	
tal-ta'alan		(unidentified)				O	O: The only use is for bonsai stock if appropriate.
tamanjho, co'-manco'an, bacen	Verbenaceae	*Lantana camara* Linn.	lantana, wild sage, curse of Barbados	herbe à plomb, camara, lantana à feuilles de mélisse	bunga tahi ayam	-	Grows wild.
tang-bintangan		(unidentified)	tumbleweed (sort of)		rumput berlari	XO	Children race the flowers on the beach in the wind.
tangghoeloen	Burseraceae	*Protium javanicum* Burn.f.	protium		trenggulum	AfC	
tanjung	Sapotaceae	*Mimusops elengi* L.	bullet wood, Spanish cherry	tanjung, canequi	tanjung	CX	Rare, many cut down over the years.
tarébung	Palmae	*Borassus flabellifer* L.	Asian palmyra, lontar palm, fan palm	palmier borasse	lontar, siwalan	AfuCEtFM	Cotton-like fibres under fronds are applied to wounds. *Tangkuli* (sap) mixed with powdered sulphur *(balirang)* is taken orally as a treatment for skin ulcers *(poro)*.
tareta	Euphorbiaceae	*Euphorbia neriifolia* L.	(sort of) succulent			-	
tarnjaq, t. binè'	Amaranthaceae	*Amaranthus* spp	spinach amaranth	épinard, amarante	bayam	AlsB	
tarnjaq duri, t. lakè'	Amaranthaceae	*Amaranthus spinosus* L.	spinach amaranth	blette épineuse, brède malabare	bayam duri, b. Jawa	AlsB	Grows wild in fields.

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
tar-sentaran, rat-jarat	Compositae	*Spilanthes acmella* Murr.	para cress	cresson de para	jotang, serunai rambat	B	
tebbu	Poaceae	*Saccharum officinarum* L.	sugarcane	canne à sucre	tebu	AB	Some is planted near wells.
teh	Theaceae	*Camellia sinensis* (L.) O. Kuntze	tea	Thé	teh	Al	A few households grow one or two trees for family consumption.
telpo', rok-korok	Leguminosae (P)	*Crotalaria striata* DC.	rattlepod, rattlebox	crotalaire	orok-orok	BM	Leaves are applied to large skin ulcers *(poro)*.
témalja		(unidentified)				Bm	Leaves are used for *jamu sapè*.
temmo labak	Zingiberaceae	*Curcuma xanthorrhiza* Roxb.	tumeric (type of)	curcuma (esp.)	temu lawak	Af	
temmo potè, t. pao	Zingiberaceae	*Curcuma mangga* Val. & van Zijp	tumeric (type of)	curcuma (esp.)	temu putih	BmM	
tèmon, mon-tèmon	Cucurbitaceae	*Cucumis sativus* L.	cucumber	concombre	ketimun	AfB	
terrong	Solanaceae	*Solanum melongena* L.	eggplant	aubergine	terung	Af	
terrong perrat	Solanaceae	*Solanum ferox* L.	hairy-fruited eggplant			M	
tette	Loranthaceae	*Viscum* or *Loranthus* spp.?				B	
thèk-kèthèk		(unidentified)				O	Seeds are used as children's toys.
théng-kaphéténgan		(unidentified)				M	Leaves are used to treat fungus infections of the foot.
tjaremmè, caremmè	Euphorbiaceae	*Phyllanthus acidus* (L.) Skeels	otaheite gooseberry	chéramélier	cermai	Af	
tompang baret	Euphorbiaceae	*Acalypha hispida* Burm.f. or *A. boehmeriodes* Miq.	red hot cat tail		ekor kucing	B	

Appendices

Madurese	Family	Species	English	French	Indonesian	Uses	Notes
tompang parot	Euphorbiaceae	*Acalypha lanceolata* Willd. (?)	Indian copperleaf, three-seeded-mercury		daun brahman	B	
tongko' bato		*Opuntia negricans* Haw.					
tòroj	Leguminosae (P)	*Sesbania grandiflora* (L.) Pers.	agati	agathis	turi	AfBX	
to-oto'an		(unidentified)				B	Resembles *oto' arpis* but lacks beans.
wortel	Umbelliferae	*Daucus carota* L.	carrot	carotte	wortel	ArBM	Juice is consumed to treat eye afflictions.

Appendix III
List of animals found in the Batuputih area and their uses

Key to Column M = Consumed or not by humans
M = Usually consumed
S = Consumed by some people
L = Only consumed in times of famine
T = Not consumed
H = Important historical or oral literature reference
R = Characterized by ritual or ceremonial use or taboo
J = Used in medical *(jamo)* treatments
C = Children's toy or adult competitive use

Madurese	Family	Species	English	French	Indonesian	M
ajam astrali, a. kastroli	Phasianidae	*Gallus* sp	chicken (raised in coop)	poulet (élevé en batterie)	ayam astrali, lenghorn putih, ayam ras	M
ajam kampong	Phasianidae	*Gallus* sp	chicken (raised outside coop)	poulet (élevé libre)	ayam kampung	MJR
ajam potong	Phasianidae	*Gallus* sp	broiler chicken	poulet d'élevage (pour la viande)	ayam broiler	M
ajam tarata	Phasianidae	*Gallus gallus bankiva*	red junglefowl	coq bankiva	ayam hutan merah	M
anggai	Gryllotalpidae	*Gryllotalpa* spp	mole crickets	taupe-grillon	anjing tanah, orong-orong, gaäng	T
angkop			cricket (sort of)	criquet (sorte de)	sejenis balang	T
babburu, cocodut	Rhinolophidae	*Hipposideros madurae* Kitchener and Maryanto *; Rhinolophus madurensis* K. Andersen	Maduran Leaf-nosed bat ; Madura horseshoe bat	chauve-souris insectivore (sorte de)	kelelawar	SB
badir	Cyprinidae	*Puntius bramoides* C.V.	barb	barbu	wader, bader merah	M

Appendices

Madurese	Family	Species	English	French	Indonesian	M
baksangger (sort of large kalabang)			(type of) centipede			
balang mennyan	Phaneropte-rinae (Scaphurinae)	*Holochlora pygmaea* Karny	sickle grasshopper			TH
balang arba	Acrididae	*Acrida turrita* (L.)	grasshopper (elongated head)		walang, belalang	T
balang bato	Acrididae		type of grasshopper			T
balang battung	Mantidae	*Creoboter* sp	praying mantis		belalang sembah	T
balang giggiri						T
balang kaju	Acrididae	*Valanga nigricornis* (Burm.), subsp *melanocornis* (Serv.) (= *V. zehntneri* Krauss)	grasshopper		walang kaju	TJ
balang leng-malengan	Acrididae	*Atractomorpha rhodoptera* (Karsch) = *A. crenulata* (F.)				T
balang rebba						T
balang songko’						T
banyak	Anatidae	*Anser anser domesticus* or *Anser sygnoides* L.	domestic or swan goose	oie	angsa	SH
barabba’			termite	termites	rayap	T
barakai	Varanidae	*Varanus* sp.			biawak	MJ
baringsang						S
bellu’	Synbranchidae	*Monopterus albus*	Asian swamp eel, rice eel, white ricefield eel		belut	MJ
ber-abber						T
bi’-bibbi’an						T

Madurese	Family	Species	English	French	Indonesian	M
bilis celleng	Formicidae		black ant		semut hitam	T
bilis gabal	Formicidae					T
bilis gatel	Formicidae		urticarial ant		semut gatel	T
bilis gurem	Formicidae		urticarial ant		semut gatel	T
bilis kaber	Formicidae		fire ant		semut api	T
bilis kekke’	Formicidae					T
bilis lenyeng	Formicidae					T
bilis mera	Formicidae		red ant		semut merah	TH
bilis perrang	Formicidae		tree-dwelling acid-projecting ant			T
bilis podhak	Formicidae					T
bilis semut	Formicidae		red fire ant		semut api	T
bung-combung						T
caceng	Megascolecidae	*Phreretima elongata* E. Perr., etc.	earthworm (type of)	vers de terre	cacing tanah	LH
cek ding-ding			long-legged spider which vibrates on walls of bathroom (*jeddhing*).			T
cek-cek			chamelion lizard		cecak	TH
cong-cong	Achatinidae	*Achatina fulica* Bowd.	giant African snail		bekicot	L
cong-cong songai	Subulinidae	Resembles *Lamellaxis gracilis* Hutt.	resembles graceful awlsnail			J
dabha’			tadpole		berudu	T
dara					merpati	MH
ebbu’	Sciuridae	*Callosciurus notatus* Bodd. *C. nigrovittatus*	squirrel	écureuil	tupai, bajing	S
embi’			goat	chèvre	kambing	M

Madurese	Family	Species	English	French	Indonesian	M
enthok				sort of small goose	mentok	M
etek					itik	M
gagatteng	Nephilidae	*Nephilia* sp.	golden orb-weaver		sejenis laba-laba	TC
galata					kutu busuk	T
ganta’			cricket (type of, small)		small jangkrik (macam)	T
ganta’ cola	Gryllacridae	*Raphidophora picea* Serv.	cricket (type of, bent body)		jangkrik (macam)	T
ganta’ cetthet	Gryllacridae	*Gryllacris signifera* Stoll, *G. tibialis* Serv.	cricket (type of,		jangkrik (macam)	T
garamang						T
gig-enggig (a)	Cerambycidae	*Batocera hector*	longhorn beetle		kokolan, wowolan	T
gig-enggig (b), budhu’na	Cerambycidae	*Xystrocera festiva* Thoms.	stem borer of leguminous trees			T
jajjalang			termite	termite	laron	MC
jangrek	Gryllidae	*Teleogryllus* (= *Gryllus*) *mitratus* (Burm.)	fighting cricket		jangkrik	T
jaran					kuda	LR
jerring (a)	Gryllidae	*Brachytrypes portentosus* Licht.	large field cricket (type of)		gangsir	T
jerring (b)	Delphacidae	*Nilaparvata lugens* (Stål)	brown plant hopper		hama werèng	T
jujjuling					cecurut	L
(jerruk poroan)	Melanconiaceae	*Sphaceloma* sp	fungus		(penyakit kudis)	T
kabambung	Curculionidae: Rhynchopho-rinae (Calandrinae)	*Rhynchophorus ferrugineus* Ol.	red palm weevil			T
kaber kombang						L

Appendices

Madurese	Family	Species	English	French	Indonesian	M
kaccowa’						T
kadalpang					kadalpang	LJ
kaddal barangan						T
kaddal	Scincidae	*Chalcides* sp (?)		(species of) skink	kadal	L
kaddal biru					kadal hijau	T
kaddal lalang	Scincidae	*Chalcides* sp (?)		(species of) legless skink	kadal ilalang	T
kakaper padhi	Delphacidae	*Recilia dorsalis* (Motsch) (=*Inazuma)*	zig zag winged leaf hopper			
kakapper	Noctuidae	*Sesamia inferens* (Wlk.)	purple stem-borer of Gramineae		kupu-kupu	T
kakejjer						T
kala			scorpion (type of)		kala	T
kala cengkeng			scorpion (type of)			T
kala gumarang			scorpion (type of)			T
kala mangga			scorpion (type of)			T
kalabang nyalanya			(type of small) centipede			T
kalabang			(type of medium-size) poisonous centipede		kelabang , lipan	T
kalallaba	Araneidae sp				laba laba	TH
kalanceng						S
kalanceng pote						L
kalangra	Chrysomelidae (Sagrinae)	*Sagra femorata* Drur.	leaf beetle (type of)			T
kalangra						T

Madurese	Family	Species	English	French	Indonesian	M
kalemmar	Cyprinidae	*Rasbora* sp (?)			wader	M
kaleng			red ant		semut merah	M
kaleng marda			red ant		semut merah	M
kaloang	Pteropodidae	*Pteropus vampyrus* (L.)	large flying fox		kalong	S
kamonduran	Agamidae	*Calotes versicolor*	Indian bloodsucker		bunglon	T
kancel	Tragulidae	*Tragulus javanicus* Osbeck	lesser mouse deer	cerf-nain, petit chevrotain malais	kancil	SH
kapang	Curculionidae	*Sitophilus zeamais* Motsch.	rice (and maize) weevil	charançon	kumbang (beras, jagung)	T
karambut	Meloidae	*Mylabris pustulata* Th.	blister beetle	charançon	kumbang (lepuh, gatal)	T
karorroe	Acrididae sp		grasshopper	sautrelle	balang (sejenis)	T
kata' kerker, kata' peltung	Bufonidae	*Bufo melanostictus*	black-spined toad	crapaud	rangkong	T
kata' biru, kata' cetet	Microhylidae	*Kaloula pulchra* Grey	Asian painted frog	grenouille verte	katak hijau	O
kata' pote, kata' tapa	Rhacophoridae	*Polypedates leucomystax*	Asian flying frog		katak pohon	T
kata' seregate						TR
katempe	Pentatominae	Pentatominae sp. Exactly like *Pygomenida varipennis* (Westw.) except 25-30 mm, rather than 5-7 mm.	(type of) shield bug			T
katempe	Pentatominae	*Pycanum alternatum* Lep. & Serv. (?)	(type of) shield bug			T
katongging					kala jengking	T
keteran (voir mano' keteran)					perkutut	THC
koceng	Felidae	*Felis catus* L.	cat	chat	kucing	T
kokkonang					kunang kunang	T

Madurese	Family	Species	English	French	Indonesian	M
kole' labang			(type of) slug			T
kombang	Curculionidae (Scolytinae)		bark beetle	coléoptère	kumbang kayu	T
koncel					ikan gabus	M
koneng daon (name of disease lice transmits)	Psyllidae	*Diaphorina citri* Kuw.	jumping plant lice		kutu daun	T
kong-bukong						T
konjair	Anisoptera		dragonfly	libellule	capung	TC
kotempa	Trionychidae	*Tryonix* sp.	softshell turtle	tortue d'eau douce à carapace molle	kura-kura	SMJ
koto			head lice		kutu	S
koto bungga	Diaspididae	*Parlatoria zizyphus* Luc., *P. pergadii* Comst., [Diaspididae] sp	black scale of citrus		kutu perisai	T
koto (sans nom)	Aleyrodidae	*Aleurocanthus citriperdus* Q. & B.	spined whiteflies		kutu aleorocanthus	T
kotok	Channidae	*Channa striata* Bl.	chevron snake head	poisson-serpent	ikan gabus	M
ko'ol	Mollusca		type of snail			H
lala'	Muscidae	*Musca domestica* L.	house fly	mouche domestique	lalat	T
lala' baning	Diptera (order)					T
lala' kerekke	Diptera (order)					T
lala' kong-rokong	Diptera (order)					T
lala' pacek	Diptera (order)					T
lala' por-tempor	Diptera (order)					T
landha'	Hystricidae	*Hystrix brachyura* L.	porcupine	porc-épic	landak	M

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Madurese	Family	Species	English	French	Indonesian	M
lay-alay			(wood-boring insect)			T
lempe’						
lonthe	Melolonthinae	*Phyllophaga* (= *Lachnosterna, Holotrichia*) *helleri* (Brsk.)	chafer beetle (grubs)	scarabée		S
manjangan	Cervidae	*Cervus timorensis* Blainville	Timor deer	cerf	rusa	M
mano ola’ (c), mano’ li-jali	Nectarinidae	*Arachnothera longirostra prillwitzi*	little spiderhunter	petit arachnothère	burung jantung kecil	LJ
mano’ kapodang	Oriolidae	*Oriolus chinensis maculatus*	black-naped oriole	loriot (esp.) (à nuque noir)	kepodang	L
mano’ barandaja (a)	Apodidae	*Aerodramus (Collocalia) maximus*	black-nest swiftlet	martinet (esp.) (à nid noir)	walet sarang hitam	T
mano’ barandaja (b)	Apodidae	*Aerodramus (Collocalia) fuciphagus*	edible-nest swiftlet	martinet (esp.) (à nid blanc)	walet sarang putih	T
mano’ kapodang aeng	Oriolidae	*Oriolus xanthonotus xanthonotus*	black-headed oriole	loriot (esp.) (à tête noire)	kepodang hutan	L
mano’ gabul						T
mano’ galte’	Ploceidae	*Padda (Munia) oryzivora*	Java sparrow	moineau de Java	gelatik, gelatik jawa	TH
mano’ gentong coet	Nectarinidae	*Anthreptes malacensis malacensis*	brown-throated sunbird, plain-throated sunbird	souimanga à gorge brune	burung madu kelapa	T
mano’ kowek					hantu	LH
mano’ ola’ (a), mano’ keccet	Sylviidae	*Orthotomus sepium ruficeps*	ashy tailorbird	fauvette couturière	cinenen kelabu	LJ
mano’ ola’ (b)	Sylviidae	*Prinia subflava blythi*	tawny-flanked prinia (warbler)	prinia (fauvette)	perenjak sisi merah	

Madurese	Family	Species	English	French	Indonesian	M
mano' perke'						M
mano' tette	Dicaeidae	*Dicaeum trochileum trochileum*	scarlet-headed flowerpecker	dicée à tête écarlate	burung cabe, soepa (S)	T
mano' komantra	Columbidae	*Treron vernans purpurea*	pink-necked pigeon	pigeons	punai leher merah, truwelot, katik walik	M
mano' coccorong	Meropidae	sp. of Merops	bee-eater (sp.)	guépier (sp.)	kirik-kirik (sp.)	L
mano' gemmek	Turnicidae	*Turnix susciator susciator*	barred button-quail	caille (sp)	puyuh tegalan loreng	SH
mano' addas	Laniidae	*Lanius schach bentet*	long-tailed shrike	pie-grièche schach	bentet	LJ
mano' bukong	Psittacidae	*Psittacula alexandri alexandri*	moustached parakeet, red-breasted parakeet	perruche (sp)	betet	TH
mano' but-embut	Cuculidae	*Centropus sinensis bubutus*	greater coucal	grand coucal	bubut besar	L
mano' cabba'	Accipitridae	*Accipiter gularis*	japanese sparrowhawk	épervier du Japon	elang nipon	S
mano' cangka bunto'	Dicruridae	*Dicrurus macrocercus javanus*	black drongo	drongo royal	srigunting hitam	T
mano' daddali	Apodidae	*Collocalia escuelenta linchi*	white-bellied swiftlet, cave swiftlet	salangane linchi	walet sapi	T
mano' dalko' (a)	Ardeidae	*Ardeola speciosa speciosa*	Javan pond heron	crabier malais	blekok sawah	TH
mano' dalko' damè	Ardeidae	*Ardea purpurea manilensis*	purple heron	héron pourpré	cangak merah	S
mano' dalko' (b)	Ardeidae	*Bubulcus ibis coromandus* Boddaerd	cattle egret	héron gardeboeuf	kuntul kerbau	M
mano' dang-dang ara	Corvidae	*Corvus macrorhynchos macrorhynchos*	jungle crow, large-billed crow	corbeau à grand bec, corbeau à gros bec	gagak kampung, gaok	SH

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Madurese	Family	Species	English	French	Indonesian	M
mano' dang-dang majit	Corvidae	*Corvus enca enca*	slender-billed crow	corneille à bec fin, corbeau de Nouvelle Guinée	gagak hutan	S
mano' elang, seka' (a)	Accipitridae	*Ictinaetus malayensis malayensis*	black eagle	spizaëte, aigle noir indien	elang hitam	M
mano' galte' tema	Ploceidae	*Amandava amandava punicea*	red avadavat	Bengali rouge	pipit benggala, emprit benggala	S
mano' gesseng	Rostratulidae	*Charadrius mongolus*	Mongolian plover, lesser sand plover	gravelot mongol	cerek monggol	
mano' jalak pote	Sturnidae	*Sturnus melanopterus tericolor*	black-winged starling	étourneau, martin-pie (sp)	jalak putih, jalak bodas	T
mano' jalak caceng	Sturnidae	*Sturnus contra jalla*	Asian pied starling	étourneau, martin-pie (sp)	jalak suren	T
mano' kerre						TR
mano' kes-kes	Alcedinidae	*Halcyon chloris*	white-collared kingfisher	martin-pêcheur à gorge blanche	cekakak, raja udang biru	T
mano' keteran	Columbidae	*Geopelia striata*	peaceful dove, zebra dove	tourterelle striée	perkutut	THC
mano' ketti'	Ploceidae	*Lonchura leucogastroides* (H. & M.)	Javan munia		bondol jawa, pipit	T
mano' ketti' cèna	Ploceidae	*Lonchura maja leucocephala*	white-headed munia		bondol haji	T
mano' koace	Cuculidae	*Centropus nigrorufus*	sunda coucal	coucal noirou	bubut hitam	S
mano' koju' aeng, m. koju' rombu	Pycnonotidae	*Pycnonotus goiavier analis*	yellow-vented bulbul	bulbul (sp)	cerukcuk, terucuk	LJ
mano' koju' songko	Pycnonotidae	*Pycnonotus aurigaster*	sooty-headed bulbul	bulbul à ventre jaune, bulbul condor	kutilang	LJ
mano' koste-kosan	Rallidae	*Gallirallus striatus*	slaty-breasted rail	râle strié	mandar padi	S

Madurese	Family	Species	English	French	Indonesian	M
mano' ob-saoban (a)	Sternidae	*Sterna sumatrana sumatrana*	black-naped tern	sterne (sp)	dara laut sumatera	S
mano' ob-saoban (b)	Sternidae	*Sterna albifrons*	little tern	sterne naine	dara laut kecil	S
mano' ob-saoban (c)	Sternidae	*Chlidonias hybridus hybridus*	whiskered tern	guifette moustac	dara laut berkumis, Camar	S
mano' ong-ko'ong, mano' lek-kolek	Cuculidae	*Eudynamys scolopacea malayana*	common koel	koel	culik-culik, tuwut, tuweuw	MH
mano' pas-kapasan	Muscicapidae	*Ficedula westermanni hasselti*	little pied flycatcher	petit gobemouche	sikatan belang	S
mano' poter bali						MC
mano' poter pote						M
mano' poter	Columbidae	*Streptopelia chinensis tigrina*	spotted dove	tourterelle de Chine	tekukur	M
mano' ra'-derra', m. kalong	Columbidae	*Streptopelia bitorquata bitorquata*	Javan turtle dove	tourterelle de Java	putar, puter-genni, deruk	M
mano' ran-jaranan	Alcedinidae	*Halcyon pileata*	black-capped kingfisher	martin-pêcheur (sp)	cekakak cina	L
mano' rijan	Ploceidae	*Passer montanus malaccensis*	Eurasian tree-sparrow	moineau friquet	burung gereja	T
mano' rijel					burung gereja (sp)	L
mano' ro-cerro'	Sternidae	*Anous minutus*	white-capped noddy, black noddy	noddi noir	dara laut hitam kecil	
mano' seka' (b)						SH
mano' tellen (a)	Charadriidae	*Pluvialis dominica fulva*	lesser golden plover	pluvier doré, pluvier bronzé	trulek kli-it	
mano' tharas, m. daris						L

Madurese	Family	Species	English	French	Indonesian	M
mano' thek-thek						LH
mano' thili bhak bhak, tur bhak bhak	Rallidae	*Amaurornis phoenicurus phoenicurus* = *A.p. javanicus* Horsfield	white-breasted waterhen	râle à poitrine blanche	kareo, terkuak, sribombok	M
mano' thok-thok, cocco' balato'	Picidae	*Picoides macei auritus*	fulvous-breasted woodpecker	pic (sp.)	caladi (platuk) ulam	L
mano' tottoeng					uncal	T
mano'jalak tandu'	Sturnidae	*Acridotheres javanicus (fuscus) javanicus*	white-vented myna, Javan myna	martin à ventre blanc	jalak ungu	L
mano'thong-latthong	Muscicapidae	*Rhipidura javanica javanica*	pied fantail	bergeronnette (?)	kipasan	L
marmot					kelinci	MJ
mas-emasan	Chrysomelidae: Cassidinae	*Aspidomorpha miliaris* F.	spotted tortoise beetle			T
merreng	Delphacidae	*Nilaparvata lugens* (Stål)	brown plant hopper		wereng coklat	T
merreng bako	Thripidae	*Thrips* (= *Isoneurothrips*) *parvispinus* (Karny)	tobacco thrips (not in ITIS database)			T
merreng jerruk	Aphidoidea	*Toxoptera citricidus* Kirk.	citrus aphid		kutu daun	T
merreng potè	Pseudococci-dae	*Ferrisia virgata* Ckll.	striped mealy bug, lamtoro luis			T
mondhung potè						H
moseng	Viverridae	*Paradoxurus hermaphroditus* Pallas	Asian palm civet	civette (type of)	musang, luwak	S
mothak	Primates (order)				kera	LHJ
mujair	Cichlidae	*Tilapia Mossambica* Peters	Mozambique tilapia	Tilapia de Java	ikan mujair	M

Madurese	Family	Species	English	French	Indonesian	M
nge-renge (a)	Blattidae	*Neostylopygia rhombifolia* Stoll,	cockroach		kecoa, lipas, tjoro	
nge-renge (b)	Blattidae	*Periplaneta australasiae* (Fab.)	cockroach		kecoa, lipas, tjoro	
nge-renge (c)	Blattidae	*Periplaneta americana* (L.)	cockroach		kecoa, lipas, tjoro	
nget-nget					ngengat	T
nyang-manyang (a)	Scolioidea	*Campsomeris* sp	scoliid wasp (type of small and medium-sized)			T
nyang-manyang (b)	Syrphidae	Syrphidae spp. similar to *Ischiodon scutellaris* (F.)	(type of) hover fly			
nyaroan	Apidae	*Apis mellifera* L.	bee	abeille	lebah	M
ola' kakapa (a)	Lymantriidae	*Orgyia postica* Wlk.	tussock moth caterpillar (type of)			
ola' kakapa (b)	Lymantriidae	*Psalis* (= *Dasychira*) *pennatula* (Fab.)	hairy rice caterpillar			
ola' kakapa (c)	Lymantriidae	*Dasychira inclusa* Wlk.	tussock moth caterpillar (type of)			
ola' komandeggan	Sphingidae	*Acherontia lachesis* F.	death's head hawk moth	Sphinx tête-de-mort		TC
ola' bulu						T
ola' galing	Sphingidae	*Agrius* (= *Herse*) *convolvuli* L.	hawk moth (type of)			T
ola' kelan	Noctuidae	*Plusia signata* (F.)	green semi-looper of tobacco		ulat bengkok, ulat kilan	T
ola' kelleng						T
ola' keppai					kipas	T
ola' lengleng						T

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Madurese	Family	Species	English	French	Indonesian	M
ola’ lenteng					jentik	T
ola’ maleng						T
ola’ marda						T
ola’ pate’						T
ola’ sengnga’						T
ola’ senni’						T
ola’ wa’ - kowa’						T
olake						T
olar aeng						L
olar baraso					ular tikus	L
olar bellang	Elapidae	*Bungarus fasciatus* Schneider	banded krait	bongare	ular welang	L
olar centhong	Elapidae	*Ophiophagus hannah*	king cobra	cobra	ular senduk	L
olar daun	Viperidae	*Trimeresurus albolabris*	green tree viper		ular daun, ular hijau	L
olar kaber	Viperidae	*Agkistrodon rhodostoma*		typhlos, serpent aveugle	ular tanah	L
olar kaber labing						L
olar kaber kokon						L
olar kaber mani’						L
olar kaber manyang						L
olar kaber celleng						L
olar kaber macan						L
olar kandilis	Colubridae	*Rhabdophis subminiatus* Schlegel	red-necked keelback		ular picung	L
olar lajing karakat						RH

Madurese	Family	Species	English	French	Indonesian	M
olar lajing					ular naga	L
olar naga					ular naga	LH
olar saba	Boidae	*Python molurus*	Asian rock python		ular sawah	L
olar tampong are						LR
olar teker	Viperidae	*Calloselasma rhodostoma*	Malayan pit viper		ular tikar	T
olar tekos	Colubridae	*Xenochropis piscator*	checkered keelback snake		ular koros	L
ola’ kakapa						T
ola’na bako, ola’ popos, lengga	Noctuidae	*Heliothis assulta* Gn.	tobacco caterpillar		ulat pupus	T
ola’na jerruk	Papilionidae	*Papilio polytes* L.	swallowtail butterfly larvae		ulat kupu-kupu	
opas						C
pak-ampak						T
patè’					anjing	T
pennyu	Testudines (order)		turtle	tortue	penyu	M
pe’-kampe’	Forficulidae	*Chelisoches morio* (F.)	earwig			T
pok kopok						TH
rang-birang			centipede (thick red/brown variety often seen)		lipan	LR
rang-garangan	Mustelidea	*Mustela lutreola* L.	ferret, European mink	furret, vison de l’Europe	mermer, cerpelai, garangan	L
rappat					rayap	TH
ra’-dara’an (a)	Pentatomidae: Scutellerinae	*Chrysocoris javanus* Westw.	shield Bug (type of)			T
ra’-dara’an (c)	Pentatomidae: Pentatominae	*Nezara viridula* (L.) var. *torquata*	green stink bug		kepik hijau, lembing	T

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Madurese	Family	Species	English	French	Indonesian	M
ra'-dara'an (d)	Pentatomidae: Pentatominae	*Tolumnia tritonata* Westw.	shield bug (type of)			T
ra'-dara'an (e)	Coccinellidae	*Coelophora inaequalis* ab. *iridea* (Thunb.)	ladybird beetle, ladybug (type of)	coccinelle (sorte de)	kumbang koksinéla (sm)	T
ra'-dara'an (f)	Epilachninae	*Henosepilachna* (= *Epilachna*) sp.	ladybird beetle, ladybug (type of)	coccinelle (sorte de)	kumbang koksinéla (sm)	T
ra'-dara'an (g)						
reggu						T
reng-berreng	Plataspididae	*Brachyplatys* sp	dwarf shield bug			T
rengnge'			mosquito	moustique	nyamuk	T
ro'-kerro'						T
rot-sorot	Diptera (order)		small mosquito	petite moustique	nyamuk	T
rot-sorot gentong						LR
rotos						T
sape	Bovidae	*Bos javanicus*-*Bos tarus*-*Bos indicus* (fertile hybrid)	Maduran cow	vache madouraise	sapi Madura	MC
satbuter, buterset						TC
seongan	Clariidae	*Clarias batrachus linnaeus* Bleeker	catfish		lele	M
seset						T
seset jarum	Asilidae	*Philodicus javanus* (Wied.)	predatory fly		capung jarum	TC
tabuan			large hornet	guêpe-frelon	tabuhan	M
tabuan kene'						S
tabuan raja						T

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Madurese	Family	Species	English	French	Indonesian	M
tanggalung	Viverridae	*Viverra tangalunga*	Malayan civet	civette tangalunga	musang tenggalung	L
tanggiling	Manidae	*Manis javanica* Desmaret	Sunda pangolin, scaly anteater	pangolin de Malaisie	trenggiling, tenggiling	MJ
tanoker	Noctuidae	*Sesamia inferens* (Wlk.)	purple stem-borer of Gramineae			T
tekko’	Gekkonidae	*Gekko gecko*	tokay gecko		tokek	L
tekos	Muridae	*Rattus* spp.	rat		tikus	L
tenango, balang sangit	Alydidae	*Leptocorisa oratorius* (F.) = *Leptocorixa acuta* Thunb.	rice bug, paddy bug		walang sangit	T
tep-gatep, gig-enggig (c)	Elateridae		click beetle, type of			T
tokkang					kuskus	TR
torbu’	Scarabaeoidea	*Dynastes* (= *Xylotrupes*) *gideon* (L.)	rhinoceros beetle (type of)		kumbang kelapa (sorte de)	M
torbu’ jerruk						T
wang-guwang	Scarabaeoidea	*Oryctes rhinoceros* L.	rhinoceros beetle		kumbang tanduk (sorte de)	T

References: Capula 1989; Kalshoven 1981; Labrousse 1984, MacKinnon 1991; Maradjo 1976, 1983; Sastrapradja 1977.

Appendix IV
Weights and Measures

Table A.6 Weights and measures used in Gedang-Gedang and metric equivalents

Surface:					
lagghu	0.125	hectare	*bouw* (historical)	0.7096	ha
Dry:					
pikol (historical)	60, 137	kilograms	*koyang* (historical)	200, 2000	kg
kojan	900	kg	*kintal, karong, daggu*	100	kg
pikol (shoulder-pole)	~ 60	kg	*bhehte*	30	kg
soc (maize, rice)	~ 50	kg	*ghantang* (rice)	3.0	kg
ghantang (maize)	3.25	kg	*meter* (rice)	1.5	kg
meter	0.5	*gantang*	*corong* (rice)	0.75	kg
corong, litre	0.5	*meter*	*saperepet*	0.375	kg
saperepet	0.5	*carong*	*cengkele* (of *oto arpis*)	400	g
kolak, cangker (of *oto arpis*)	133	grams			
Liquid:					
tang, drum	200	litres			
carong	1	l.	*canteng raja*	1	decilitre
cengkele	0.5	l	*canteng kènè'*	0.5	dl.
Distance:					
sadepa' (one armspread)	1.25-2	m	*sapangolok'an* (the distance voice carries)	50-200	m

Appendix V
Glossary

abdi[231]	- court retainer
air/aèng	- water
alas	- mixed coppice, uncultivated land, forest, 'wilderness'
alang-alang/lalang	- long grass variety (*Imperata cyclindrica*)
alia/aliyah (Arabic)	- Islamic high school
alos	- soft, delicate, refined, cultured
alun-alun/lon-alon	- town square
arak	- alcohol made of rice or palm juice
arisan/arèsan	- revolving savings and credit association
arta'	- green gram; mungbean (*Paseolus aureus, Roxb*.)
asaka/asaka'	- to plough
ayam/ajam	- chicken
bagan	- fixed fishing platform
bal	- bale
bara'	- West; west monsoon
barisan	- Madurese troops allied to VOC
bharung	- rudimentary shelter; shed
becak	- pedicab
beccè	- harmonious relationship
bengko	- house [various types]
bhala	- a kinsman or relative
bhengngok	- Bengal bean (*Stizolobium aterrimum*)
bhuju'	- sacred tomb
blidja	- trader
blidja kènè'	- small trader
blidja raja	- large trader
bindingan	- a raised mound for a tobacco plant
bor	- drill; tube well
braskin/raskin	- poor quality rice; 'rice for the poor'
bupati	- district head
buyut	- ancestor; sacred place
bamat	- sub-district head
barik/carèk	- village secretary
barok	- knife-fight; violent attack
cekdam	- water reservoir; man-made lake
cukupan/cokopan	- 'those who have enough'; people of adequate means
dagang/dhagang	- trade; trader
dapor/dhapor	- kitchen
desa/disa	- village
dikir/dikkèr	- prayer
dokar	- horse-pulled wagon
dukun/dukon	- native healer; magician; ritual specialist
ilmu/èlmo	- science, esoteric religious doctrine
embi'	- goat

[231] This glossary is limited to the Madurese and Indonesian/Madurese words frequently used in this thesis.

ghantang	- a particular unit measurement
gheddhang	- banana (tree)
ghulung	- bundle
gudang	- warehouse; a storage facility
guweh	- cave
haddrah	- male religious chant and dancing session
jagung/jaghung	- maize (flint type varieties, *Zea mays indurate* L.)
jamu/jamo	- indigenous medicinal potion/ointment
juragan/jraghan	- large trader
kabupaten	- district/regency
kadhelli	- soybean (*Glycine max* L.)
kampung/kampong	- hamlet, neighbourhood
kandang/kandhang	- stable, cowshed
keranjang	- basket
kerrabhan sapè	- bull-racing contest
karesidènan	- residency
kasar	- crude(ness), impolite(ness)
kèban	- domesticated animal
kecamatan	- sub-district
kemarau/nèmor	- dry season
keluarga	- (nuclear) family
kepala keluarga	- household head
kemit	- village aide
kiyai/kiyaè	- religious teacher/leader
klèbun	- Madurese village head
komak	- hyacinth bean (*Labla purpureus*)
kotamadya	- town/city/municipality
krètèk	- clove cigarette
la'ang	- palm juice
la'as	- unhusked rice
labang	- door, portal
ladang	- swidden farming land
lagghu	- measure of land
lalang	- long grass variety (*Imperata cyclindrica*)
lanas	- cantala; pineapple variety
langgar/langghar	- prayer house
lantak	- bamboo lattice
ludruk/loddrok	- theatre
lurah/klèbun	- village head
madrasah	- Islamic elementary school
mamaca	- poetry reading session
mandhapa (see pendopo)	- audience hall
mantri/mantrè	- minister (historical); civil servant; male nurse
mantri hewan	- livestock extension officer
maowan	- 'cow sharecropping'
masat	- cutting and shredding
mesjid/masjid	- mosque
muntjes	- kidney bean (*Phaseolus vulgaris*)
musim/mosèm	- season
nanam/namen	- sowing
nangke'	- assistant-trader
nèmor	- east monsoon [from tèmor, the East]

nèyat - an explicit fervent wish; pledge
nyèsèr - milkfish fry (*Chanos chanos*)
nyèwa - to rent
ngala' derrebbhan - share cropping
nocu - weeding
ojung - combat game
onggu' - nodding the head
orèng - human being, non-kin
orèng alèm - pious person
orèng Blandha - Dutchman
orèng blatèr - thug, gangster
orèng cokopan - people of adequate means
orèng dhalem - 'insider'; non-fishing folk
orèng ghunong - 'people of the hills', 'hilly billies'
orèng lowar - 'outsider'; fishermen
orèng saktè - sacred individual
orèng santrè - religious student
orèng sè andi' - 'the haves'
orèng sè ta' andi' - 'the have-nots'
oro-oro - grassland
otang - debt
oto' karpis - rice beans (*Phaseolus calcaratus Roxb.*)
palawija - non-rice crops
pamong desa/disa - village official
pance - corvée labourer
pancer lakè' - patri-line
panembahan - title of Madurese ruler
pangeran/pangèran - prince
pasarèan - tomb-cemetry
patih - governor, vice regent
pekarangan - household garden, yard
pembantu/rosoro - helper; servant; maid
pendopo/mandhapa - audience hall
peranakan - people of mixed ethnic origins
percaton - appendage
pikul/pèkol - to carry with shoulder pole
podjur - good fortune
pondok pesantrèn - Islamic boarding-school
poro - tropical ulcer
priyayi - nobility
rajangan - shredded tobacco
rato - king, ruler
rawa/raba - swamp
rebbha - grass
reformasi - the post-Suharto period of political reform
roh - spirit; supernatural being
rosoro (see also pembantu) - a person who can be ordered about
rokat - exorcising ritual
roma - house
romusha - forced workers in WWII
rujak/rojak - pungent fruit dressing
rumah /roma - house

sabbhrang	- cassava (*Manihot esculenta* C.)
samroh	- religious music
sapi/sapè	- cow
sapè sono	- Madurese cow beauty and agility contest
saronèn	- Madurese flute
sawah/saba	- wet-rice field
sentana agung	- high-level aristocrat
sindèn	- professional female dancer
sokon	- bread fruit
soma	- house
somor	- spring, well
ta' beccè	- disharmonious relationship (esp. marriage)
tahlil	- prayer for the dead
tanah/tana	- land
tanah daleman/tana dhalemman	- crown land
tanah Negara	- government-owned land
tana(h) percaton	- appanage
tanda' binè'	- female dancing and singing
tanè	- farmer
tanèan	- farmyard, compound, cluster of farm houses
tapa/tappa	- recluse, hermit
tarekat/tarèkat	- mystical Islamic order, brotherhood
taukè/tokè	- a Chinese trader or middleman
tebasan/tebbhasan	- pre-harvest purchase of crops in the field
tegal/teggal	- dry agricultural land
tikar/tèker	- a plaited mat
tèmba	- basket
tèmor	- east
tionghoa	- Chinese
tokang	- skilled labourer; craftsman (various types)
toko	- shop
tokoh masyarakat	- VIP; prominent and influential person
tombuwan	- feverish skin eruptions
tukang (see tokang)	- skilled labourer
tlama	- religious leader
tali	- Muslim saint
warung/bharung	- kiosk; shelter
wedana	- district-chief (formerly vice-regent)

Summary

This dissertation is the result of diachronic and comparative anthropological study of rural households in Northeast Madura, Indonesia, carried out on eight separate visits between August 1985 and March 2009. The aim is to bring time-structured data to bear on key questions regarding the evolution of this rural community.

My initial research from 1985 to 1987 focused on animal husbandry, household budgets, and time allocation, subjects central to Madurese society that had not been studied since well before Independence. I was interested in understanding more about Madura's high levels of poverty and notably how sedentary villagers could raise cows using a cut and carry mode of fodder collection in a savannah ecosystem prone to drought and without the benefit of communal grazing lands. The early focus on animal husbandry immediately expanded to cover all productive activities, which in turn raised questions about the value of children. A fertility study was undertaken to confirm what seemed to be unusually low fertility rates in comparison with other parts of Madura and Indonesia. The incoming data from the time allocation study provided a wealth of new questions on household consumption and expenditures, inter-household and inter-generational exchange, and social organization. Patron-client ties, high levels of violence, political, religious and secular networks and growing cash-cropping provided additional focus for intermediate trips to the field and a long-stay in 1995-1996. The study follows the comparative and diachronic research strategy advocated by many ecological anthropologists since Julian Steward.

The ecological setting was a harsh one; the interrelationships people entertained with nature appeared to be complex and evolving. It appeared that Madurese agricultural ecology, household economy, fertility, religious practice, interpersonal violence, and other aspects of life would be better viewed as parts of a mutually-interacting system than as discreet elements detached from each other. The thesis adopts a problem-oriented perspective to build an explanatory framework for some of the critical questions regarding Madurese society. For example, I wanted to know what was keeping the Madurese poor, whether the well-known practice of racing bulls in pairs, and competing pairs of cows in beauty and agility contests had other functions in the society, and why Madura was considered a violent society. Historical research provided depth to the analysis to complement a set of one hundred case studies of violence collected in 1995-1996. Detailed analyses of the Madura cases, and the experience of violence in Kalimantan, presented elsewhere, are complemented by the findings from this study of household dynamics and the challenges its members face. For the roots of Madurese violence are found in the critical violent responses people on the edge of poverty can sometimes make when other avenues of redress are blocked.

My overall objective is to tie together the specific ecology of the study village, the productive system, the economic challenges and the often dramatic social insecurity to the development, maintenance and transmission of household units over time. In trying to resolve each of the questions, the mechanism and the processes involved are equally, if not more important than solving the different conundrums that motivate the search in the first place. I found that the understanding and explanation of these Madurese cultural phenomena and processes were most parsimoniously advanced by systematic reference to material factors, processes and contingencies, and moreover that Madurese sentiments, values,

ideologies and conceptual schemes were largely determined by these material constraints.

The ecological approach (including such variants as cultural materialism and human ecology) having often been the subject of considerable controversy in Anthropology over the years, particularly in my home country of France, I devoted a great deal of the Introduction (Chapter One) to explicating the research strategy's theoretical underpinnings, and notably to addressing the contentious issues of functionalism, teleology, system and holism.

In Chapter Two, "Historical Ecology of Madura and Gedang-Gedang," I discuss the ecological and historical context in which Madurese communities on the island and in the local area of the field site village developed, particularly in light of the demands placed on rural communities by colonial and elite governments through taxes and forced deliveries. One of the effects of this structural violence, colonial wars and security force recruitment was the creation of the image of the violent Madurese, one that they are still trying to shake off. This and the agro-ecological system of maize cultivation and animal husbandry in a savannah ecosystem contribute to the organization of village communities characterized by dispersed settlement of households and household clusters and the development of self-help social institutions.

Chapter Three, "Organization and Exploitation of Domesticated Nature" explores the various ways that villagers in Gedang-Gedang and the subdistrict Batuputih perceive and exploit their natural environment. Modalities of access to land are first discussed before examining ways in which locals conceptualize the plant and animal resources at their disposal, and the various uses to which they are put (in appendices). Plant and animal taxonomies are found to be pragmatic and utilitarian, a departure from early ethnoscience theorizing but congruent with more recent formulations. The rest of the chapter deals with the basic income-generating occupations available to villagers, calculating for each the returns to labour with the help of time allocation data and extensive interviews. An effort is made to chart diachronic trends, and show how access to certain high-earning activities is unequal.

"Social, Political and Religious Dynamics" (Chapter Four) presents the household concept used in this study and the composition of Gedang-Gedang's conjugal units and the households they form based on a shared hearth. Religious and ritual structures and practices provide a glimpse of the institutions of social interaction that rhythm daily life in the village. Transitions occurring in the political arena are charted including changes since *Reformasi*. The chapter ends with an extended discussion of social control, first within the family, then within the wider community. Control is found to be exercised most strikingly, both in the village and in the town of Sumenep, in the practice of demanding and offering work through asymmetrical exchange, though most exchange is symmetrical between equals.

Chapter Five on "Households and Process," deals with households, the location where adaptation takes place in concrete and observable ways. The goal in this chapter is to make the most of the longitudinal and comparative perspectives provided by the research to see through the analysis of actual cases how households develop over time, how they reproduce themselves, and how resilience and vulnerability can come to characterize them at different stages in time. Simple dependency ratios and consumer-producer values for 44 households are plotted over the 24 years of the study to demonstrate the low overall rates found for most households in Gedang-Gedang, with occasional high rates a sign of poverty or crisis. Household consolidation or fission appears usually to be caused by economic and reproductive (child-raising) factors, though in not a few instances conflicts, exacerbated by economic and other inequalities, play a role. Households are plotted

on time scales showing progression (or regression) of landholding and livestock over time, and divided into groups of wealthy, poor, or "have enoughs." The analysis then shifts to examining individual household histories to obtain a more palpable idea of how they develop in specific directions over time.

Among the generalities that can be drawn is the importance of labour, particularly the retaining of one's child in the *tanèan* and the obtaining of a son- or daughter-in-law that will augment the household's productive capacity. This ability to retain children and attract their spouses is one that is not equally shared; wealthy households are usually favoured in this regard.

Food and other consumption and exchange data augmented with interview data pointed to important variations in nutrition over the yearly agricultural cycle. Exchange of food and other resources in Gedang-Gedang appears to serve principally to cement social relations among kin and neighbours, or to compensate for work done. The data from Gedang-Gedang points to highly symmetric exchange practices, except in the case of "work for food," religious and ritual exchange. Life-cycle exchanges have the effect of smoothing over the otherwise significant perturbations in the day to day lives of families when members enter and leave the household, be it the result of marriage, birth or death. As it constitutes a form of exchange, the institution of raising prime cows and bulls for competitive purposes is treated in this chapter, highlighting the positive feedback from these sports to village animal husbandry. In concluding the analysis of individual household economic trajectories, Marten Scheffer's model of the poverty trap (Scheffer 2009) was readily applicable.

My presentation of Gedang-Gedang households concluded with Chapter Six on "Fertility." The data showed very low average fertility for Gedang-Gedang in comparison with other villages studied with similar methods in Madura and Java. The conclusions and indicators from the fertility study in Gedang-Gedang strongly validate the findings of Benjamin White's well-known study of high fertility in the village of Kali Loro, Central Java, though the contexts differ in key respects. I conclude that the particular ecological and economic context of Gedang-Gedang encourages women to self-regulate fertility rather stringently. The salient elements of this context are the relative paucity of income-producing employment for children, the small size of landholdings, and the particular constraints of cut and carry cow husbandry.

In evaluating the hypotheses initially enunciated at the beginning of the study in light of the data collection and analysis it is found that:

- Differential adaptation of village households can be accounted for in large part by theories and principles from general ecology. This provides validation for the use of ecological models in anthropology;
- Different limiting factors in each part of the village are responsible for different economic adaptations, which evolve as opportunities change;
- Time allocation and the use of time-structured data provides information about the behaviour of households and individuals that is not obtainable from classical ethnographic methods, and that has important implications for comparative studies of the value of children;
- The poorest households are usually unable to obtain the credit necessary to engage in high risk but potentially high return occupations such as tobacco planting but some poor and almost all other villagers in appropriate agricultural zones do accept high risk under certain circumstances as the only way to obtain high income. Risk avoidance explains the refusal of villagers to plant high yielding varieties of maize;
- The propensity of Madurese on the island of Madura to engage in violent

interpersonal attacks is best understood in relation to struggles over material resources;

- "The rich get richer, the poor get poorer" as a general trend is validated for the village, and the reasons are linked to initial conditions of wealth to a much greater extent than to other personal traits.

Providing diachronic and comparative data from a rural Indonesian community, the study contributes to supporting general ecological theories. The study concludes that ecology and anthropology may well work better conjoined than either of them does alone.

Samenvatting

Dit proefschrift is het resultaat van een diachronisch en vergelijkend antropologisch onderzoek van rurale huishoudens in noordoost Madoera, Indonesië, dat werd uitgevoerd in acht afzonderlijke bezoeken in de periode tussen augustus 1985 en maart 2009. De op de verschillende tijdstippen verzamelde gegevens worden betrokken op kernvragen aangaande de evolutie van deze rurale gemeenschap.

Het eerste onderzoek (1985-1987) betrof veehouderij, huishoudbudgetten en tijdbesteding, onderwerpen die van centraal belang zijn voor de Madoerese samenleving maar in de periode voorafgaande aan de onafhankelijkheid van Indonesië niet echt goed bestudeerd zijn. Het was gericht op het verkrijgen van inzicht in de oorzaken van de wijdverspreide armoede op Madoera en het vinden van een antwoord op de vraag hoe veehouders hun rundvee kunnen onderhouden door middel van een systeem dat is gebaseerd op het verzamelen van her en der verspreide voedingsgewassen in een savanne-achtig ecosysteem dat onderhevig is aan droogte en de voordelen van gemeenschappelijke weidegronden ontbeert. De oorspronkelijke gerichtheid op de veeteelt werd uitgebreid tot andere productieve activiteiten, hetgeen vragen opriep over de waarde van kinderen. Een fertiliteitstudie werd uitgevoerd ter bevestiging van de ogenschijnlijke lage fertiliteitscijfers in vergelijking tot andere delen van Madoera en Indonesië. De gegevens van het tijdsbestedingsonderzoek riepen talloze nieuwe vragen op over huishoudelijke uitgaven en consumptie, de onderlinge uitwisseling tussen huishoudens en tussen de generaties, alsmede over de sociale organisatie. Observaties aangaande de patroon-cliënt relaties, veel voorkomend geweld, politieke, religieuze en seculiere netwerken en het in toenemende mate verbouwen van gewassen voor de markt, riepen aanvullende vragen ter beantwoording op gedurende tussentijdse bezoeken aan het veld en een lang verblijf in 1995-1996. Dit onderzoek volgt de vergelijkende en diachronische onderzoeksstrategie die sinds Julian Steward wordt voorgestaan door vele ecologische antropologen.

De plaatselijke ecologische omstandigheden waren hard en de onderlinge relaties van mens en natuur bleken complex en veranderlijk. Het kwam mij voor dat de landbouwecologie, de huishoudeconomie, de fertiliteit, de godsdienstige gebruiken, het onderlinge geweld en andere aspecten van het leven op Madoera beter begrepen werden als ze werden gezien als delen van een interactief samenhangend geheel dan als losse discrete elementen. Dit proefschrift gebruikt een probleemgericht perspectief en poogt een verklarend kader te scheppen voor enkele kritieke vragen met betrekking tot het functioneren van de Madoerese samenleving. Ik wilde, bijvoorbeeld, weten wat de Madoerezen arm hield, of de welbekende volksgebruiken van stierenwedrennen en schoonheids- en behendigheidswedstrijden van koeien nog andere maatschappelijke functies hadden dan vermaak, en waarom Madoera beschouwd werd als een geweldadige samenleving. Historisch onderzoek verschafte meer diepte aan de analyse en completeerde het beeld dat verkregen werd door middel van honderd case studies van geweld gedurende de periode tussen 1995-1996. De gedetailleerde analyse van de Madoerese cases en van de geweldadige ervaringen in Kalimantan (Borneo), die elders beschreven zijn, vulden de bevindingen aan van dit onderzoek aangaande de dynamiek van huishoudens en de uitdagingen waarvoor hun leden zich geplaatst weten. De wortels van de Madoerese gewelddadigheid liggen in de heftige, onbeheersbare oplossingen die mensen, verkerend op de kritieke rand van armoede, soms kiezen wanneer andere mogelijkheden ter verbetering van hun situatie geblokkeerd zijn.

De algemene doelstelling van het onderzoek is het aan elkaar verbinden van de specifieke ecologie van het onderzoeksdorp, de economische uitdagingen en het vaak dramatische gebrek aan sociale onzekerheid, met de ontwikkeling, bestendiging van en overdrachten tussen huishoudelijke eenheden door de tijd. In de poging deze vragen te beantwoorden zijn de betrokken mechanismen en procesen even belangrijk, zo niet belangrijker, dan het oplossen van de raadsels die in eerste instantie de motivatie tot dit onderzoek vormden. Ik bemerkte dat het inzicht in en de verklaring van deze Madoerese culturele verschijnselen het best werden bevorderd door systematische verwijzing naar materiële factoren, processen en omstandigheden, en bovendien dat Madoerese gevoelens, waarden, ideologiën en conceptuele schemata grotendeels bepaald werden door deze materiële beperkingen.

Omdat de ecologische benadering (met inbegrip van zulke varianten als cultureel materialisme en humane ecologie) al vaker het onderwerp zijn geweest van lange en diepgravende discussies binnen de antropologie, in het bijzonder in Frankrijk, mijn huidige verblijfplaats, heb ik een groot gedeelte van de Inleiding (Hoofdstuk I) gewijd aan het toelichten van de theoretische uitgangspunten van de onderzoekstrategie, met bijzondere aandacht voor controversiële thema's zoals functionalisme, teleologie, systeem en holisme.

In Hoofdstuk II, "Historische ecologie van Madoera en Gedang-Gedang", bespreek ik de ecologische en historische context waarbinnen Madoerese gemeenschappen op het eiland en in het onderzoeksgebied zich ontwikkelden, in het bijzonder in het licht van de eisen die aan rurale gemeenschappen door de koloniale en feodale overheden werden opgelegd in de vorm van belastingen en gedwongen leveranties en diensten. Als gevolg van dit structurele geweld, koloniale oorlogen en het ronselen van mankracht voor veiligheidstroepen, ontstond het beeld van de geweldadige Madoerees, een beeld dat de Madoerzen zelf nog steeds van zich af proberen te schudden. Dit en het agro-ecologische systeem van maïsverbouw en vee-teelt in een savanne ecosysteem dragen bij aan de organisatie van dorpsgemeenschappen die gekenmerkt worden door een verspreide woonwijze van huishoudens en huishoudgroepen en de ontwikkeling van sociale instituties van zelfredzaamheid.

Hoofdstuk III, "Organisatie en exploitatie van de gedomesticeerde natuur", verkent de diverse manieren waarop dorpelingen in Gedang-Gedang en het subdistrict Batuputih hun natuurlijke omgeving percipiëren en exploiteren. Modaliteiten van toegang tot land worden besproken, voorafgaande aan het onderzoek naar de manieren waarop de lokale bevolking de beschikbare plantaardige en dierlijke hulpbronnen conceptualiseert en aanwendt voor gebruik (zie de bijlagen van dit proefschrift). Plant- en diertaxonomiën blijken vooral pragmatisch en utilitair van aard te zijn, in afwijking van de vroegere theorievorming in ethnoscience maar aansluitend bij meer recente standpunten. De rest van het hoofdstuk behandelt de primaire inkomensgenererende bezigheden van de dorpelingen en berekent de opbrengsten ervan in relatie tot geïnvesteerde arbeid aan de hand van gegevens over tijdsbesteding en uitvoerige interviews. Een poging wordt ondernomen om diachronische ontwikkelingen te schetsen en te laten zien dat toegang tot de beter betaalde activiteiten ongelijk verdeeld is.

"Sociale, politieke en religieuse dynamiek" (Hoofdstuk IV) bespreekt het begrip huishouden dat in deze studie is gebruikt, de samenstelling van de gezinseenheden in Gedang-Gedang en de huishoudens die zij vormen op basis van het delen van een kookplaats. Religieuze en rituele structuren en praktijken bieden een kijkje in vormen van sociale interactie die het ritme van het dagelijks leven in het dorp

bepalen. De veranderingen die plaatsvonden in de politieke arena worden beschreven, inclusief de recente vanaf de *Reformasi*. Het hoofdstuk wordt besloten met een uitvoerige bespreking van sociale controle, allereerst binnen het gezin en de familie, vervolgens binnen de grotere gemeenschap. Zowel in het dorp als in de stad Sumenep blijkt sociale controle het meest opvallend te worden uitgeoefend in een asymmetrische uitwisseling van vraag en aanbod van werk. De meeste uitwisseling vindt echter plaats tussen gelijken en is symmetrisch van aard.

Hoofdstuk V over "Huishoudprocessen" gaat over huishoudens, de context waarin aanpassingen op concrete en zichtbare wijze plaatsvinden. Het doel van dit hoofdstuk is zo goed mogelijk gebruik te maken van de longitudinale en vergelijkende perspectieven die het het onderzoek biedt en door middel van de analyse van concrete gevallen te laten zien hoe huishoudens zich in de tijd ontwikkelen, zichzelf reproduceren, en hoe weerbaarheid en kwetsbaarheid deze huishoudens kunnen kenmerken in de verschillende fasen van de levensloop. Eenvoudige afhankelijkheidsratio's en consument-producent ratio's van 44 huishoudens die gedurende de 24 jarige onderzoeksperiode werden vastgelegd, illustreren de lage gemiddelden voor de meeste huishoudens in Gedang-Gedang, met incidentele hoge waarden als teken van armoede of crisis. Consolidatie en opsplitsing van huishoudens blijken gewoonlijk veroorzaakt te worden door economische factoren en factoren die te maken hebben met reproductie en de opvoeding van kinderen, hoewel conflicten – verergerd door economische en andere ongelijkheden – ook een niet geringe rol spelen.

Huishoudens worden afgezet op tijdschalen die de toe- of afname in landbezit en veestapel in de tijd registreren, verdeeld in groepen van rijke, arme, en 'toereikende' huishoudens. Daarna wordt de analyse verschoven naar onderzoek van individuele huishoudgeschiedenissen teneinde een tastbaarder idee te krijgen hoe zij zich in specifieke richtingen in de tijd ontwikkelen. Onder de algemene conclusies die kunnen worden getrokken is het belang van arbeid, in het bijzonder van het behoud van een eigen kind voor de *tanèan* (het boerenerf en bedrijf) en het aantrekken van een schoonzoon of schoondochter om daarmee de productieve capaciteit van de huishouding te versterken. De mogelijkheden om kinderen te behouden en hun echtelieden aan te trekken zijn niet gelijkelijk verdeeld; rijke huishoudens zijn hierin gewoonlijk in het voordeel.

Gegevens over consumptie van voedsel en van andere zaken en gegevens over uitwisselingen ondersteund door informatie uit interviews wezen op belangrijke variaties in voeding gedurende de jaarlijkse landbouwcyclus. Uitwisseling van voedsel en andere hulpbronnen in Gedang-Gedang blijken voornamelijk te worden gebruikt om sociale relaties tussen verwanten en buren te verstevigen of ter compensatie van verrichte arbeid. De gegevens van Gedang-Gedang wijzen op sterk symmetrische uitwisselingspraktijken, met uitzondering van "arbeid voor loon" en religieuze en rituele uitwisselingen. Uitwisselingen in het kader van levensloopgebeurtenissen hebben een dempend effect op de verstorende effecten op het dagelijks leven van gezinnen wanneer leden het huishouden binnenkomen of verlaten, als gevolg van huwelijk, geboorte of dood. Aangezien het een vorm van uit-wisseling betreft wordt het fokken van eersteklas koeien en stieren met competitieve oogmerken eveneens in dit hoofdstuk behandeld, om de positieve terugkoppeling van deze sporten op de veeteelt in het dorp te laten zien. In het slotgedeelte van de analyse van de economische ontwikkelingsstadia van individuele huishoudens kon het door Marten Scheffer ontworpen model van de armoedeval (Scheffer 2009) rechtstreeks worden toegepast.

Mijn bespreking van huishoudens van Gedang-Gedang wordt afgerond met Hoofdstuk VI over "Fertiliteit." De gegevens tonen een laag niveau van de fertiliteit voor Gedang-Gedang ten opzichte van andere dorpen in Madoera en Java die met vergelijkbare methoden bestudeerd zijn. De conclusies en indicatoren van het fertiliteitsonderzoek in Gedang-Gedang bevestigen de bevindingen van het bekende onderzoek door Benjamin White naar de oorzaken van hoge fertiliteit in het dorp Kali Loro in Midden-Java, hoewel de omstandigheden in de twee lokaties op hoofdpunten verschillen. Mijn conclusie is dat de bijzondere ecologische en economische omstandigheden van Gedang-Gedang vrouwen aanmoedigt om de zelfregulatie van hun vruchtbaarheid strikt uit te voeren. De meest saillante elementen in deze context zijn de relatieve schaarste van inkomensgenererende arbeidsmogelijkheden voor kinderen, de beperkte omvang van het landbezit, en de bijzondere beperkingen voor de veeteelt als gevolg van de gangbare wijze van voedselverzameling voor het vee.

Wanneer we de hypotheses die aan het begin van het onderzoek werden geformuleerd beschouwen in het licht van de verzamelde en geanalyseerde gegevens dan resulteert dit in de volgende bevindingen:

- De differentiële aanpassing van rurale huishoudens kan grotendeels worden verklaard met theoriën en principes uit de algemene ecologie. Dit rechtvaardigt en legitimeert het gebruik van ecologische modellen in de antropologie.
- De verschillende beperkende factoren in de afzonderlijke delen van het dorp zijn verantwoordelijk voor de verschillende economische aanpassingen, die zich voegen naar zich ontwikkelende nieuwe kansen en mogelijkheden.
- Tijdgebruik en het gebruik van tijdgebonden gegevens verschaft informatie over het gedrag van huishoudens en individuen die niet verkrijgbaar is met de klassieke ethnografische methoden, hetgeen belangrijke implicaties heeft voor vergelijkend onderzoek met betrekking tot de waarde van kinderen.
- De armste huishoudens zijn gewoonlijk niet in staat het krediet te krijgen dat nodig is om zich in te laten met beroepsactiviteiten waarin hoge risico's samengaan met potentieel hoge opbrengsten, zoals de verbouw van tabak. Desalniettemin aanvaarden sommige arme en bijna alle andere dorpelingen in de daarvoor geschikte landbouwgebieden onder bepaalde omstandigheden deze hoge risico's als zijnde de enige mogelijkheid om een hoog inkomen te verkrijgen. Het vermijden van risico's verklaart de weigering van dorpelingen om hoogwaardige maïsvariëteiten te planten.
- De neiging van Madoerezen woonachtig op het eiland Madoera om zich in te laten met geweldadige persoonlijke confrontaties wordt het beste begrepen in relatie tot hun strijd over schaarse materiële hulpbronnen.
- De algemene tendens dat "de rijken steeds rijker worden en de armen steeds armer" vindt bevestiging in het dorp, en de redenen daarvoor zijn vooral gerelateerd aan de materiële aanvangssituatie, meer dan aan persoonlijke kenmerken.

Op grond van de verschafte diachronische en vergelijkende gegevens afkomstig van een rurale Indonesische gemeenschap draagt deze studie bij aan de algemene ecologische theorievorming. De studie concludeert dat ecologie en antropologie gezamelijk wellicht betere resultaten opleveren dan wanneer ze afzonderlijk beoefend worden.

About the author

Wilson "Glenn" Smith was born on March 4, 1955 in Eureka, California, and grew up in San Francisco and the Bay Area. He attended the University of California at Berkeley, where he received the Bachelor of Arts in Anthropology in 1979. He moved to France in 1980 and attended the Université Paris VII, receiving the *Licence* and *Maîtrise* in Anthropology in 1981 and 1982, before beginning doctoral studies at the Ecole des Hautes Etudes en Sciences Sociales under Prof. Dr. Georges Condominas in 1982 (and following the retirement of Prof. Condominas, under Prof. Dr. Yves Goudineau at EHESS and Prof. Dr. Anke Niehof at WUR). He completed the *Diplôme d'Etudes Approfondies* in Ethnology in 1984 with a thesis on the economic adaptation of Laotian refugees in the Paris area.

He worked on various research projects in addition to pursuing a longitudinal doctoral study of a rural Madurese community spanning the years 1985-2009. In 1991-1992, he worked on a Centre National de la Recherche Scientifique – French Overseas Development Agency (CNRS-ORSTOM) study of spontaneous migration in South Sumatra funded by the World Bank. In 1995, he received a grant from the Fondation Fyssen in Paris for research on the cognitive anthropology of decision making in his Madurese community.

From 2001 to 2005, he was Senior Advisor to the CNRS – Indonesian Institute of Sciences (LIPI) programme Social Sciences for the Study of Conflict in Indonesia, designed to increase research capacity to deal with a number of intercommunal conflicts facing the country (see www.conflictrecovery.org). Between 2005 and 2009, he worked on several United Nations Development Programme (UNDP) projects with the Indonesian Ministry of Planning (Bappenas) to promote conflict sensitivity in development planning and post-conflict recovery. Notably, from 2007 to 2009, he led the UNDP team responsible for peacebuilding in Aceh following the peace accord between the Government of Indonesia and the Free Aceh Movement (GAM) signed in Helsinki on August 15, 2005.

He has been affiliated since 1987 with the Centre Asie du Sud-Est (CASE), a research centre under the CNRS and EHESS in Paris. Over the years, he has published extensively on Madurese society, ecological anthropology, migration and conflict, as well as theoretical and methodological issues.

The cover art is based on original watercolours of Gedang-Gedang village by the writer and poet Zawawi Imron of Batang-Batang.