# 10 Dynamics of Agricultural Production. An Analysis of Micro–Macro Linkages

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## Introduction

This chapter aims to set out a theoretical and methodological framework for analyzing the specificities of agricultural and rural development. Coming to grips with these specificities is essential for understanding the social and cultural dynamics of contemporary agricultural production. Specific for agriculture is its multiform and heterogeneous character, closely associated with the fact that it is practised by actors who embody different interests, are part of diverse networks and share particular cultural repertoires. Furthermore, land forms the basis of production. Hence, the encounter with nature is also specific for agriculture.

These specificities are crucial for understanding the morphology of today's agricultural sector and its intrinsic heterogeneity. Farms and farmers' practices are located in different domains of activities: those of production, reproduction, family and community, institutional and regulatory settings. Farmers' practices are also affected by the interests, cultural repertoires and networks indicated. These different influences and domains are, as it were, glued together in and through the labour process in such a way that various, internally consistent styles of farming emerge in dynamic and constantly changing ways, varying in time and in place.

This way of characterizing agriculture is born out of three different, but partly overlapping theoretical strands concerning agrarian change. These strands will be summarized to clarify the position we take in this chapter in order to understand heterogeneity in agriculture. The notion of styles of farming is a central concept for such an analysis. In addition, we will deal with the methodological repercussions of this notion. Lastly, we will look at the relevance and implications of this concept for research in the field of agricultural and rural development by reflecting on the huge variety in maize yields in Kenya, and on the prevailing iron laws which are assumed to be operating in agriculture.

This chapter draws mainly on our experiences and research in Third World agriculture, and most of the illustrations are derived from such contexts. We are, however, convinced that the theoretical and methodological approach presented here is equally relevant for understanding rural

and agricultural change in Europe. This does not imply that regionally specific cultural contexts are understood as being irrelevant here. Indeed, we locate such contexts at the heart of our analysis.

Throughout the text we will use the term *farmers*, despite the fact that is does not adequately reflect rural reality. Farmers denote actors engaged in agriculture only, while farmers' livelihoods increasingly entail migratory work, petty trade, and other forms of off-farm and on-farm non-agricultural activities. The term *peasant* in its turn is also inaccurate in assuming that agricultural production is solely for subsistence, and that production is hardly integrated into commodity circuits. The term *rural producers* is another alternative, but again does not cover the fact that rural people are also consumers. The term farmer is used here in the sense of someone engaged both in agricultural and non-agricultural activities.

## Setting and Rephrasing the Debate

The debate on agrarian change is an old one in social sciences. It is not our intention to summarize that debate in detail here, but to highlight three theoretical approaches which have informed the development of the styles of farming notion.

1 the anthropological focus on the cultural basis of agricultural production (sometimes referred to as agricultural anthropology); within this tradition, the actor-oriented methodology, as elaborated by Long, has proved highly useful in getting to grips with the specificities of agricultural practices.
2 the structural analysis of agrarian change, which focuses on processes such as market incorporation, commoditization, institutionalization and externalization, and
3 the labour process approach, initially developed in the sociology of industry, but has proved extremely useful in the analysis of agrarian production and development.

After briefly characterizing these strands, we will try to formulate a synthesis. In so doing, we will not propose some kind of unhappy and eclectic marriage, but aim to redefine the concept of structure from an actor-oriented perspective. Central to this synthesis is the concept of farming as the outcome of actors' projects, thus, agriculture is conceptualized as a social construction. It is obvious that not only the projects of the farmers involved matter. We will argue that it is especially the interaction between these projects and those of others, such as planners, politicians, implementers, bankers and traders that is significant. Crucial to both the development and the materialization of these projects is the encounter with, and subsequent interpretation and translation of, the 'realities' reigning in different markets, together with the rules, regulations and institutions in which farming is embedded. This interpretation,

and the related translation into action, are structured according to the prevailing cultural repertoires (Long and van der Ploeg 1994).

*Anthropology and the Cultural Basis of Agriculture*

The study of the cultural basis of agricultural production focuses on the people who practice agriculture. It aims to understand farmers, their agricultural practices and relationships 'within the context in which they live' (Rhoades 1984, pp. 40–41). The starting point for the analysis is a cultural approach to gain insight in the perceptions and images of actors in relation to *rurality* (see also van der Ploeg in this volume), and how culture 'articulates social life with the material conditions of their habitat' (Rhoades 1984, p. 43; see also Den Ouden in this volume). The notions about farming and agricultural practices emerging through time are locally specific and strongly embedded in, and shaped, by the various knowledge repertoires of farmers, including their perceptions of land use, nature, cropping patterns, tools and technology. Mendras (1970) refers to this as *l'art de la localité*, meaning that agriculture is locally specific and involves a diversified knowledge of ecological, technological, economic and cultural conditions, which is constantly being enriched through processes of mutual exchange and communication.

Culture and cultural repertoires are studied from the perspective that 'real' and 'ideal' patterns exist, indeed recognizing that what actors say or believe may bear little relationship on what they actually do. A second element is that manifestations of human behaviour are interrelated parts of cultural repertoires. Agricultural practices are referred to by farmers as not simply made up of maize, potatoes and cattle in isolation from each other. Furthermore, a great deal of culture is expressed in non-verbal ways (such as use of land and space, dietary patterns, religious practices), and people's cultural repertoires are diverse, dynamic and adaptive rather than monolithic and static, as well as based upon past experiences.

*Structural Analysis*

Farming implies an encounter with markets, whether for the mobilization of the resources required and/or for the distribution of the products produced. Farming also involves a specific procedure (and the corresponding artefacts) for the transformation of resources into these products; hence, farming entails a specific technology. In structuralist approaches, farming as practice is understood and explained as determined by these markets and technologies. When we talk about structural analysis, however, we reject such a notion. 'Our' structural analysis focuses essentially on:

1 how specific interrelations are established between farm enterprises and communities, on the one hand, and markets, market agencies and the processes of technology development and transfer on the other.
2 Structural analysis also focuses on the question of how these relationships, once established, affect and remould the farm practices concerned (including the underlying strategies).
3 Finally, structural analysis studies how the relationships involved might be changed over time.

In other words, the *a priori* assumptions of structuralist analysis are changed into a set of research questions within structural analysis.

Hence, structural analysis studies how agrarian change and farmers' practices are shaped by processes associated with market incorporation and technology development. At the same time, it studies how commodity circuits are affected by social behaviour and embedded in cultural frameworks. Market incorporation and commoditization are not understood, as is frequently the case in structuralist traditions, as unilinear processes, inevitably leading to destruction, impoverishment and class formation. Special attention is given to external mechanisms and institutions (for example, the state, farmers' cooperatives) which mediate such processes.

Central in structural approaches are the concepts of simple commodity production and capitalist production, each of which specifies particular sets of interrelations between (farming as) productive activity and the set of commodity relations in which it is embedded. The latter are sometimes expanding; at other moments commodity relations are reduced and/or distanced from the respective processes of production. For some authors, simple or petty commodity production represents a distinct social form of production with its own logic (for example, Friedmann 1980). Others have claimed that contemporary relations of production are the outcome of a transition to capitalism which, in Third World countries, started during colonial rule. Petty commodity production is treated conceptually as being generic to capitalism (for example, Bernstein 1979, 1988; Gibbon and Neocosmos 1985). These positions were criticized by Long *et al.* (1986) as laying too much stress on external determination and unilinear interpretations of social change. It is, for instance, unlikely that 'peasant' forms of production will disappear and that the pattern of socio-economic differentiation will consolidate itself in a firmly established class structure.[1] In addition, these positions fail to consider how commodity exchange affects the everyday life of farmers and to incorporate analytically the concrete nature of the intermediate structures and networks linking farmers to the wider economic and political environment. They overlook, furthermore, that producers are strategizing and attempting to resist the impact of commodity relations by actively and purposefully seeking to maintain and defend non-commoditized relationships. In the same way, processes of 'self-commoditization' or farmer initiatives (Ranger 1978) have not received the attention they deserve. Hence, little attention has been given

either to the active role played by farmers or to explaining 'structural variance' or heterogeneity in agricultural development processes. Long has emphasized the need to go beyond teleological interpretations of agrarian change (see also Booth 1985, 1994).

An important contribution from the actor-oriented perspective consists in the notion of markets and technology as entailing specific room for manoeuvre, which is actively created by the actors involved through processes of negotiation and redesigning. Rural producers have their own reference points, insights and interests (such as the family, community, cultural notions) for developing their farm. These insights are often used to counterbalance and/or to mediate the 'logic' reigning in the markets (that is, the 'logic' as represented and articulated by market agencies), as well as to develop responses *vis-à-vis* the designs entailed in the development of new technologies. For farmers, markets and technology provide room for negotiation; they allow for differential 'positions.' Thus, agricultural development can be perceived as an arena of struggle, as a complex, heterogeneous and often contradictory process of change, to which farmers respond in a highly differentiated way.

*The Labour Process Approach*

The labour process approach is the third strand forming the theoretical backbone of our analytical framework. The labour process approach is particularly relevant since it reveals exactly what remains hidden in most social scientific analyses of agricultural development: that is how culture, and economic, institutional and technological developments as mediated by cultural repertoires, are materializing in specific practices. Labour process analysis highlights the way in which styles of farming and the components contained in it, are actively moulded. Therefore, labour process analysis focuses on the farmer as actor, on farming as a social construction and on the relationships in which farmers' work and life are embedded. Hence, this approach opens up the possibilities to look at practices resulting from goal-oriented actions and negotiations.[2] We will do this from a threefold perspective.

In the first place, we define the labour process as a goal-oriented activity; it is a purposeful action on the part of the actors involved in converting various resources into commodities. As such, the labour process is embedded in cultural repertoires, husbandry practices, and *l'art de la localité*. It involves, and implies at the same time, the creation and maintenance of feedback and communication mechanisms and networks to ensure production and reproduction.

In the second place, the labour process is conceptualized as a socially constructed farming practice in which the landscape, history, crops, husbandry practices, and forms of land and labour use appear as artefacts. The way in which farmers cultivate the land, have a detailed knowledge

about their eco-system, labour supply and demand, cannot be seen as disconnected from the labour process.

In the third place, the labour process is understood as a relationship between people and artefacts as well as among people. Hence the organization of the labour process reflects specific social relations of production.

*Synthesis: Styles of Farming*

The synthesis of these three strands of theories of agrarian change and agricultural development amounts to the notion of *styles of farming*. A style of farming comprises three interrelated and mutually dependent levels. These are, in the first place, a specific cultural repertoire composed of shared experiences, knowledge, insight, interests, prospects and interpretations of the context in which farmers operate. Taken together, these specify the way farming ought to be organized. Second, a style of farming is an integrated set of practices and artefacts. Fields, crop varieties, instruments, cattle, cropping schemes, and so on are combined in such a way that they constitute a rational and internally consistent constellation. It goes without saying that this constellation is informed by and structured along the central parameters of the relevant cultural repertoire. Third, a style of farming comprises a specific ordering of the interrelationships between the farming unit, on the one hand, and markets, technology and institutions on the other. More specifically, those interrelations allow for the reproduction of the practices indicated at the second level. These interrelations may range from distantiation to integration (Saccomandi 1995). Typical, then, for styles of farming is that these three levels are wrought into one consistent whole, which specifies and embraces the different domains in which farming as a many-sided activity is evolving.

The three approaches discussed above concern different aspects or levels of styles of farming. Taken together, and using *praxis* as the integrating moment, they allow for the adequate analysis of agrarian development processes. They also allow for the correct analysis of the social relations of production, which are those relations that constitute the labour process, and therefore the process of production as well (Poulantzas 1975).

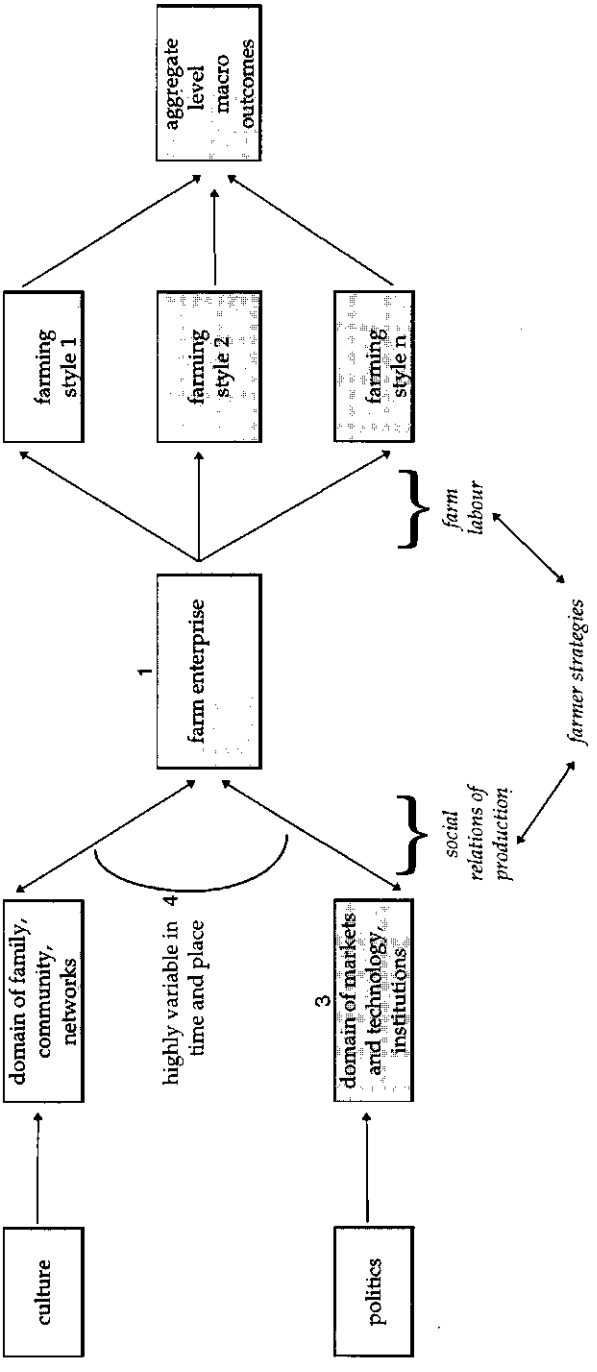
The styles of farming concept nearly always implies that we are talking about highly differentiated practices which are due to different and strategically chosen 'positions' of farmers as far as family, cultural repertoires, markets, technological developments, relations with agribusiness companies and extentionists are concerned. The concept also expresses the idea that farming is not just an activity based upon the application of a single 'blue print' or 'iron laws' provided by markets and technology-developing agencies. Despite the growing 'grip' of markets and technology on the organization of the production process, these provide room for manoeuvre for farmers, that is, they allow for differential positions.

In more general terms, styles of farming are to be interpreted as the result of goal-oriented actions and related strategies, and thus as actors' projects carried out in particular historical contexts and arenas. The whole gamut of styles which empirical reality unfolds, represents in fact differently constructed farmers' projects and constitutes a repertoire composed of a wide range of potential responses to trends and changes in markets, technology, agrarian sciences, and policy. But farmers' projects are not simply reactions to those that are imposed by more powerful 'external' actors. They are actively managed (and constructed) differential responses to the strategies and conditions generated by others, which are modified, transformed, adopted and/or counteracted by farmers. In this way farmers are able to create room for manoeuvre for themselves and their families. For instance, by linking up with particular commodity circuits and agencies or by distancing themselves from them, farmers are able to accommodate such relationships to fit their conditions of livelihood and locally institutionalized perceptions of how to farm. It is obvious, but still necessary to underline, that the emergence of these actor projects is time and location specific. They are not to be seen as static or stagnating projects which only require outside assistance for their further development. A theoretical advantage of such a conceptualization is that it allows 'structure' to be understood as 'the product of ongoing interlocking, interplay, distantiation and mutual transformation of different actors' projects' (Long and van der Ploeg 1994, p. 81).

The approach discussed so far can be summarized in an analytical framework illustrated in Figure 1. The framework deserves several comments on its layout. The three different strands discussed can be positioned at different 'places' in the scheme. The anthropological perspective is incorporated to study the social relations of production as defined by the domain of the family, community and cultural repertoires. The 'structural' analysis in its redefined form plays a role in studying the social relations of production moulded and reproduced by the economic and institutional environment. The labour process approach comes in when production and reproduction at the level of the farm enterprise are analysed.

Central to the analytical framework is the farm enterprise (1). It is understood as the point where ('macro') relations as entailed in commoditized and non-commoditized circuits meet and converge. It is also the point from which the general relations in which farming is embedded are translated into action, that is, into a particular style of farming. In practice, the farm enterprise is not always an easily demarcated entity. In various regions of Africa, 'farm enterprises' are composed of different fields for husbands and wives, for uncles and aunts, and so on. In the Peruvian Andes, potato fields are scattered over the slopes of the mountains. Furthermore, communal lands form an essential part of the grazing and feeding regimes for cattle farmers and pastoralists in Africa.

Figure 1 Analytical Framework




N.B.: Italic characters refer to analytical concepts; the normal formatted characters represent empirically observable practices and relationships. The numbers refer to explanations in the text below.

The farm enterprise is also understood as a complex set of activities where artefacts, labour, soil, cattle, and crops interact. The interaction is, however, such that it only exists through and in the labour process, for example as practices carried out by the direct producers. The interpretation of the meanings of the artefacts, labour, soils, cattle and crops are known to the direct producers and their concrete meanings only emerge in the labour process. Soils, crops and so on interact in a meaningful way only through the active role and knowledge of the direct producers. Soils as such do not have any meaning at all. Farm labour (or local knowledge) is here the central analytical concept and is an essential condition for the labour process. Farmer knowledge is not only utilized and reproduced in the labour process, but also enriched, exchanged, renewed and corrected. Knowledge and farm labour are inseparable from each other. 'Manual' and 'mental' labour which are usually seen as different entities, are, in farm labour, very closely related and overlapping.

Farm labour as an analytical concept and the empirically observed practices at farm enterprise or field level are, on their turn, being shaped – and not determined – by two social domains: that of the family, community and culture (2) and that of markets and technology (3).

The domain of farm, family and culture is an essential context and precondition for agricultural production. Some of the relevant social relations of production are situated in this domain and need to be reproduced in an active way. These relationships are not static, but rather dynamic and subject to transformation or change. It is in this domain that particular practices and ideas emerge, and are being contested and (re)negotiated. Farming is highly symbolic, coded and material and immaterial at the same time, and it derives much of its meaning from the cultural repertoires involved. A few examples will illustrate this.

Labour is generally recruited at community and/or family and household level. Rice polders in Guinea Bissau cannot be maintained without the organization of such labour groups. Chayanov (1966) emphasized the precarious balance between labour power and consumers within a farm household as a major regulatory device for agricultural production. Rituals and religious practices such as *chisi* and rain dances in Zimbabwe provide an important frame of reference for the particular way the Shona people organize their labour process. *Chisi* is a day sacred to the guardian spirits of the land, on which the soil should not be tilled in any way (Bourdillon 1987, p 70). Working on the land on such days disturbs the spirits and make them feel unhappy; periods of drought may be the outcome. Such religiously informed practices have the effect that on *chisi* days the soil is not tilled. However, observing *chisi* is not static and has changed considerably over the years – from six days in the past to four nowadays. Furthermore, *chisi* is not shared by all community members and is in fact heavily contested by quite a large number of farmers and businessmen.[3]

In rather similar ways among the Luo in west Kenya, the time of sowing by sons, is increasingly regulated by their fathers. Due to land scarcity and little room for sons to establish their own compound and fields, they remain as along as possible on their father's compound and are thereby subject to the practices of their fathers and his decision to plant. Furthermore, gender differentiated interests at 'household' and/or family level also shape the observed practices at field and farm enterprise level.

In Kenya, for instance, a programme to boost the commoditization of milk introduced zero-grazing as a new technology. This involves procuring quality fodder by production on the farm itself by the planting, cutting and feeding of napier grass to cows. One of the consequences is that in west Kenya, where land is limited, farmers increasingly decide to allocate land which was previously planted with food crops to napier. This shift in land use produced the effect that food consumption is increasingly dependent on market relations. Known cases indicate that such decisions are usually taken by men and not always shared by their women who uproot the napier to make room for food (Mango 1995).

The reappearance of drought resistant crops, such as cassava and sweet potatoes, in the agricultural landscape of western Kenya can be interpreted in a similar way. Granaries in the Gusii region, Kenya, once a dominant part of the landscape, are now loosing their meaning because food is now being stored in the farmhouse for security and social reasons. The context within which this is happening is the gradual emergence of a livelihood crisis in that part of Kenya.

In the Peruvian Andes, farmers identify their fields in a bipolar way as 'cold' and 'warm' fields (van der Ploeg 1995). The meaning of such a distinction is not related to temperature but to exhausted and rich soils. The meaning of such terminology is not always clear and demarcated, and not vested in the words *per se*. The words derive their meaning in and through the labour process in which theory is combined with practice (Darré 1985). These processes of change, meanings, negotiations and struggles can only be understood by taking into account rural people' cultural domains and the dynamic changes that take place there.

Moreover, such domains are often associated with non-commoditized spheres and circuits of exchange through which farmers mobilize resources outside market spheres. These non-commoditized circuits and the social relationships in which they are embedded are not to be seen as leftovers of previous conjunctures. Instead, they are essential and dynamic parts of agricultural production, and form part of a strategic line of defence against the influence of markets and technology. On the other hand, the commodity–non-commodity balance is central to the strategy of farmers to regulate and arrange production and reproduction according to their interests, opportunities and perceptions. The degrees of commoditization are all reflections of certain rationalizations and strategic choices farmers make

in order to produce and to safeguard – or at least attempt to protect – the reproduction of farm and family (van der Ploeg 1990). Long (1984, 1986) stresses that farming or livelihood strategies contain a wide range of possibilities:

> 'although integration into markets and external institutional structures may reduce the range of economic alternatives available to the farmers, the availability of non-wage household/family labour and resources, coupled with the maintenance of local networks based on kinship, friendship or patronage, allow farmers to continue to resolve certain of their livelihood and consumption problems outside the market.' (Long 1986, p. 19).

Hence, farmers' strategies vary considerably in the way they maintain locally specific, socio-culturally defined relations. What follows automatically from this is that agricultural production and development needs to be conceptualized as a certain balance between commoditized and non-commoditized relationships and circuits. Farmers devise certain strategies to maintain and defend such a balance.

On the other hand, the domain of markets and technology and institutions represents the interlocking of agricultural practices through and in the labour process with commodity circuits. Historically, different kinds of agricultural institutions (TATE, an acronym for Technological Administrative Task Environment) – often labelled as agribusiness – have emerged around the labour process (Benvenuti 1985). The relationships between these institutions and the labour process were intensified as farmers decided to reallocate crucial farm tasks to such agencies. These agencies create specific ideas and images about agricultural production and aim to consolidate specific social relations of production in the agricultural sector. These agencies do not, however, command such power that agricultural development proceeds in the directions promoted by them. In practice, considerable room for manoeuvre is created in the space composed of markets and technology, through negotiations and adaptations in and through the labour process and by farmers' active involvement. The matrix of relations between the institutions and the agricultural population shows considerable variance.

Different relations are created between the farm enterprise and the surrounding world (2 and 3 in Figure 1) . The nature, weight and impact of these relations depends as much on the farmers concerned as on the entities that compose this 'surrounding' world. It is difficult, for instance, to go against widely shared norms within the village or farming community. Farmers who are doing so will be categorized, as Moerman (1968) demonstrated in his study of a Thai village, as 'a son of a bitch.' However, if the same farmer joins a new group of Seventh Day Adventists (that is, when he changes one cultural framework for another), he might well

be able to deviate from the dominant norms (see also Long 1968, Seur 1993, Magadlela and Hebinck 1995).

The same goes for the relationships with markets. Some farms will be strongly affected by a general rise in interest rates. Others, who financed farming with own savings and/or with income obtained from migratory labour, will hardly be affected. A dramatic drop in coffee prices will have far-reaching, if not destructive effects on specialized farms, whilst the impact will be different in highly diversified farms. In central province Kenya, for instance, specialized coffee farmers responded to a drop in coffee prices relative to food prices by changing their cropping pattern from coffee in pure stands into coffee inter-cropped with maize (Cowen 1983). In synthesis, the relations between markets, communities and farms are neither unilinear nor uniform. They are twofold as well as highly differentiated relations.

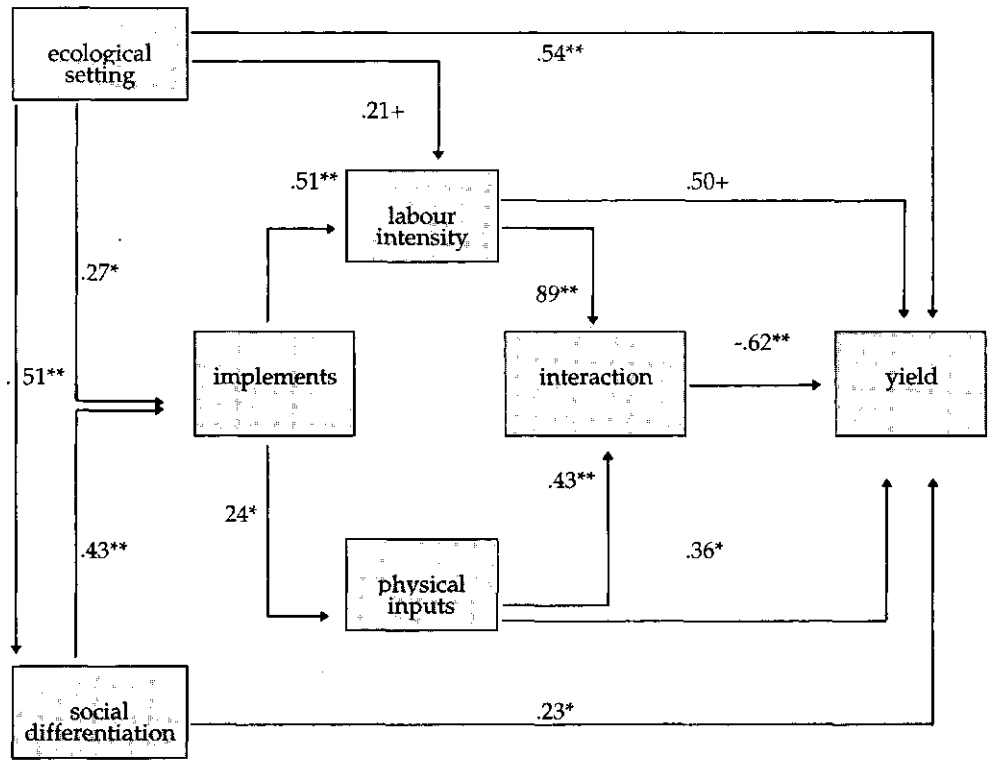
It is also important to stress that there is no generalized tendency from (2) to (3), that is from an agriculture only partly integrated in markets towards a fully commoditized economy. As a matter of fact, the balance (4) between non-commoditized (2) and commoditized (3) relations is historically variable and highly differentiated. The *couleur local* of agricultural and rural development may at some stage be defined and informed by strengthening relationships with markets and technology; at a later stage, the domain of community and family and non-commoditized relationships may be predominant in achieving progress. The particular balance (4) between commoditized and non-commoditized relationships is, in other words, locally specific and diverse. This implies that it requires time and moreover a research programme to establish what exactly operates in a particular situation as social relations of production.

## Making Sense Out of Chaotic Diversity

Variety is an essential and often telling characteristic of agricultural systems throughout the Third World. It needs, however, proper unravelling in order to come to grips with its relevance. We will illustrate this with some comments regarding maize production in a region in Kenya, in which new Green Revolution technologies have been introduced and distributed in a massive way (Hebinck 1990, 1995).

The area of research, Nandi District, may be portrayed as one in which commodity production gradually became widespread and commodity relations deeply rooted. It was not, however, a linear process since people's practices and the economy were founded neither upon a fully fledged circulation of commodities, nor were their livelihoods based upon agricultural production alone.

Figure 2 Pathdiagram




N.B.: ** = significant at the level of Sig T=0.00)
* = significant at the level of 0.00 >Sig T<0.05
\+ = significant at the level of 0.05>Sig T<0.06

Source: Hebinck (1990)

Data on maize yields present a very chaotic picture at first sight. The variation is enormous, with an average of 40.8 bags (of 90 kg) per ha and a standard deviation of 23.5 bags per ha. One might initially expect to find an explanation in the particular linkages with markets and institutions, the degree to which farmers internalized the hybrid maize package, and the socio-economic conditions of maize farming (see Griffin 1979). However, one is still confronted by variations in yields realized by farmers working under roughly the same circumstances (governed by the access to production factors like land, labour, capital), which require further explanation. With the analytical framework in mind, the search for relevant relationships and interactions between people and artefacts concentrated on the wide variety of farming practices. These practices are in their turn shaped by farmers' different strategies. The analysis brings us to the specific ways in which farmers have organized their labour process. The puzzle of diversity may be explained by a multiplicity of labour processes which have emerged through time, each having its own characteristics and dynamics. In the Nandi context, the labour process appears to be strongly associated with farmers' choices concerning instruments, labour input, quantities of seed and fertilizer application, and the ecological conditions for farming (here understood as the interaction between altitude, rainfall, and soil quality). So partly, the answer is embedded in the various, but locally specific agronomic husbandry practices of farmers (such as planting distances, seed and fertilizer applied, mode of land preparation, sowing and weeding), as well as in the strategies devised by farmers to secure a certain livelihood for themselves and their families. But the answer also lies partly in the differential access to resources and the nature of the relationships with the institutional environment. Figure 2, showing the various (statistical) interactions between the elements of the labour process and social conditions for farming, illustrates this in detail.

The quantitative and qualitative data point to two main, but mutually exclusive labour processes which reflect different, but relevant social realities and social relations of production. One of the labour processes is based on the intensification of basically family labour and land. The second is basically founded on the recommended application of the Green Revolution package (referred to in Figure 2 as 'physical inputs'), and the input of hired labour. Hence, two strategies emerge here for the intensification of maize production. The first hinges, technically speaking, on increased labour input, which is expressed in planting densities, manual (with the hoe or oxen) ploughing and sowing, and intensive to very intensive and laborious weeding practices. This strategy is oriented towards *protecting the means of production and consumption* and shaped by, and embedded in, the domain of the family and cultural repertoires. The second strategy is not labour driven, but technology driven, that is mechanized farming. It is founded upon *expansion and accumulation*, and primarily moulded by the predominant market and technology relationships. The

first strategy and its associated agricultural practices finds its dynamic basis in minimizing and distancing themselves from commoditized relationships. The second strategy is founded upon the active creation and intensification of commodity relations and a clear interlocking (also in the political sense) with the predominant market and technology agencies in the district. Furthermore, both strategies are for most of the farmers mediated by 'straddling' a livelihood in agriculture with other economic activities, albeit for different objectives.

Surprisingly, what is missing is a combination of a high labour input with the recommended use of hybrid seed, fertilizers and agro-chemicals that compose the Green Revolution package. Technically speaking, such a combination could be very promising. In practice, however, when such a combination occurs, it results in a completely different outcome (see the interaction-term in the path diagram), with a negative effect upon yields. The explanation is simple: the physical inputs are not disembodied or neutral artefacts. They carry specific social relations of production (as for example an increased degree of commoditization). They do not therefore go together with an increased labour input. They are used, instead, to *replace* labour.

A further interesting element in the analysis is that the physical landscape of Nandi District in Kenya is, in its turn, shaped by socially regulated practices and strategies, and power relations. A crucial characteristic of agricultural and rural development in Nandi District is related to variation in natural agro-ecological resources, which are unequally distributed over the region. The northern part of the district is generally the area endowed with suitable soils and climatological conditions for maize and other crop production, and farming is much more organized on a large scale and labour extensive. The southern part is less well off and agricultural production is land and labour intensive. Maize yields are on average higher in the North than in the South. This is partly because of the natural factors involved, and partly due to specific socio-economic, institutional and cultural factors. It may or may not be coincidental, but it is striking that such a social distinction has emerged through time.[4]

What has been made clear with reference to the conceptual and analytical framework is, in the first place, that the seemingly chaotic diversity is not coincidental, but rather emerges from the strategic actions of actors. The first strategy with its associated agricultural practices, is clearly shaped by the domain of family and community and the interests expressed at that level. The second strategy is clearly informed by market institutions. In the second place, meaningful patterns of agricultural development have emerged through time.

Furthermore, the data and the analysis raise an important *development issue*: how, and by which mechanisms and relationships, can one strengthen the dynamics represented in the domain of family and culture? Two discussions relate to this issue. The first concerns the debate about the

pros and cons of small-scale versus large-scale farming (see also McC.Netting 1993). The field data indicate that the farm labour processes and strategies deeply embedded in the domain governed by family relationships and cultural repertoires, are exactly those that rely on intensive labour inputs, and hence rural employment is actively created in and through production. Moreover, the data point out that such labour processes are as productive as those in which labour input is replaced by technology. The empirical dimensions of scale and intensity of farming appear as relevant horizons with practical implications for rural development.

The second discussion relates to the relevance of agricultural research agendas for agricultural development. The maize research agenda has for decades (roughly since the beginning of the 1960s) been dominated by the breeding of hybrid maize varieties suitable for the Kenyan situation. These programmes and the dissemination of the produced innovations were glorified by the World Bank, and evaluated as very successful. Reference is made to the fast uptake of the hybrid maize innovation by small and large-scale farmers in the country. This points at an integration of farmers' projects with TATE projects. The statistical interrelations in the path diagram in Figure 2 show that the – direct and indirect – contribution of hybrid maize to a general increase in productivity is modest and relatively small as compared with the contribution of the factor labour, particularly in intensive labour driven labour processes (see, for more detail, Hebinck 1990, pp. 169–205).

It is not surprising therefore that farmers in different parts of Kenya reject the application of hybrid maize packages. Some do so after they have applied it for some time, while others have never applied it since its introduction.[5] Farmers are now engaged, as they been engaged for some time, in searching for new, but locally produced and reproduced maize varieties. Such efforts by farmers are positioned, in terms of our conceptual framework, in the non-commoditized circuits shaped by the domain of family, community and local culture. They involve processes of distancing themselves from TATE or technology-driven projects. Moreover, their efforts – theoretically and practically – boil down to (re)strengthening such domains, which involves distancing themselves from TATE-driven social relations of production. An important question, then, is how such efforts (re)mould the relationships between farmers and TATE institutions, and how such an experience forms the parameters for another type of agricultural research agenda in Kenya.[6]

## Demoulding Iron Laws

At the aggregate level (see Figure 1), the many and sometimes contradictory development processes entailed in different styles of farming flow

together in particular outcomes, regularities and/or discontinuities. An average maize yield, as discussed above, is an example of such an outcome. The same example makes it clear that such an outcome cannot be taken as indicative for the many micro situations from which it is emerging (see also Steenhuysen de Piters 1995, van der Ploeg 1990, Almekinders *et al.* 1995). The same goes for particular regularities, such as a decrease in agrarian employment levels. Especially when such regularities are noted in different time-space locations, there is a strong tendency to consider them as 'iron laws' which govern the development processes concerned. This is not only the case within agrarian sciences, but also in the fields of policy and planning.

We believe that the concept of 'iron laws,' which in its turn is frequently associated with notions of unavoidability, indisputability and universality, is one of the awkward characteristics of structuralist approaches. This is especially the case since these 'iron laws' are directly grounded in relations, patterns and processes encountered in the domain of markets, technologies and institutions. It is assumed that the processes located in the latter domain lead *inevitably* to the kind of regularities that are noted at the macro level of aggregate outcomes. Just as water runs from the Swiss mountains to the Dutch delta (and not the other way around), rural development goes in one direction only, according to the 'iron laws.'

There is a nice collection of 'iron laws' in rural development processes. Take for instance the widely shared notion that rural and/or agrarian development can only proceed with a simultaneous reduction of rural (and/or agrarian) employment levels. Growth on the one hand and expulsion of labour on the other are, according to this 'law,' two sides of the same coin. Development cannot occur without such an expulsion. The two are forged together in one equation that depends, in its turn, on the 'basic economic laws governing our societies' (or, for that matter, 'governing capitalism'). Another well-known 'iron law' implies that 'monetization' of the rural economy is a crucial prerequisite for the 'development of the agrarian sector.' Again, these are just two sides of the same coin. Third, farmers will only be able to 'survive' if they operate as entrepreneurs: those who do not 'follow the logic of the market' will inevitably become marginalized. The same goes for technological development. It is not only an unavoidable ('autonomous') process; its implementation is equally understood as being unavoidable, since those who do not 'innovate' in time will sooner or later become marginalized. The 'law of diminishing returns' is yet another example.

Although the bouquet of 'iron laws' could easily be enlarged, we will not do that in this chapter. We want to stress here, in the first place, that these 'iron laws,' which are produced and reproduced (albeit sometimes also contested) within the domain of (agrarian) science, have a deep and far-reaching impact in the domains of policy and planning. These 'laws'

are currently highly institutionalized – to such a degree that they have become self evident. They reflect, so it is assumed, the world as it is. Hence, any attempt to run counter to these basic or iron 'laws' represents something ludicrous.

On the other hand, one could argue that the same basic laws are 'social constructions,' underpinned by the regularities that are produced precisely by and through these constructions. 'Iron laws' inform policy and planning: they compose the coordinates that define, delineate and separate the world of the possible and the world of the impossible, about which only lunatics dream. Hence, policy proposals are in line with the iron laws – the latter inform the former. Consequently, practice is shaped and reshaped according to the 'laws': policy and planning become, above all, self-fulfilling prophecies. It is only the world thought as possible (that is: within the boundaries as defined by the iron laws) that is being constructed. So finally the regularities produced indeed seem to confirm the basic 'laws' as indisputable.

We do not share the (post)modernist view that society is as malleable as clay, nor do we reject the notion that people operate in a world characterized by different degrees of freedom and coercion. We are also convinced that there are regularities and patterns that cannot be evaporated by the simple application of postmodern rhetoric. We do, however, strongly reject the notion of 'iron laws.' Consequently there follows a 'programme' that can be summarized in the following points:

1 Wherever specific regularities emerge (giving rise to deterministic interpretations geared around 'iron laws'), the production and reproduction of these regularities is to be investigated repeatedly.
2 At the same time, the possible 'deviations' from the iron laws indicated become extremely interesting. Representing at best anomalies within the paradigms based on iron laws, these 'deviations' might very well be starting points for interesting developments, both at practical and theoretical levels, within alternative approaches.
3 The application of the analytical framework (Figure 1) is, we believe, an important tool for doing so. This we will illustrate with reference to an 'iron law' that seems to govern land reform processes throughout the world.

### *The Iron Laws of Land-Reform: An Excursion into Empirically Underpinned Self-Evidences*

A central concept in every planned land reform process is the 'economic holding.' This refers to the particular man/land ratio to be introduced into the agricultural sector through the reform process. The central assumption governing these reform processes is that only through the application of the 'economic holding' can viable enterprises be created.

The required 'economic holding' is basically calculated on the basis of the price levels expected in the markets and the world market in particular. It also takes into account the (expected) process of technology development. Markets and technology are important arenas in which agriculture is exposed to general and particular processes of accumulation. Thus whilst existing agricultural organization – including the empirical, average man/land ratio – is considered as being at odds with the (new) requirements as entailed in markets and technology, the newly calculated 'economic holding'[7] and the organizational solutions associated with it are seen as representing a new and more effective balance between the two sides.

If we analyse the historical development of the 'economic holding' and compare it to existing, empirical man/land ratios, the contradictory nature of the relation between agriculture and the development of markets and technology becomes clear. In the early 1950s, Egypt underwent land reform. The calculated 'economic holding' of 2.6 acres per man was some 44 percent higher than the empirical man/land ratio for the time. Thus, in Warriner's phrase 'some displacement was necessary' (1969, p. 413). The economic holding calculated a decade latter for Iran was 80 percent higher than the average man/land ratio. There are other figures: in Tunisia in 1964 the economic holding calculated by World Bank specialists for the new cooperatives was 166 percent above the average man/land ratio of the area; in Chile in the 1965–1970 period, the Frei reform had a newly realized man/land ratio that was 260 percent above the existing man/land ratio; in Peru, 1969, the economic holding envisaged in the new land reform and calculated by the *Iowa Mission*, was more than 400 percent above the average man/land relationship, and finally in South Africa, World Bank specialists have recently calculated a provisional economic holding that will probably be more than 1,000 percent above average man/land ratios. These data have been summarized in Figure 3.

The growing distance[8] between the average man/land ratio and the economic holding as introduced by state controlled[9] land reforms reflects the *acceleration* and *non-simultaneity* implied by the global processes of accumulation. Both these processes were articulated towards and imposed upon the sectors concerned through the recommended calculation of the economic holding. These recommendations reflect, from a technical point of view, the dominance of labour-saving technological designs and the deterioration of exchange relations both at the international level[10] and between agriculture and industry. They function as non-negotiable parameters in the standard procedures for calculating the economic holding, and through them[11], the dynamics, requirements and contradictions of global accumulation processes are 'translated' directly to field level.

Consequently, state controlled land reform processes are resulting in an increasing marginalization of both the farmers and rural wage labourers. We could refer to this tendency as being one of the 'iron laws' that seem to govern rural development processes: in order to (re)mould agriculture

to the changing requirements of the process of accumulation, a massive and rapid *dispossession* of the rural population must take place. Agricultural development brought in line with accumulation (through the design and implementation of land reform schemes) becomes a major mechanism for creating overpopulation. Figure 3 demonstrates the seeming inevitability of such a 'law,' which is also reflected in the title of Thiessenhuisen's discussion of land reform processes: *Broken Promises*.

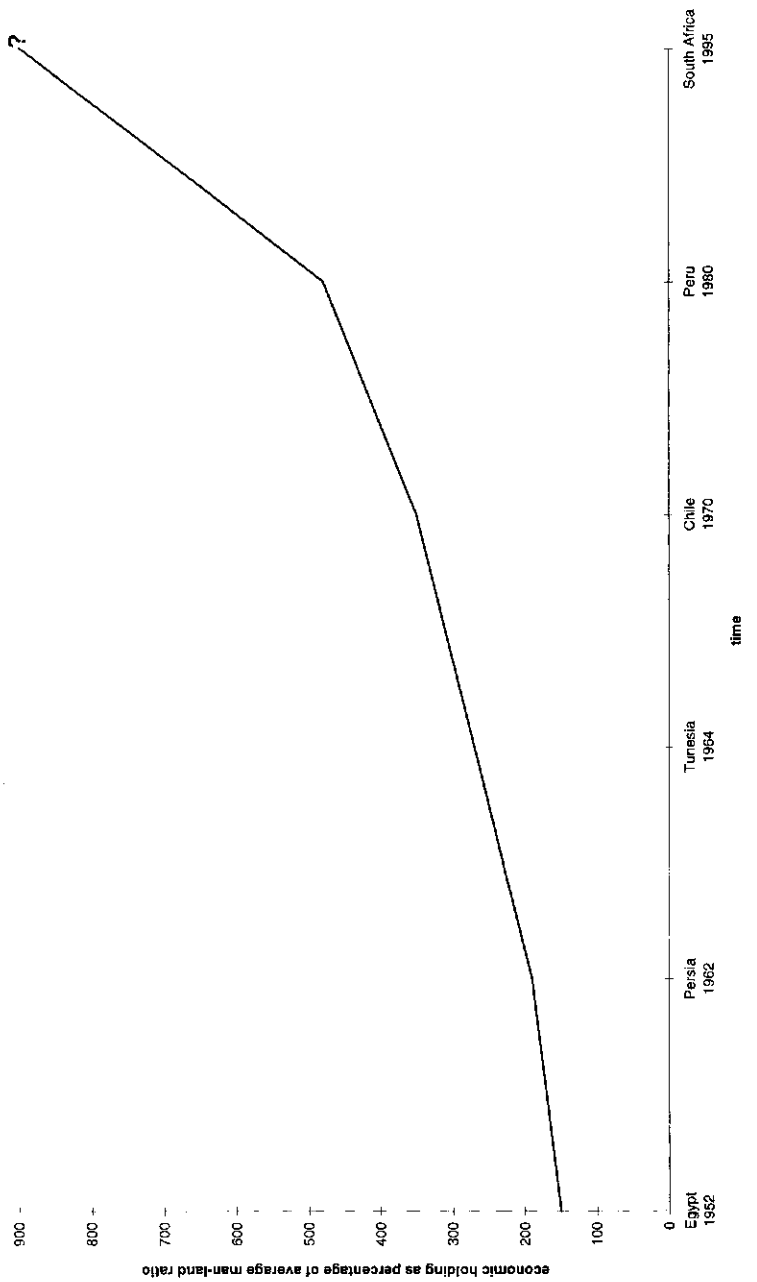
It may well be the case that land reforms were meant to contain and 'resolve' an agrarian question that blocked processes of accumulation and presented an immanent political threat to existing regimes. This was undoubtedly the case in Peru, for example. But, as history has shown, the remoulding of agriculture to fit the new political and economic requirements of a particular accumulation regime does not 'solve' the agrarian question. Instead, the agrarian question is reproduced if not deepened. This is another 'iron law' governing land reform processes: more often than not they produce new turmoil: those sections of the rural population who see their aspirations being frustrated ('land to the tiller'), and the dispossessed, will try to regain access to land. Their movements may bring down governments, as was the case in Peru in 1975.

Meanwhile, the 'reformed' sector will frequently have problems in managing these new large-scale agricultural production units characterized as they are by their increased man/land ratio. This is particularly so because banks, trading houses and state institutions will be unwilling and/or unable to create the conditions necessary for a proper functioning of these new units, whether they are large family farms or state controlled cooperatives. As a result production will remain fixed at levels often lower that those of the prereform period. This is, we would argue, a third 'iron law,' which is equally supported by the available documentation: often inspired by the need to increase production, most reform processes do ravage instead the levels of production.

*Is There a Way Out?*

Several observations concerning these 'iron laws,' and especially the one contained and illustrated in Figure 3, can be made using the analytical scheme (see Figure 1). Indeed, as long as the 'economic holding' is derived from the evolving economic tendencies at world market level the marginalization indicated is inevitable. But then, there is no need to ground the required man/land ratio in a unilinear way to external economic parameters only. Farming *interacts* with the market, it is not *determined* by it. The balance between market dependency and relative autonomy might well be changed. This has been shown in a range of empirical studies (van der Ploeg 1990; Hebinck 1990). But probably even more important is that such a balance can be changed, precisely in and during land reform processes.

Figure 3 Man-Land Ratios in Models for Land Reform



Second, it is during land-reform processes that the intensity of farming may be changed in a substantial and self-contained way. These two observations lead to the already discussed 'anomalies.' In the Peruvian land-reform process, for instance, such phenomena emerged in several locations, leading consequently to a new man/land ratio that differed markedly from the one entailed in the state controlled reform process (in Bajo Piura 1:1.5 versus 1:7, see van der Ploeg 1977; and in Alto Piura 1:3 versus 1:10, see Bolhuis and van der Ploeg 1985).

Practice shows, if only at the level of the 'anomalies'[12], that the so-called 'iron laws' can be negated if not modified. It is time that the room required at the level of theory for understanding this 'bending of iron' is created.

## Conclusion

Throughout this chapter we have argued that heterogeneity is of strategic importance for any analysis that deals with agrarian and rural development processes in Third World countries. The same goes for the proper understanding of micro–macro linkages. Heterogeneity is grounded in the construction and reproduction of a highly differentiated set of micro–macro linkages amongst other things. We have shown that the diversity (in for example maize yields), which at first sight seems to represent a chaotic variance, is the outcome of different actors' projects, which also reflect the construction of different interrelations with macro phenomena such as the introduction of Green Revolution technologies. We have also shown that certain regularities (or 'iron laws') that emerge at the aggregate level may very well be deconstructed by going backwards from the macro level towards the micro level where contrasting trends can be encountered.

In synthesis, we believe it to be extremely important that heterogeneity, at any level, is taken seriously. Heterogeneity often brings the researcher to a reservoir of highly interesting and mutually contrasting (potential) responses to the processes of change and problems that are characteristic for Third World agriculture. In addition, by taking heterogeneity seriously and understanding the different responses to change, the possibility of identifying potentially relevant and dynamic endogenous development patterns in the countryside emerges, on the basis of which a meaningful contribution can be made to the policy debate about the directions of agricultural development.

We believe that we have provided a relevant analytical and conceptual framework for coming to grips with heterogeneity in its different forms. What has been left open is the kind of field research methodologies required for such an analysis. This chapter has hinted at least that there is scope for a fruitful combination of qualitative (for example, ethnographic)

and quantitative (for example, statistical) approaches. Such approaches assist us in meaningful analyses of the different development patterns in the countryside.

## Notes

1 This is not to deny the recognition of processes of rural differentiation. Classes are important but their membership is ambiguous, insecure and liable to considerable fluctuation.

2 Furthermore, what needs to be stressed is that theoretically as well as empirically, different labour processes emerged through time. Marx (Capital, Vol III) was one of the first to draw our attention to the heterogeneity of production processes and co-existence of various labour processes. Within the historically specific situation in eighteenth-century rural England, he distinguished between labour processes linked to specific commodity circuits and those founded upon a complete circulation of commodities. Extending this argument towards (Third World) agricultural systems, we may propose that every labour process in agriculture, whether on a capitalist farm enterprise or on a family farm, can be characterized in terms of a maintenance of a certain balance between use value and exchange value, between commoditized and non-commoditized forms of production and reproduction. The connotation 'degree of commoditization' and the extent of externalization is used (see van der Ploeg 1986, 1990) to reflect this strategic balance.

3 See Magadlela and Hebinck (1995) for a more detailed analysis.

4 Historically, it is in fact not a coincidence as land settlement patterns in Nandi were such that the first landholdings to be pegged and claimed, and later registered and privatized after the 1945, were the ones owned by the elite who managed to control relatively large holdings in such a way. At a later stage, in the early 1950s particularly in the southern part, quite a lot of land was subdivided and subsequently sold to neighbouring people (such as the Luhya). The outcome of such settlement patterns is that the landscape in the northern part is predominantly large scale with land and labour extensive agriculture, and the southern part predominantly small scale with land and labour intensive agriculture.

5 The processes of distancing and/or rejection are usually coined by TATE actors in terms of non-adoption or disadoption of innovations. The empirical evidence for such process is, however, still not conclusive. The information has become available through research projects conducted by Omosa in Kisii District, Mango and van Kessel in Siaya District, and by Jansen in the southern region of Nandi District. It appears so far that there is a variety and complex set of reasons to explain these phenomena which are associated with ecological issues (soil degradation), a livelihood crisis, collapsing institutions in the aftermath of structural adjustment, and missing and failing markets.

6 A research project to look at processes of distancing and to identify the consequences for agricultural research agendas, is in the process of formulation. The partners in the research will be the Centre for Rural Development Sociology, KARI (Kenya Agricultural Research Institute) and CIMMYT (International Centre for the Improvement of Maize and Wheat).

7 It is mostly US agencies (including 'missions' of US universities) and/or the World Bank that are making the required calculations.

8 The same tendency can be found in countries such as Mexico and India where land reform processes took several decades. In Mexico, for instance, the realized economic holding averaged 9.7 ha/man in the period 1916–1934. This increased from 22.3 ha/man in the period 1935–1940, to 41.3 ha/man in the period 1941–1956 (Maddox 1965, pp. 373–398).

9 There are the notable and significant exceptions: the land reform realized in the mid 1950s in Bolivia was a peasant-managed land reform that occurred during and in the aftermath

of the *Violencia*. It resulted in an 'economic holding' that was nearly identical to the average man/land ratio (Burke 1967). Similar 'deviations' from the general trend emerged in Peru wherever peasant movements, notably the peasant communities, managed to gain direct control over a land reform process that was initially controlled by the state and managed as a military campaign (van der Ploeg 1977).

10 It is telling that for the Lambwe area of Nyanza Province, Kenya, it was reported 'that some years ago, that is in period 1951–1954, the economic holding required to obtain a minimum income level for a farming family was according to all calculations above 100 acres. Currently, however [1955] the required unit has decreased to 25 acres and it will probably fall even further' (HMSO 1955, p. 28).

11 The malleability of the interrelations between farming and markets is strategically denied in these calculations; a total integration and submission is assumed in an *a priori* way.

12 But then again the reader is reminded that it is the dominant paradigm which divides the world into anomalies and normalities.