

**SOCIAL FORESTRY:
CHANGING PERSPECTIVES
IN FORESTRY SCIENCE OR PRACTICE?**

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**SOCIAL FORESTRY:
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IN FORESTRY SCIENCE OR PRACTICE?**

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Propositions

being part of the dissertation

'Social forestry: changing perspectives in forestry science or practice?' by K.F. Wiersum

1. The proposition that forestry should change from a 'forest-centred' paradigm to a 'people-centred' paradigm is superfluous, since the formal object of forestry concerns forest - people interactions (Gilmour & King, 1989; Leary, 1985)
2. The concept of social forestry can only be operationalized if forest is not considered only as an ecosystem, but also as a social construction (this thesis).
3. Most definitions of social forestry do not state whether this concept relates to forest policies or to forest management; this reflects that traditionally close institutional links existed between forest policy and professional forest management (this thesis).
4. Conflicts concerning forest use and management can be resolved through regulation, markets or negotiation. Conventional forestry has emphasized the first two categories of instruments, but at present the third category is gaining in importance (Clawson, 1987; Kennedy et al., 1998).
5. In colonial times, more attention was given to the need to diversify forest management in order to meet the demands of a dual economy, than during the initial period of independence of tropical countries. In this last period attention focused specifically on forestry for industrial development and centrally-planned development schemes (Westoby, 1962; this thesis).
6. In forestry the interpretation of the concept of sustainability has changed gradually from sustained yield of forest products to sustained conservation of ecological characteristics and finally to sustained co-evolution of forest conditions and social requirements regarding forests (this thesis).
7. The present efforts to codify sustainable forest management are not entirely in harmony with efforts to base forestry science on an empirical instead of a normative foundation.
8. The discussion on the need for interdisciplinaire research (of beta and gamma sciences) is often based on the assumption that such cooperation should take the form of joint design of predictive models. This is a one-sided approach, which neglects the specific role of various categories of science within the scientific cyclus of exploration, explanation and prediction. The significance of interdisciplinary cooperation lies at least as much in the joint search for explanations of discrepancies between social reality and the structures of scientific models, as in the joint design of such models.
9. The present enterprising university is mostly focused on the 'predict and control' function of science and neglects the cultural task of universities in searching for 'reflective wisdom'. Within the framework of the development of the civil society, this cultural task of universities urgently needs greater recognition, which will be quite an enterprise.
10. The motto of the sixties 'Let imagination take power' has, in the nineties, been subverted by many into 'I have power, therefore I have imagination'.

Stellingen

behorende bij het proefschrift

'Social forestry: changing perspectives in forestry science or practice?' van K.F. Wiersum

1. De stelling dat er in bosbouw overgegaan zou dienen te worden van een 'forest-centred' paradigma naar een 'people-centred' paradigma is in tegenspraak met het feit dat het formele object van bosbouw de bos - mens interactie is (Gilmour & King, 1989; Leary, 1985).
2. Het begrip sociale bosbouw is alleen dan operationeel te maken, indien men het begrip 'bos' niet alleen opvat als een ecologische systeem, maar tevens als een sociale constructie (dit proefschrift).
3. Het feit dat in de meeste definities van het begrip sociale bosbouw niet aangegeven wordt of dit begrip betrekking heeft op bosbeleid of op bosbeheer, illustreert de traditioneel zeer nauwe institutionele banden tussen bosbeleid en professioneel bosbeheer (dit proefschrift).
4. Conflicten ten aanzien van bosgebruik en -beheer kunnen opgelost worden door middel van regelgeving, marktwerking of overleg. In de conventionele bosbouw lag de nadruk op de eerste twee categorieën van instrumenten, maar thans wordt de derde categorie steeds belangrijker (Clawson, 1987; Kennedy et al., 1998).
5. In de bosbouw bestond in de koloniale tijd meer aandacht voor de noodzaak tot diversificatie ter voldoening aan de eisen van een duale economie, dan in de initiele fase van onafhankelijkheid van tropische landen, toen de aandacht zich concentreerde op industriële ontwikkeling en centrale ontwikkelingsplanning (Westoby, 1962; dit proefschrift).
6. De interpretatie van het duurzaamheidsbegrip in bosbouw ontwikkelt zich geleidelijk van duurzame instandhouding van produktie via duurzame instandhouding van ecologische karakteristieken tot duurzame co-evolutie tussen bosgesteldheid en maatschappelijke eisen ten aanzien van bos (dit proefschrift).
7. Het huidige streven naar internationale codificering van duurzaam bosbeheer staat op gespannen voet met het streven de bosbouwwetenschap op een empirische inplaats van normatieve grondslag te funderen.
8. In de discussie over de noodzaak tot interdisciplinair onderzoek (op het gebied van beta en gamma wetenschappen) gaat men er vaak van uit dat een dergelijke samenwerking vooral gestalte dient te krijgen in de vorm van het gezamenlijk ontwerpen van voorspellende modellen. Dit is een eenzijdige benadering, die geen recht doet aan de specifieke aard van de diverse categorieën van wetenschap in de wetenschappelijke cyclus van verkenning, verklaring en voorspelling. De betekenis van interdisciplinaire samenwerking ligt minstens evenzeer in het gezamenlijk zoeken naar verklaringen omtrent de aard van discrepanties tussen maatschappelijke werkelijkheid en model structuur als in het gezamenlijk ontwerpen van dergelijke modellen.
9. De huidige ondernemende universiteit richt zich primair op de 'predict and control' functie van wetenschap en verwaarloost de culturele taak van de universiteit om te zoeken naar 'reflectieve wijsheid'. Deze culturele taak van universiteiten is in het kader van de ontwikkeling van een 'civil society' dringend aan opwaardering toe; dat wordt een hele onderneming!
10. Het credo van de zestiger jaren "De verbeelding aan de macht" is in de negentiger jaren door velen verbasterd tot "Ik heb macht, dus ik heb verbeelding".

ABSTRACT

Forestry has been defined as a profession embracing the science and the practice of creating, conserving, and managing forests for the continuing use of these resources. Since its inception in the 18th century it has gradually evolved in character in response to changing social values. At the end of the 1970s a new concept was introduced in forestry, i.e. social forestry. This approach focuses specifically on the forest-related needs of local communities in tropical countries, and on stimulating community involvement in the sustainable management of forest resources. It has been suggested that the development of social forestry implies a paradigmatic change in forestry. This suggestion is contested, however. The objective of this study is to contribute towards the elucidation of the question whether the emergence of the concept of social forestry has indeed brought about a paradigmatic change in forestry. A paradigm involves the total set of disciplinary commitments; this disciplinary matrix includes a basic world-view, normative perspectives and conceptual generalizations as well as ideal-typical exemplars for problem-solving. Both scientists and professionals may adhere to such normative commitments. Consequently, the suggestion of a paradigmatic change in forestry may be related either to forestry as a science or forestry as a professional institution.

The study consists of four analytical steps. First a short overview of the history of forestry and of one of its major conceptual generalizations, i.e. sustainability, is given, and the nature of the disciplinary matrix of conventional forestry is identified. Next the development of social forestry is described. This forestry approach is conceptualized as involving forestry policies designed and implemented by professional foresters, and community forest management practices executed by local communities, who are not professionally-trained in forestry. It cannot be assumed that the normative perspectives of these two categories of practitioners are similar. The third step of analysis therefore consists of a comparison of the perspectives of these two categories of forestry practitioners; it shows major differences in normative perspectives. The last step of analysis focuses on how the recognition of such differences has impacted on forestry science and professional practice. It is concluded that social forestry involves major changes in both role- and rule-orientation of professional foresters. The role of professional foresters is not considered any longer as being ideal-typical forest managers, but also as being facilitators of community forestry. Consequently, several new concepts and theories concerning social coordination in forestry evolved. Forestry science became more empirically oriented by paying attention to all possible forest management conditions rather than to professionally-controlled forest management situations only. These changes in forestry science can best be considered as an evolutionary change rather than a paradigmatic one. However, the differentiation in tasks of professional foresters and the loosening of the close institutional links between forestry scientists and professional practitioners can be considered as involving a paradigmatic change in forestry as professional institution.

PREFACE

The year of 1978 was a memorable year for forestry. In that year both FAO and the Worldbank published authoritative reports, in which the need was identified to devote more attention to the forest-related needs of local communities and to the role of forestry for rural development. Similar ideas were also expressed at the 1978 World Forestry Congress, which had as theme 'Forestry for the people'. Since then the concepts of social and community forestry quickly were incorporated in forestry. Also at the Department of Forestry of the Wageningen Agricultural University this new approach was quickly picked up. In 1982 a student study group made a first exploration of this new concept. Subsequently, several field studies were initiated to elucidate the scope and significance of social forestry, i.e.

- 1) 'Tree and forest resource planning in the uplands of Java', which included a sub-programme on 'Leucaena farming systems in Lombok and Sumbawa' (1985-1989);
- 2) 'Evaluation and planning of tree growing programmes in tropical countries' (1986-1989);
- 3) 'Analysis and development of local utilization and management of woody vegetation in the Sahel' (1989-1993) and 'Use and management of silvo-pastoral vegetations' (1994-1998).

The first research project was initiated by Cor Veer, who in the early 1980s was responsible for research and education on social aspects of forestry. The study aimed at obtaining a better insight about the scope of social forestry in Indonesia. It concentrated on analyzing the role of trees in local farming systems and the reasons for (non)participation of local people in selected social forestry projects. The second project was directed at obtaining a more general understanding about factors which influenced the results of social forestry projects. It had as purpose to identify and compare different social forestry development strategies with their main socio-economic features, as well as to develop a better insight in the nature and scope of community involvement in such forestry projects. One important finding from this research, was the identification of the discrepancy between the kind of forestry activities introduced by social forestry development projects and the indigenous forest utilization and management systems of local people. The last two research projects were therefore directed at obtaining a better insight of such indigenous systems. The aim of these studies was to obtain a better understanding about the complex nature of village-level systems for forest utilization and management, as well as to identify in what way social forestry interventions could be better adjusted to the village environment.

The subject of social forestry was also quickly incorporated in the teaching programme. In 1984 Cor Veer initiated a critical assessment about the nature of forestry as a social institution within the framework of a course on "Social aspects of forests and forestry". And in 1986 a lecture series on 'Forestry and rural development' was incorporated in the teaching programme. In the same year an English M.Sc. course on Tropical forestry was started which included a specialization in social forestry.

Since the start of these activities, within the framework of various temporary assignments I have been cooperating with Cor Veer as well as his successor Lucienne Berenschot. In 1984 I got the opportunity to elaborate the ideas as developed at the Forestry Department WAU during a fellowship at the East-West Center in Hawaii. Subsequently I also contributed to a major study of FAO on 'Tree growing by rural people'. In 1988 I became officially responsible for teaching forestry and rural development at the Forestry Department of Wageningen Agricultural University.

As a result of the various experiences gained in the 1980s with research and education in social forestry, it became increasingly recognized that the development of social forestry involved some major new perspectives on the nature of forestry. In 1991 the idea took shape for the present study on whether social forestry involved a paradigmatic change in forestry. In 1992 a first discussion on this subject was organized within the framework of a *caput-selectum* lecture series on 'A decade of social and community forestry; lessons learned, challenges ahead'. Since then, I have been working on and off on this study. Originally it was planned to prepare a book with a totally new text, but this idea had to be abandoned due to the many teaching obligations and participation in other research programmes. As several of the ideas underlying the study had gradually found their way into various articles, it was then decided to use these articles as a basis for the book. These articles had been written for various occasions and are therefore partly of a different style. At first it was thought that this might hinder a proper and logical structure of the book. In hindsight, however, I believe that the present structure of the book with its multi-faceted assessment of the relevance of social forestry is of value. The study is primarily an assessment of the nature of and dynamics in forestry science and practice. The study approach is therefore not based on the 'predict and control' function of science, but rather on the function of science as providing theoretical clarification through critical reflection. Multi-faceted explorations can well serve to obtain such clarification.

I am grateful to my promotor, Prof. A. van Maaren, that throughout the whole process he kept faith in my endeavour to prepare this book. The book would not have been written if he had not been so interested in the development of social forestry and its scientific significance. Under his leadership a strong basis was established for the 'Wageningen approach' to forestry in which prominent attention is given to the social significance of forestry in a changing society and to the potential roles of forestry for socio-economic development. I am also thankful to Prof. Wessel for his continued interest in the progress of the study. His repeated questions on its status were a good stimulus to pick the study up again after periods in which other tasks required priority.

Three persons have contributed to the original identification of the topic of this book. My predecessor at the Department of Forestry Cor Veer introduced in the early 1980s a systematic reflection on the nature of forestry in his course on 'Forestry as an institution'. His ideas on the institutional nature of forestry were one of the foundations for this study. John Raintree, at that time working at ICRAF, introduced me to the idea of applying the concept of paradigm to forestry. In a paper presented to the 1989 'International Conference on Agroforestry, principles and practices' he applied this concept to assess the scientific relevance of agroforestry. This example inspired me to apply the concept to

social forestry. A third person who contributed to my unfolding ideas was Nalini Kumar, who was a colleague during a mission to India and who subsequently continued studying at Yale University. Our discussions provided in a fertile seeding bed in which my fledging ideas could flourish to fuller insight.

Many people have assisted and stimulated me during the over 15 years that I have been working in the field of social forestry. Outstanding amongst them is Mike Arnold, the former head of the Administration and Policy branch of FAO, who can be considered as a major founding father of social forestry. I have been privileged to cooperate with him on several occasions; especially his invitation to join the team preparing the FAO report on 'Tree growing for rural people' greatly increased my interest in this subject. The pleasant and stimulating contacts with the FAO Forests, trees and people programme continued under his successor Marilyn Hoskins. Larry Hamilton of the East-West Center in Hawaii invited me as a research fellow at this institute, and encouraged me during this stay in my first effort at conceptualizing social forestry.

Also in the Netherlands many people contributed towards the development of increasing insights in the significance of social forestry. Especially with Berry Lekanne dit Deprez of the Department of Development Sociology WAU, Franz von Benda-Beckmann of the Department of Agrarian Law WAU, Paul Richards of the Working Group on Technology and Agrarian Development WAU, Margaret Skutsch from the Development Group of Twente University, Gerard Persoon of the Center of Environmental Studies, Leiden University and Hans van der Breemer of the Department of Anthropology, Leiden University, stimulating collaboration and exchanges of ideas and information took place. The joint publication with Berry Lekanne dit Deprez in this book stands as witness to these very pleasant and collegial contacts. Margaret Skutsch kindly assisted me in language-editing several chapters in this book.

In addition to pleasant collaboration with several colleagues in the Netherlands, this book has also profited much of joint research activities with social forestry researchers in other countries. This is illustrated by the inclusion in this book of a joint publication with Junus Kartasubrata, one of the first researchers on social forestry from Indonesia. This publication is a contribute to the very agreeable co-operative activities with several Indonesian forestry scientist. Fondly remembered are the joint activities with Hasanu Simon and his colleagues of the Forestry Faculty of Gadjah Mada within the framework of the NUFFIC-sponsored Forestry and nature conservation (FONC) project.

In the course of years several people have been actively engaged in the social forestry programme of the forestry department WAU, and many of the ideas in this book have benefitted from the intensive scientific interactions as well as pleasant personal contacts with them. In addition to the activities of Cor Veer and Lucienne Berenschot also the activities of Bram Filius on issues concerning forestry development and policy contributed significantly to the foundation of a synergetic mass for the department's social forestry programme. I also profited much from the cooperation within the framework of the WAU Sahel research programme with Jan Joost Kessler, Martha Bloemberg and Maja Slingerland. They contributed valuable information and insights on forestry development

in the Sahel region. Also the discussions with Kees van Vliet and Laurent Umans on the nature and development history of (tropical) forestry science were important stimuli to this study.

Since the beginning of this study, I guided 6 Ph.D. and over 50 M.Sc. students from the Netherlands and from tropical countries with studies dealing with different aspects of social forestry. Several of these studies were co-supervised by staffmembers of the WAU Departments of Development Sociology, Extension Science, or Agrarian Law, and the Working Group on Technology and Agrarian Development. The possibility to engage in such interdepartmental activities offered excellent opportunities to apply emerging concepts from social sciences in assessing the nature and significance of social forestry. The studies were very useful in obtaining information from many different countries on experiences gained with social forestry. They provided important empirical information to check the gradually evolving conceptual framework of social forestry as developed at the Department of Forestry WAU.

The ideas in this book did not only take shape as a result of constant interaction and cooperation with scientists and students, but also in regular interaction with many persons engaged in forest development policy formulation and implementation. In the 1980s several consultancies were carried out for the Directorate-general of Development Cooperation (DGIS) to appraise or evaluate social forestry development projects. This brought with it stimulative discussions with Egbert Pelinck, the (former) forestry advisor of DGIS. In the period 1988-1992 I was a member of a group of WAU staffmembers who provided guidance to the forestry development projects of the Netherlands Organization for Development SNV in the Sahel. Regular and spirited collegial contacts were also maintained with the DGIS development forestry support group, i.e. Cathrien de Pater (IKC/N), Kees van Dijk (IKC/N), Herman Savenije (IKC/N), Peter Laban (IAC), Gert-Jan Renes (IAC), and Reinout de Hoogh (IAC). With the last three persons as well as Nan van Leeuwen and Lyda Res an active cooperation took place within the framework of the IAC course on 'Design of community forestry'. This course provided me with yet another opportunity to discuss and test my ideas on social forestry with people from tropical countries, many of whom already had some working experience in this field. These opportunities to work at the interface of forestry science and practice have been very helpful in gaining a better understanding of the relations between forestry as a science and as a practice.

Finally this book would possibly never have been completed without the support of my children Friso and Joan. In the first place they provided for the, sometimes much needed, moments of family enjoyment and relaxation, while never complaining about non-office hours spent at getting work finished or being away for work. And when they became university students themselves, they showed increasing signs of not only understanding the challenge of science, but also enjoying the sport of challenging their father to get his academic education finally completed. Thus they stimulated action to complete this study of reflection.

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Chapter 1

GENERAL INTRODUCTION

1.1. Introduction: changes in forestry

Forestry has been defined as a profession embracing the science, business and art of creating, conserving, and managing forests and forest lands for the continuing use of these resources (Ford-Robertson, 1971). Such continuous use of forest resources is considered essential, as forests provide many important products and environmental services to mankind; the rational management of these resources forms a vital contribution to the welfare and well-being of mankind (Behan, 1966). Notwithstanding the fact that these basic assumptions on the nature of forestry were already established over a century ago, since the end of the 1970's the role of forestry in rural development in tropical countries has received increasing criticism. In these regions it was found that forestry had in many cases not in fact contributed to improving the welfare and well-being of the large segments of the rural population (Douglas, 1983; Westoby, 1989). Consequently, it was found necessary to develop a new approach towards forestry, which aims at increased rates of community participation in the development and management of forest resources (FAO, 1985; Shepherd, 1985; Arnold, 1987; Gregersen et al., 1989; Wiersum, 1989). This approach has been termed social (or community) forestry. Although the concept of social forestry is at present well established, a general consensus about the exact meaning of this concept has still not yet been reached. This lack of agreement seems partly to be related to semantic questions (Arnold, 1991). But in addition it is related to more fundamental differences in assumptions about the nature of (social) forestry. One may well wonder why in forestry it was considered necessary to identify a concept such as social forestry, while similar concepts of 'social' agriculture or 'social' animal husbandry do not exist. Indeed, it has been remarked that social forestry can be applied to almost every type of forestry since social benefits (such as employment or income generation) may be obtained from any of them, and that the term creates the false impression that 'non-social' forestry does exist (Burley & Wood, 1983). It has also been stated "what was required over the past years was not the proliferation of social forestry projects, but the application of modern professional forestry standards and practices to production forestry" (Roche, 1992).

Notwithstanding these criticisms, the concept of social forestry has gained general acceptance. Apparently, this concept reflects such an important innovation in forestry, that it was deemed relevant to represent the new approach with a specific term. Various authors have suggested that the development of the concept of social forestry implies not only an important change in forestry practice, but also an major change in dominant values and concepts in forestry. For instance, Dargavel et al (1985) voiced the opinion that the emergence of this concept signals the underdevelopment of forestry, and Gilmour & King (1989) ascertain that it indicates the need for a "people-centred" paradigm in forestry rather than the conventional "forest-centred" paradigm. Alternatively, this last proposition has been labelled "a false antithesis" by Roche (1992); who dismissed the notion of a paradigm change as "sociological rhetoric made worse by the use of discredited political slogans".

It is not only in tropical forestry that the idea of a paradigmatic change in forestry has been voiced. In several industrialized countries such as Europe (Kennedy et al., 1998), the USA

(Behan, 1990; Bengston, 1994; Brown, 1995), Canada (Kimmins, 1995) and Australia (Kentish & Fawns, 1995) the conventional approaches to forest management are being challenged and the question is being asked whether forestry is in evolution or in a revolution leading to a new paradigm (Coufal, 1989). As stated by Gordon (1994) "Forestry is undergoing a rapid and deep-seated change, of the kind Thomas Kuhn called a paradigm shift (....) We tried every means to keep the old view (of conventional forestry) in place, yet failed utterly"¹. Also in this case the proposition of a paradigm shift is hotly debated and challenged (e.g. O'Keefe, 1990; Czech, 1995). The simultaneous occurrence of such discussions about the nature of disciplinary commitments and need for conceptual changes in forestry demonstrates a global search for new normative commitments in forestry.

Notwithstanding such contradictory opinions about whether at present new 'revolutionary' concepts within forestry are developing, there have been little effort to assess systematically whether the proposition of a paradigm change is tenable, and if so, what the major differences in the commitments of conventional and 'new' forestry such as social forestry are. In order to be able to do so, first three major aspects need to be clarified: (i) what is the precise nature of forestry, (ii) what kind of normative commitments may be distinguished in forestry, (iii) what are the specific commitments of (conventional) forestry?

1.2 Forestry as a science and a practice

As indicated by the definition of forestry quoted above, the term forestry is used in reference to a professional activity embracing both scientific and economic activities (Burley, 1997). Often no clear distinction is made between forestry as a science and forestry as a practice². Thus, the first question to be considered when assessing normative commitments in forestry, is whether such commitments are attributable to forestry scientists, forestry practitioners or both. To be able to answer this question, it is necessary to have a better understanding of the nature of forestry as a science and a practice.

¹ In the USA it has been proposed to label this new forestry paradigm as forest ecosystem management. In this approach much attention is focused to a better integration of ecological values in forestry. But it is also stressed that such ecological considerations should be related to social values and that due attention should be given to the role of forestry in 'the cultural fabric of different societies' (Kimmins, 1995, see also Behan, 1990; Bengston, 1994; Kennedy et al., 1998).

² This lack of lexical distinction between forestry as a science and as a practice is not the case in all languages, e.g. in German and French a distinction is made between Forstwissenschaft and Forstwirtschaft and Science forestière and Economie or exploitation forestière respectively (Burley, 1997). Nonetheless, as illustrated by the definition of forestry, the lack of distinction should not be considered as an idiomatic matter only.

Table 1.1. **Types of science** (after Van Hengel, 1991)

	Academic	Applied	Practical
Purpose	Truthful explanation and/or prediction in abstract terms	Truthful explanation and/or prediction in options for human interventions	Rational problem solving
Object	Idealized/abstract objects	Real world/practical objects	Real world/practical objects
Criteria	Science based	-----	Society based

1.2.1 Categories of science

Three different categories of science regarding their orientation towards different kinds of problems may be distinguished, i.e. academic sciences (sometimes also called basic sciences), applied sciences and practical sciences (Koningsveld, 1987; Van Hengel, 1991). These categories of science differ with respect to their role-orientation and in respect of the purpose of research. Consequently, they also differ in respect to the object under study, and the origin of their value systems (Table 1.1).

Academic sciences are directed at explaining and predicting the truthful behavior of idealized and abstract objects. The value systems in academic sciences are primarily grounded in the scientific community. The criterion of objective scientific truth is considered as the ideal value system, even if it is accepted that normal development in these sciences is proceeding on the basis of (often unconscious) domain assumptions.

In the applied sciences the objects of study are not idealized and abstract objects, but rather real world, practical objects. The aim of these sciences is to explain and predict truthful solutions for problems with respect to options for human interventions. The value system underlying the applied sciences are still basically grounded in the scientific community, but the identification of problem situations to be studied is mostly based on a social rather than a scientific problem identification.

In contrast to the academic and applied sciences, the practical sciences are not primarily focused on explaining or predicting options for solving problematic situations, but rather on developing general concepts about how to rectify problem situations in a rational way. The objective of

practical sciences is to develop a set of general design principles for technical and social activities, which may serve as a basis for professional action. The criterion used for judging the validity of these principles is therefore not the objective truth, but rather rationality, i.e. the effectivity and efficiency of a principle for the solving of practical problems. Thus, although still adhering to the general scientific principles of systematic logical reasoning and application of scientific theories and concepts, the inherent value systems of practical science are to a large extent society-based rather than science-based.

The distinction between these three categories of science should be considered to be analytical rather than discrete. Many scientific disciplines involve characteristics of at least two of these types of science.

1.2.2 Forestry as a practical science

Referring to the definition of forestry quoted in Chapter 1.1, forestry science can be characterized as the science which develops knowledge which is needed for effective protection and management of forests in order that these can provide the required products and ecological services to society. This knowledge should allow forestry practitioners to carry out their activities in the most rational way. Thus, as forestry science focuses on rational problem solving of real world problems, it is primarily a practical science.

As indicated above, in contrast to basic sciences, the impetus for developing a practical science is usually not generated internally by science itself. This is also the case for forestry. As forestry by definition aims at sustaining forest resources for human benefit, the development of forestry science is primarily fueled by social values with regard to forests. These values originate within society and are communicated to foresters (Koch & Kennedy, 1991). In order to solve the various practical problems in managing forest resources, one needs a set of predictive tools. In response to the request for such knowledge, it is necessary to develop truthful predictions of the effects of different options for human interventions. As discussed above, the development of such explanative and predictive functions is the domain of the applied sciences. Thus, although forestry is basically a practical science, it has developed in constant interaction with related applied sciences such as vegetation and production ecology, economy and social sciences. In several cases such applied sciences have been incorporated into forestry science, e.g. forest ecology, sylvimetry, etc. Forestry science thus consists of a basis of applied science and a superstructure of practical science.

The development of forestry science takes place in a process of constant interactions between scientific endeavours and changing social values. As a result of the changing social values, from time to time the demands for different types of forest resources change. This often calls for a new approach towards managing forests to sustain these resources. This demand must then be solved by forestry as a practical science. In developing new designs for forestry, it may be necessary to apply knowledge from or even develop new insights in the field of the related

applied sciences. Alternatively, it may be that new insights developed in the applied science, gradually result in new social demands on forests. For instance, scientific information on the loss of biodiversity has resulted in social concerns regarding the need for biodiversity conservation; this has resulted in the need to develop new designs for forest management.

1.2.3 Forestry as a professional practice

Because of the practical character of forestry science, the development of forestry science and forestry practice have historically proceeded along the same path. Indeed, in many cases forestry practice has been equated with the application of scientific principles (c.f. Pleschberger, 1981). For instance, in a review of the history of forest science Mantel (1964) states:

"It was only at the end of the 18th century that a complete synthesis between the empirical knowledge held by technically skilled practical foresters and the more theoretical concepts and teachings of the "Kameralisten" (students of finance and administration) and natural scientists was achieved. This synthesis was personified by the so-called classics of forestry, who, because of their practical experiences and thorough scientific training, were in a position to unite theory and practice, and to develop the (modern) science of forestry as a coordinated whole (...) by linking intellectual and natural science knowledge with woodland empiricism".

As a result of this close interaction (see also Van Maaren, 1993), forestry is often equated with a professional activity (Zivnuska, 1963; Behan, 1966).

Professionalism refers to the thinking, values, methods and behavior which are dominant amongst members of a certain profession (Chambers, 1993). In contrast to scientists, the role orientation of professionals is not the carrying out of research, but the solving of problems. For this purpose professionals interpret and apply the general concepts developed by practical scientists into routines for concrete problem solving (Van Hengel, 1991). The knowledge needed to do so is obtained from education, with academic training being considered as the most advanced level. During this education professionals are initiated into the disciplinary matrix of scientists. This training allows them to have regular communication and exchange of experiences with practical scientists. As a result of having followed a similar education and by being involved in the same discipline, practical scientists and professionals mostly have a set of shared disciplinary commitments. One of their dominating values is the belief in the progressive nature of scientifically developed professional practices. If difficulties are encountered in applying such practices, these often become coded in such a way as to defend rather than challenge the institutional perspectives and thus become assimilated within the paradigm. The failures in problem-solving are not considered to be the result of wrong professional commitments, but rather lack of professional performance or need for more refined scientific knowledge (Chambers, 1993).

1.2.4 Non-professional forestry practice

An important effect of equating forestry with professional activities, is that it limits the scope of what are considered forestry practices. It does not leave room for the possibility that people without professional training may manage forests based on their own knowledge and experience without being cognizant of the principles of forestry science.

It is at present increasingly acknowledged that in addition to professional practitioners, there may also exist many practitioners who were not formally professionally educated and thus not subjected to the disciplinary commitments of professionals. Such non-professional practices are not based on a body of explicitly systematised and logically argued concepts and theories, but rather on location-specific empirical experience and craftsmanship. Often they are very professional in a vocational rather than educational sense. On the basis of empirical evidence from many agricultural research and development projects of the past decade, questions are increasingly raised about whether it is always true that scientifically developed practices are superior to such non-professional practices. Firstly, it was found that many of the scientific practices did not fit into the fabric-of-life of certain categories of farmers. For instance, in tropical countries many scientific resource management practices required external inputs to which many farmers did not have access (e.g. Reintjes et al., 1992). Secondly, a growing recognition emerged that 'indigenous' practices (Richards, 1985) or 'l'art de la localité' (Van der Ploeg, 1993) often contain valuable elements for problem-solving, e.g. in respect to natural resource management (Warren, 1991). As a result of the increased attention being given to the activities of local practitioners, a better understanding also has gradually emerged about the normative values and social perspectives of these groups of practitioners. It is also becoming recognized that any new scientifically developed practices which are introduced amongst local practitioners encounters a set of local institutions and normative values. Whether the new practices get accepted, resisted or rejected, in whole or part, is determined by the internal coherence and normative structures of the local institutions (Von Benda Beckmann, 1991).

1.3. Paradigms and institutions

As forestry embraces both the science and the practice of conserving and managing forests, forestry practitioners can be either scientists or professionals. The practices of both groups are grounded in a complex of norms which serve collectively valued purposes (Veer, 1984). In view of this lack of distinction between scientific and professional activities, it is often not clear whether the claim for paradigmatic change relates to the normative commitments of forestry scientists or professionals or both. In scientific literature two concepts are often used to refer to the set of normative commitments which guide certain practices, i.e. paradigm and institution. The term paradigm is mostly used in relation to the domain assumptions which guide scientific research, while the term institution refers to the complex of norms which result in a specific type of behavior of a certain group of people. If the changes in the commitments of forestry are primarily of relevance for the scientific activities, one might speak of a paradigmatic change.

However, if they primarily concern professional activities, it might be more appropriate to speak about an institutional change. In order to be able to differentiate between these options, it is important to consider the concepts of paradigm and institution in more detail.

1.3.1 The concept of paradigm

In 1962 Kuhn published the first edition of the book "The structure of scientific revolutions" (Kuhn, 1970a), which has become highly influential in understanding the dynamics of scientific development. In this book two sorts of scientific change are distinguished. The course of scientific progress is characterized as involving long periods of 'normal' science punctuated by a succession of scientific revolution and paradigmatic change. Normal science involves a cumulative process, during which the basic theories of a scientific discipline are progressively better articulated and extended. Central to Kuhn's view is the notion that during such periods of normal science scientists operate (mostly unconsciously) within a 'paradigm'. Such a paradigm has been described by Kuhn (1970b) as "A world view, a general perspective, which is deeply imbedded in the community of adherents and practitioners telling them what is important, what is legitimate, what is reasonable. Paradigms are normative, they tell the practitioner what to do without the necessity of long existential or epistemological considerations". Others described it as "that grand, overarching collection of assumptions and elements of world-view, which defines not only the nature and boundaries of the scientific phenomenon under investigation, but also the type of questions to be asked and the methodologies considered legitimate for answering them" (Raintree, 1989). Or, as "a set of domain assumptions which are essentially nonconscious, pre-theoretical and thus, non-testable statements that function to define and to order a given reality" (Werker, 1985).

The concept of paradigm has won widespread acceptance, although initially the ambiguous nature and multiple interpretations of this concept were criticized. Masterman (1970) identified 21 different senses in which Kuhn originally used the concept. In reaction to such criticism, Kuhn (1970 a,b) has clarified the concept as referring to a disciplinary matrix which covers the entire constellation of beliefs, values and techniques shared by practitioners of a specified scientific community. In the constellation of group commitments three distinct elements can be distinguished:

- * Shared symbolic generalizations which serve both as laws and as definitions for the formal (or readily formalizable) components of the matrix;
- * **Metaphysical paradigms:** shared beliefs in specific models to which there are no potential falsifiers;
- * Shared values such as consistency, accuracy of predicting and plausibility, which are used to judge the relevance of scientific endeavours and which provide a sense of community to the members of a scientific discipline.

These group commitments are manifested in exemplars: shared examples of concrete problem-solutions which can replace explicit rules as a basis for the solution of the problems addressed by normal science. The adherence to common exemplars constitutes the fourth dimension of the

disciplinary mix.

When combined in a unitary whole, these domain assumptions function to define the fields of study in 'normal' science. A researcher apprises his 'facts' on basis of these fundamental perspectives and a paradigm thus serves to channel and facilitate empirical investigations. Thus, research questions are defined by and within a paradigm. If anomalies are found, they are used for further theoretical development within the realm of the paradigm. 'Normal' science can therefore progress in a regulated way and take the form of solving of 'puzzles' (Kuhn, 1970a).

From time to time 'normal' science breaks down. At certain times anomalies may be perceived which cannot be reconciled within the paradigm. The decreasing confidence that anomalies are soluble within the paradigm may lead to the emergence of a scientific 'crisis', in which an increasing number of scientists start to question the paradigm itself. The disciplinary commitments are gradually no longer adhered to and replaced. Such paradigmatic change cannot be proven through empirical research by testing hypotheses against facts on the basis of agreed propositions and theories. In the case of a paradigmatic change it is precisely the basic perspectives and propositions that are in question. In such a 'revolutionary' phase of science, the observations and interpretation of empirical 'facts' are mixed up with unresolved normative problems and a lack of generally accepted exemplars. In the absence of proof, the degree of commitment to the value systems inherent in the old paradigm influence the choice between incompatible ways of practicing a discipline. During the crisis the individual variability in the application of the shared values become manifest. As these values are not applied in the same way by all members of a disciplinary group, different interpretations arise about whether an anomaly is an ordinary or a crisis-provoking one. This brings with it a discussion between proponents of the old paradigm and the researchers who seek an alternative paradigm. It may only be in such a crisis that a paradigm is clearly articulated and that those who have been operating within it actually become aware of it. Gradually the new paradigm becomes manifest and replaces the old one. Such a new paradigm has a progressive puzzle-solving ability. It is not just 'additive' to the old one by enabling scientists to explain more things as well as what was already known. It involves a change of basic perspectives, which can explain the anomalies and which even may lead to re-interpretation of previously 'known' phenomena.

A paradigmatic change cannot be proven through empirical research by testing hypotheses against facts on the basis of agreed propositions and theories. The concept of paradigm can therefore not be used as a predictive but only as a retrospective device for analysis. Such a retrospective analysis should proceed from the recognition that the articulation of a paradigm becomes manifest only during a scientific crisis as a result of discussions between the proponents of both normal and 'revolutionary' science. Any paradigm-directed or paradigm-shattering study must therefore begin with the determination of competing disciplinary groups. The analytic unit for data collection for the construction of a disciplinary matrix should consist of the practitioners of a certain discipline, who produce and validate scientific knowledge: "men bound together by common elements in their education and apprenticeship, aware of each other's work, and characterized by the relative fullness of their professional communication and the relative

unanimity of their professional judgements, ... (who) see themselves and are seen by others as men exclusively responsible for a given subject matter and a given set of goals, including the training of their successors" (Kuhn, 1970b). Once these groups have been identified, one can attempt to identify and conceptualize key elements of the disciplinary matrix of these research communities. Such an analysis should involve an evaluation of the events which resulted in the formation of the new group, and a comparison of the nature and structure of group commitments before and after it occurred (Kuhn, 1970b).

1.3.2 The concept of institution

The concept of paradigm was originally used by Kuhn to explain the nature of scientific debates in the community of academic physical scientists. In the pure physical sciences the criteria of advance are considered to be purely internal to the scientific community concerned (Foster-Carter, 1976). But since its inception, the concept of paradigm has also been applied to understanding fundamental changes in the implicit assumptions underlying and guiding scientific enquiry in the social, agricultural and environmental sciences (e.g. Foster-Carter, 1976; Werker, 1985; Beus & Dunlap, 1990; Van Hengel, 1991). In these applied and practical sciences the criteria of advance do include not only scientific considerations, but also societal considerations. The concept has even been extended to represent not only commitments of groups producing scientific knowledge, but also the "coherent and mutually supporting pattern of concepts, values, methods and action" of professional practitioners (Chambers, 1993). Such group commitments serve as a mechanism of collective behavior: the group acts as an institution.

An institution may be defined as a stable, valued, recurring pattern of behavior. Institutions include rules or procedures that shape how people act, and roles or organizations that have attained special status or legitimacy (Brinkerhoff & Goldsmith, 1992). The distinguishing characteristic of an institution is a complex of norms and behaviors that persist over time by serving collectively valued purposes (Douglas, 1986). These meaningful collective representations facilitate coordination among people by helping them form expectations which each person can reasonably hold in dealing with others. Thus, institutions are carriers of public values and serve as a framework for decision-making. Institutions also hold legitimacy; in order to sustain their position, groups can mobilize or use this legitimacy to sustain the institutional values.

The communities of academic scientists as discussed by Kuhn can be considered as one specific kind of institution; the role of these institutions is to develop new scientific insight and understanding, and their rule-orientation is a system of conventions about how to arrive at the 'objective' truth. The communities of practical scientists can also be considered as institutions; they have the same role-orientation as the communities of academic scientists, but a different set of rule-orientations. As it is the purpose of practical science to solve real world, practical problems as conceived in society, their rule-orientation includes social and political conventions rather than only scientific conventions. The role-orientation of professional institutions is

primarily directed at the application of scientific insights; consequently both their role- and rule-orientation is to an important degree socially and politically oriented. As a result of the similar rule-orientation of practical scientists and professionals, as well as their joint education and intensive communication, these people can be considered, and also consider themselves, to be members of one professional institution.

In view of the ambiguous nature of forestry as a practical science and professional practice, when assessing the normative commitments of forestry it is important to distinguish clearly between scientific and institutional commitments, and to differentiate between scientific and socio-political norms and values. It has been suggested (e.g. Werker, 1985; Studley, 1994) that this can be accomplished by differentiating the concept of paradigm into two levels of abstraction, i.e. (i) a world-view in the sense of a model or frame of reference of basic ideas and values shared by members of a certain society by which they order their life experiences, and (ii) a sub-set of group commitments in the form of theoretical and normative perspectives, which act as meaningful collective representations for the members of the group. In this way, the concept of paradigm is identified at a theoretical, abstract level of articulation as a set of essentially non-conscious, pre-theoretical and non-testable scientific commitments as identified by Kuhn. At a lower level of abstraction it is identified as a set of 'perspectives' in the sense of more or less conscious socio-political expressions of the world-view. For the academic sciences the first level of abstraction is most meaningful. However, for practical scientists as well as professional practitioners, the second level of abstraction can be considered to be equally relevant as the first. Their shared values towards what is considered to be a problem, and towards particular models for problem-solving, are to a large extent based on social values; this is also the case with respect to the exemplars. These exemplars include not only examples of past achievements of how to solve scientific problems, but also ideal-typical normative referents on what 'problem-free' conditions should look like.

On the basis of such considerations and in analogy of the elements of the disciplinary matrix of academic sciences as distinguished by Kuhn, the disciplinary matrix of a joint institution of practical scientists and professional practitioners can be specified as involving the following elements:

- * A world-view (or mode of perception) in the sense of a non-conscious model or frame of reference of basic ideas and values shared by members of the institution by which they order their life experiences,
- * A constellation of group commitments in the form of theoretical and normative perspectives
 - Shared conceptual generalizations of the object and kind of activities being considered;
 - Shared perspectives on what to consider a problem situation;
 - Shared perspectives on basic concepts for problem solving.
- * Ideal-typical exemplars for problem solving and ideal-typical referents for "problem-free" situations, that practitioners encounter from the start of their professional education.

1.4 Problem statement

Several forestry scientists have voiced the opinion that the emergence of the concept of 'social forestry' in tropical countries should be considered as a paradigmatic change in forestry. According to this view, the development of social forestry indicates that many of the presently recognized forestry problems cannot be solved on basis of the prevailing normative commitments underlying forestry. In order to better understand and to solve these new problems a new normative grounding of forestry is needed. A basic premise is that increased rates of community participation are needed to ensure more effective forest management. Such involvement has universally been associated with a new "people-oriented" paradigm in forestry (Gilmour & King, 1989). Thus, the concept of social forestry is essentially grounded on a new perspective that problems in maintaining forests can be solved by involving a new group of people, who are not professional trained in forestry, but who depend on forest use as part of their livelihood strategies.

However, there is still lack of critical assessment of whether such an differentiation in organisation of forest management should indeed be construed as involving such major normative change in forestry, that it can indeed be considered as a paradigmatic change. It is also not clear, whether such a change involves a change (*sensu* Kuhn) in forestry science, or whether it is a change in group commitments of forestry as a professional institution. And finally it is not clearly specified which specific elements of the disciplinary matrix of forestry are changing.

1.5 Research objectives and approach

1.5.1 Objective and analytical approach

The general objective of this study is to contribute towards the elucidation of the question concerning whether the emergence of the concept of 'social forestry' has indeed brought about a fundamental change in the disciplinary matrix of forestry, and whether such a change can be construed as a paradigmatic change in either forestry science or forestry as a professional institution. In trying to answer the question whether or not a paradigmatic change has taken place in forestry, it is important to recognize that the concept of paradigm refers to non-testable domain assumptions. It can not therefore be used as a predictive but only as a retrospective device. As indicated in Chapter 1.3.1, such a retrospective analysis should focus on identifying the events which resulted in the recognition of competing disciplinary groups, and on determining the composition of the groups involved. Subsequently an attempt can be made to identify and conceptualize key elements of the commitments of these competing groups through a comparison of the nature and structure of their commitments.

In order to be able to distinguish whether a paradigmatic change, if any, relates either to forestry science or forestry as a professional practice, this analytical approach was applied by focusing attention not only on scientific groups, but also on forestry practitioners. Considering the

practical nature of forestry science and the close institutional relations between forestry scientists and professional forestry practitioners, in assessing whether a revolution occurred in the disciplinary matrix attention will be given to the question of whether any new world-view and/or group commitments (with concomitant changes in ideal-typical exemplars) occurred, and to the question whether such new normative commitments relate to (a part of) the community of forestry scientists and/or forestry professionals. The analytical framework used in addressing the question of whether social forestry has brought about a paradigmatic change in either forestry science or professional forestry practice is summarized in Figure 1.1.

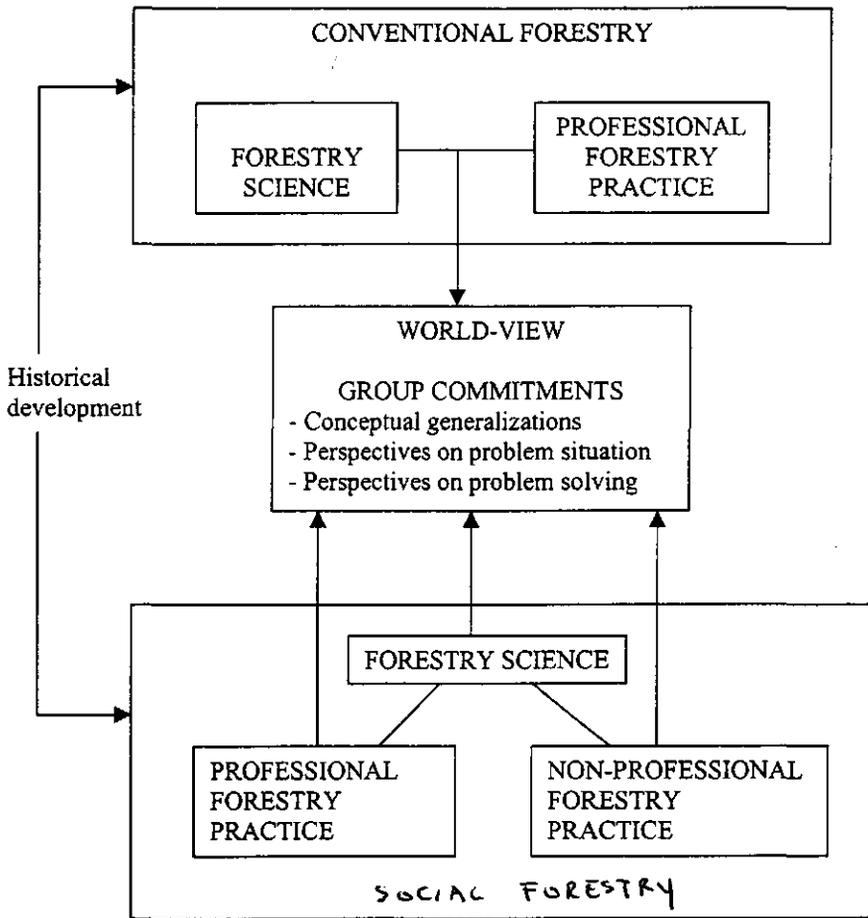


Figure 1.1 Analytical framework for study

1.5.2 Research questions

On basis of the analytical framework, the research objective was operationalized in the following four research questions:

1. **What are the major characteristics of the disciplinary matrix of conventional forestry?**

As the concept of paradigm refers to a set of, often, non-conscious values and group commitments, the first analytical step in trying to answer the question whether a change in the disciplinary commitments of forestry has taken place is to try to conceptualize the disciplinary matrix of conventional forestry. This disciplinary matrix can then be used as a basis for identification and comparison of any newly evolving values and group commitments which developed as a result of the emergence of social forestry.

2. **What events resulted in the emergence of social forestry? How did this emergence compare to the 'normal' development of conventional forestry, and did it involve a major change in world-view?**

When considering possible changes in the disciplinary commitments induced by the concept of social forestry, in the first place an assessment will be made concerning whether the new perspective of involving local communities can indeed be considered as a 'revolutionary' event when viewed in the general history of forestry. How did this change in thinking compare with other changes in the 'normal' development of forestry? This question is based on the consideration that before accepting the proposition that a 'revolutionary' event has taken place, one should first assess the advent of social forestry in the wider historical context of forestry development. Such historical analysis can elucidate whether the creation of this new approach to forestry could be considered an evolutionary development in forestry, or whether it is indeed a 'revolutionary' event resulting from certain anomalies in forestry which could not be solved by further development of the conventional approach. Such an assessment will also indicate whether the emergence of social forestry involved a change in the basic world-view underlying forestry.

3. **Did any changes in the constellation of group commitments of conventional forestry emerge as a result of the development of social forestry? If yes, what was the nature of those changes?**

After it has been decided whether the emergence of the concept of social forestry could be considered a 'revolutionary' event in forestry development, the question of whether any changes in the group commitments took place will be assessed. Attention will be given to whether (i) conventional and social forestry are based on different conceptual generalizations on the nature of forestry, (ii) new problem situations and new major concepts for problem solving are implied by social forestry. Thus, the research question can be elaborated in two sub-questions:

3.1 What are the major characteristics of social forestry, and how are these reflected in conceptual generalization?

After establishing the events which resulted in the emergence of social forestry, a closer assessment will be made of specific conceptual features of this approach. Based on this information a comparison will be made about the main conceptual features of conventional forestry and social forestry.

3.2 What new basic concepts for problem solving are implied in social forestry?

As indicated above, as a starting point for analysis it was considered, that the concept of social forestry seems to be essentially grounded in a new perspective that many of the current forestry problems can best be solved by active involvement of local people, who are non-professionally trained in forestry. The question then becomes, whether this recognition brought with it any concomittant changes in the perspectives on basic concepts for problem solving in forestry. An important difference between conventional and social forestry is that instead of one, two categories of practitioners are involved, i.e. professionally-trained forestry practitioners and rural people who are not professionally-trained in forestry. The question thus arises, whether these non-professional practitioners have the same set of values and objectives concerning the use and managment of forests as scientifically trained practitioners. If this is the case, participation of local communities in forestry may proceed within the predominant approaches to problem solving. But if the commitments of professional and non-professional foresters are different, community involvement may bring with it a new problem situation of how to reconcile such different commitments. The second sub-question to be considered is therefore whether community practitioners have their own distinct set of commitments, and whether the recognition of such 'non-professional' commitments has brought with it any new perspectives on basic concepts for problem solving.

4. Do any changes in disciplinary matrix relate to forestry as a science or forestry as a professional institution?

Based on the information to the research questions 1, 2 and 3 an assessment will be made whether any changes in disciplinary perspectives can be attributed to the group commitments of forestry scientists, professional forestry practitioners or both. For both forestry science and forestry as a professional institution the basic world-view, group commitments and related exemplars, which evolved as a result of the development of social forestry, will be summarized. By comparing these disciplinary matrices with the disciplinary matrix of conventional forestry, it will be analyzed whether major differences in disciplinary perspectives in either forestry science and/or forestry as a professional institution have emerged. This will allow to draw a final conclusion on the question whether major normative changes in forestry have taken place, and whether this could be considered a paradigmatic change for either forestry science, forestry as a professional institution, or both.

1.6 Research methods

In addressing the research questions a multi-theoretical approach was used. This approach was based on two considerations:

- * A multi-theoretical approach reflects the explorative nature of the study. It allows a multi-faceted inquiry into the nature and dynamics of the domain assumptions in forestry. As such domain assumptions consist of sub-conscious theoretical and normative perspectives, there exists no standard methodological approach for assessing them. It was expected that a clearer insight would be obtained by using a multi-theoretical approach rather than by using only one, arbitrarily selected, theoretical approach only.
- * A multi-theoretical approach is needed because the answering of the research questions requires two types of analysis. In the first place, it requires the deconstruction of the various activities implied by conventional and social forestry and of the actors involved in them, and an assessment of the normative grounding of such activities by the various actor groups. In the second place, these emergent characteristics should be used to construct a comparative disciplinary matrix of sub-conscious normative perspectives of different actor groups.

In view of these considerations the research approach included aspects of both philosophy of science and social science. In order to conceptualize the different dimensions of the disciplinary matrix of forestry the theoretical constructs of philosophy of science were used. As the development of social norms can best be understood in their historical context, in addition also a historical analysis of the focus of forestry has been employed in the process of conceptualization. In order to deconstruct the practices and related perspectives of various groups engaged in forestry an actor-oriented research approach was used. This approach from rural development sociology is based on the assumption of knowing and active actors having an agency, they have the capacity to problematize situations, process information and make strategic decisions in dealing with each other. It focuses on the deconstruction of social reality of development projects and the interpretation of the variations in organizational forms and cultural patterns which are the outcome of the different ways in which actors deal, organizationally and cognitively, with problematic situations. Such actors could be either individuals, groups or institutions (Long, 1989). In this study this approach was primarily used to assess how different groups of people deal with the use and management of forest resources and to evaluate the normative perspectives underlying such behaviour. In view of the main objective of this study, three major institutionalized groups of actors were focused upon, i.e. forestry scientists, professional foresters, and local people³.

³Of course, local communities cannot be considered as homogenous social entities, and different community groups may hold different interest with respect to forest resources. However, this study primarily aims to assess contrasts in perspectives between professional and 'non-professional' forest practitioners rather than contrasts in perspectives of different community groups.

The methods used for data collection involved both field and literature studies. The field studies focused on gaining a better understanding about the characteristics and results of social forestry activities in several tropical countries. These studies were carried by myself, but also by a number of graduate students. The results of these studies provided the essential empirical information for better understanding the evolving nature and specific characteristics of social forestry. The literature studies aimed at further elaboration of the insights gained from the empirical studies and at placing these results in a more general context. A reiterative process of assessing the information from the empirical and theoretical studies, led to a gradual conceptualization of the specific characteristics of social forestry, and the features which distinguish it from conventional forestry. These ideas were evaluated, and further adapted and elaborated during many discussions with various colleagues from the forestry department WAU and other forestry organizations, forestry professionals working at policy and project level and social scientists.

These research activities were carried out in close association with educational activities, including the teaching of Dutch undergraduates and graduates as well as graduate students from tropical countries in the field of social forestry and forest policy. The courses included discussions on the nature of conventional and social forestry, and on the prevalent values within forestry. These teaching activities allowed for further exchange of ideas on the domain assumptions in conventional and social forestry.

The multi-faceted history of research is reflected in the various chapters of this study. The book does not consist of a set of systematically structured and related chapters, but rather of a compilation of individually prepared papers. The chapters 3, 6, 7, 8 and 9 consist of articles published in the period 1993 - 1997. They are complemented by this introductory chapter, Chapter 2 conceptualizing the disciplinary matrix of conventional forestry, chapters 4 and 5 describing the history and conceptualization of social forestry respectively, and the final chapters 10 and 11 with reflections and conclusions. The articles consist both of reviews and case-studies and thus reflect various combinations of field and literature study. They were prepared for various occasions and consequently some arguments are repeated. Moreover, they are not written in exactly the same style. However, in view of the explorative nature of the study, it is considered that such mixing of styles is defensible. It reflects the research approach of focusing on the main research question from various angles.

Regional focus

In addressing the research questions, attention will be focused mainly on three regions in the tropics, i.e. Indonesia, the Indian peninsula and the Sahel. This focus results from the fact that much of my working experience was obtained in these regions. The Department of Forestry has been engaged in a cooperative research and education programme in social forestry with the Faculty of Forestry, Gadjah Mada University in Yogyakarta, Indonesia from 1981-1989. In 1989 a new research programme on local utilization and management systems of woody vegetation in the Sahel started. In 1986 I made a first study trip to India, which was followed by several additional missions to the Indian peninsula. Additional experiences were obtained while guiding

studies of graduate student in these regions.

A second reason for concentrating this study on these three regions is that they provide a good representation of tropical forestry with respect to geographic location, forestry history and social forestry development. Firstly, the regions cover the major humid to semi-arid forest types. Secondly, in their forestry history the regions represent three of the main colonial systems. The colonial forestry activities of the English and Dutch started at the beginning of the 19th century in India and Indonesia respectively. Somewhat later in that century the French started forestry in their French colonies. This contrasts with the situation in the Spanish and Portuguese colonies, where forestry activities started only a century later (Kengen, 1992). Thirdly, all three regions were involved in social forestry development from its inception. In their respective programmes much experience has been gained about the various options for implementing social forestry. India is in fact considered to be the country-of-birth of the concept of social forestry. Since the inception of the Indian social forestry programme, an increasing number of social forestry programmes have been implemented in the region. Also the 'prosperity approach' used in Indonesia and the Sahelian woodlot programmes were important early examples of social forestry, which have been gradually been augmented by additional social forestry initiatives in these regions.

1.7 Structure of this thesis

This book is structured as follows. Chapter 2 and 3 deal with the first research question. In these chapters the disciplinary matrix of conventional forestry is assessed. First in Chapter 2 an effort will be made to construct the conventional disciplinary matrix of forestry. Next in Chapter 3 a review is presented of the history of one of the major doctrines in forestry, i.e. the doctrine of sustainability. This Chapter serves to illustrate the changes in forestry which have taken place in response to changing social values, and thereby demonstrates the evolutionary trends in forestry. These two Chapters will serve as a comparative basis for assessing whether changes brought about by social forestry can be considered as being revolutionary, or whether they are comparable in scope to other historical changes in forestry.

Next in Chapter 4 a general assessment of the development of social forestry is made (research question 2). This Chapter focuses on the changing forestry policies in tropical countries. Special attention is given to the changes in thinking which resulted in the emergence of the new social forestry policies as well as the experiences gained in implementing them. Subsequently, in Chapter 5 a tentative effort to conceptualize the specific features of social forestry is made (research question 3.1). Two main dimensions of social forestry are conceptualized, i.e. social forestry policies and community forest management. It will be argued that an important difference between social forestry policies and community forest management is that whereas in the first, professional foresters are the main initiators, local people are the main actors in community forest management. These different actor groups each have specific perspectives on forestry as well as different responsibilities in implementing social forestry.

A major new conceptual generalization arising from social forestry is thus, that the different perspectives of professional foresters and local communities need to be reconciled and that their activities need to be coordinated. This problem of social coordination is further elaborated in Chapters 6, 7 and 8. These Chapters aim at providing information for answering the research questions 3.2 what new lessons were learned during the operationalization of the concept of social forestry, and whether this involved any new group commitments with respect to perspectives on problem situations and problem solving. In Chapter 6 a study about the results of an actual forestry development project in Indonesia is presented. In this chapter an assessment is made of local participation in, and impact of, a social forestry project planned by professional foresters. In Chapter 7 the assessment of interaction between local communities and forest services is further extended by means of a study of forestry developments in the Sahel. This Chapter focuses specifically on the interface between professional forestry and community forestry. In Chapter 8 attention is focused specifically on the characteristics of non-professional forestry practices. Through a pan-tropical review of literature it will be demonstrated that it is incorrect to assume that local communities have traditionally just used forests without managing them. However, many of these activities have traditionally not been recognized by forestry professionals and scientists. Next, in Chapter 9 an assessment is made about the impact of changing approaches to forestry on silvicultural research and practice. This chapter serves to evaluate whether the changing perspectives on the role of local communities in attaining effective forest management have impacted on the technical aspects of forestry.

In Chapter 10 all this information is pulled together and an evaluation is made concerning to what extent social forestry can indeed be considered to have significantly impacted on the disciplinary matrix of either forestry scientists and/or professional forestry practitioners (research question 4). In Chapter 11 these findings will be reflected upon in a wider framework of changing values in forestry. Then a final conclusion about whether social forestry can be considered as constituting a paradigmatic shift in forestry science or a 'revolution' in forestry as a professional institutional will be presented.

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Chapter 2

THE DISCIPLINARY MATRIX OF CONVENTIONAL FORESTRY

2.1. Introduction

As discussed in Chapter 1.2, in conventional forestry there exist close relations as well as coinciding perspectives between practical scientists and professional practitioners. This is illustrated by the following description from the USA:

"Pinchot synthesized the Forest Service, the American forestry profession, the foundations for American forestry training, and our Society (for Forestry). The stuff of all these, the separate strands, were waiting to be braided into a single, strong cord (...). The Forest Service was the central strand, the profession reinforced it, the universities created trade schools to supply and support it, and the Society whipped the ends to keep the cord from fraying" (Behan, 1966).

It is also reflected in the opinion of Duer & Duerr (1975) of forestry forming (sub)culture with its own specific characteristics with respect to language, social structure with hierarchy of power and prestige, artifacts-technology, esthetic activities, and tenets of faith (c.f. Duerr, 1986). Forestry can thus clearly be considered as an institution (Veer, 1984). As discussed in Chapter 1.3.2, such a joint institution of practical scientists and professional practitioners can be characterized by its disciplinary matrix consisting of a basic world-view, a constellation of group commitments and ideal-typical exemplars. This chapter focuses on a tentatively identification of the different elements of the disciplinary matrix of conventional forestry.

2.2 Basic world-view

As discussed in Chapter 1.2, forestry is considered as the science and practice of effective and efficient management of forest resources in order to fulfil human needs and values. One of the dominating values in forestry is belief in the progressive nature of scientifically developed forest conservation and management practices. Thus the basic world-view guiding the behavior of its practitioners is predicated on enlightenment philosophy (Studley, 1994) with foresters being conceived of as resource managers.

In various recent philosophical treatises it has been argued, that such a resource management point of view represents only one of the possible relations between humans and nature. Alternatively, the interactions between humans and nature may be perceived in terms of (i) frontier economics, (ii) environmental protection, (iii) resource management, (iv) eco-development, or (v) deep ecology (Colby, 1990). Consequently, the basic role of humans in dealing with nature cannot only be conceived as resource managers, but also as either colonizer, enlightened ruler, partner, or participant in natural processes (De Wit, 1990; Achterberg, 1994). The relevance of these different views on possible human-nature interactions for environmental management and nature conservation has recently been subject to discussion. This question has also received attention within forestry (e.g. Gale & Cordray, 1991; Ten Hoopen, 1997). Especially in the USA there is an ongoing debate about whether forestry should proceed from

a 'land (or ecosystem) ethic' or 'resource management ethic' (e.g. Brown & Harris, 1998). However, most discussions on how to accommodate dynamic social values in forestry (e.g. Umans, 1993; Brown, 1995; Kennedy et al., 1998) focus on the changing views with respect to forest resources rather than on basic worldviews on nature. It seems to be generally accepted that the basic values in forestry should be conceived of as providing for current and future social values (Kennedy, 1985) with the role of forestry scientists and practitioners being to optimizing the relation between humans and finite natural resources. The central values of forestry are thus based on standards of welfare and well-being of mankind, and not on standards intrinsically related to insensate earth and/or its forest resources¹ (Behan, 1966). Different views on the role of forests for humanity are possible and these may change with time (e.g. Kennedy et al., 1998); forestry focuses on the question of how to accommodate these diverse and often dynamic social values in developing operational principles for forest management.

2.3 Group commitments

The development of the operational principles for forest management is guided by various institutional commitments. As discussed in Chapter 1.3, such group commitments are often subconscious and may only become manifest after they have been declared in a state of crisis by critics. These critics thus function in a theoretical and progressive manner in clarifying the major conceptual generalizations and perspectives underlying disciplinary endeavours (Werker, 1985).

In recent years, various critical assessments of the predominant perspectives in forestry have been published. The discussions focus on what have been variously called paradigms (Behan, 1990; Bengston, 1994; Gordon, 1994), doctrines (Duerr & Duerr, 1975; Glück, 1987), ideologies (Pleschberger, 1981), classical tenets (Duerr, 1986; Fairfax & Fortmann, 1990), concepts (Leary, 1985), institutional characteristics (Veer, 1984), or model views (Kennedy et al., 1998). From this body of literature it is possible to construct a general characterization of the major dimensions of the group commitments in conventional forestry with respect to both conceptual generalizations on the nature of the object of forestry, and perspectives on what are considered problem situations and what basic concepts for problem solving.

¹This does not mean that no 'intrinsic values of nature' may be recognized in forestry. But these are basically conceived of as social constructions. As with any other social values, they should be taken seriously in developing operational principles for forest management, but they do not have an *a-priori* higher standing than other social values with respect to forests.

2.3.1 Conceptual generalizations on forestry

A basic tenet of forestry is that forests provide many essential products and environmental services to mankind. The different forest resources may have the nature of a private, common or public property with different resources being used by different user groups. Forestry aims for the conservation of these functions of forests and at a rational combination of resource uses. The basic concern of forestry is to understand the functioning and means of manipulation both of forests as an ecological object as well as of the interactions between man and forests, and to design the best ways to optimize these relations through effective forest management regimes. Forestry science can therefore be characterized as being a strategic science of composite interdisciplinary nature (Veer, 1984).

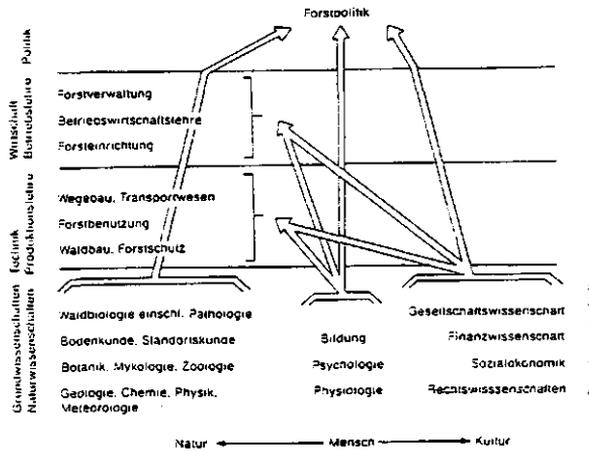
Forest management may be defined as the process of making and effectuating decisions about the use and conservation of forest resources and the organization of the related activities (Duerr et al., 1979). It refers to the total set of technical and social arrangements involved in the protection and maintenance of forest resources for specific purposes, and the harvesting and distribution of forest products. Consequently, in analogy to agricultural science (Koningsveld, 1987), in forestry science three dimensions can be distinguished (Van Vliet, 1993), i.e.:

- * The process dimension, which involves the manipulation of natural processes in forests in such a way, that the biological resources are transferred to the required end-products;
- * The dimension of technical operations by human actors;
- * The dimension of social coordination, the production process is not the outcome of a multitude of actions of individual actors, but is based on social coordination between those actors.

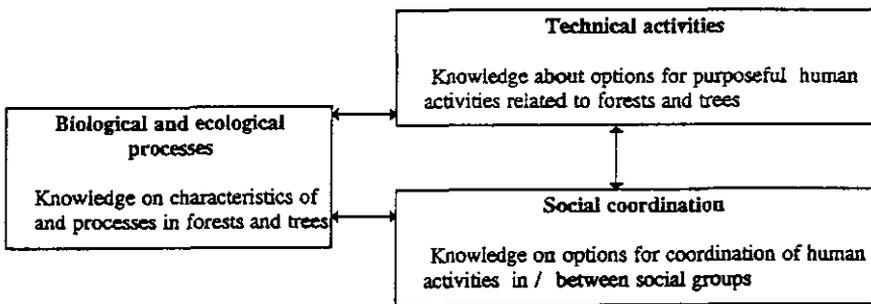
The relations between these three dimensions of forestry may be conceived of in different ways. As reflected in some German overviews on forestry science (Lemmel, 1951; Zundel, 1990) conventional forestry was based on a technocratic approach (Figure 1). According to this view, the first level of consideration in forestry is the question 'what is technically feasible'. Once this question is answered in an objective, scientific way the next question is 'is its technical operation economic feasible'. And in third instance the question becomes 'is the proposed practice socially acceptable'. This approach is based on the assumption that options for forest management practices can be derived in an objective manner using scientific knowledge from the applied sciences for formulating management options with respect to the process and technical dimensions. Once these options have been identified, a further selection between the various practices has to be made on basis of economic criteria. Finally, it is then decided by forest politicians what is socially most desirable. According to this view the question how to arrange the dimension of social coordination only becomes of relevance after professional foresters have decided in an objective way how forests can be treated in a technical way.

In contrast to this technocratic view, it has recently been argued that the three dimensions interact with each other in a recursive way (Van Vliet, 1993). The selection of technical management practices is influenced by both forest ecological conditions and institutional norms with

respect to forest protection and use (Figure 2.1). Professionally-developed forest management practices are not based solely on objective scientific knowledge, but also on professional norms with respect to what to consider legitimate forest problem situations and concepts for problem solving. This perspective leaves room for the consideration that current professional forest management activities are based on a specific set of social values from the past and should not *a-priori* be considered as representing a universal best scientific approach. However, this perspective has not yet won general acclaim, and, as will be discussed below, both the shared perspectives on problem solving and exemplars in conventional forestry are predominantly based on the technocratic perspective.



Forestry as a technocratic activity (after Lemmel, 1951)



Forestry as a multidimensional activity (Van Vliet, 1993)

Figure 2.1 Two contrasting views on the nature of forestry science

2.3.2 Shared perspectives on problem situations and problem solving

As discussed in the paragraph on the world-view underlying forestry, forestry is normally conceived of as the science and practice of how to conserve and to optimize the multiple benefits of finite forest resources for mankind. Thus, the main shared perspective on what to consider as a problem situation is the ineffectiveness or inefficiency of the prevailing approaches for conserving and regulating use of forest resources. The main concepts used to understand these problems better and to solve them relate on the one hand to the process and technical dimensions of forestry, and on the other hand to the dimension of social coordination in forestry. In this respect two major doctrines² of forestry can be distinguished: (i) the doctrine of multiple-use and sustained yield, and (ii) the doctrine of political legitimacy and state custody.

Doctrine of multiple-use and sustained yield

As discussed above, a major conceptual generalization in forestry is that forests provide many different products and environmental services to mankind. To ensure a sustained production of these multiple benefits, forest management should aim at a combination of resource uses that does not degrade the resource basis, and that will best meet the needs of all people. To ensure this, two concepts are fundamental to forestry: sustainability and multiple use (Behan, 1990). The concept of multiple use concerns the minimization of conflicts between various forms of forest utilization. With a harmonious integration of uses, the aggregate benefit will exceed the sum of non-integrated uses. The concept of sustainability relates to the requirement that the ecological characteristics and production output of forests should be maintained, or at least that the ability of forest lands to provide the required products and services should not be impaired.

Doctrine of political legitimacy and state custody

A corollary to the concept of multiple use is that there often exist a multitude of forest users. These may either compete for similar products, or may be interested in different products. To overcome conflicting demands between various forest user groups, basically three options exist: (i) market regulation, (ii) legislation on rights for various user groups to use forest products, and (iii) negotiation between various user groups resulting in joint agreements concerning who may use which products and how much of each (Clawson, 1989).

When in the 18th century forestry was developed as a science and professional practice, this was primarily the result of concerns about the loss of timber resources (e.g. Westoby, 1987). Due to its importance in building ships for the navy and commercial fleet, for urban construction, and for industrial development wood was considered of strategic economic value. It was argued that various types of local forest use for agricultural use (e.g. grazing and litter collection) were detrimental to wood production. It became politically and professionally accepted that such wood production often cannot compete with other types of forest use and can therefore not be left to

²The term doctrine is used here in the sense of a scientific belief or tenet which is used as a body for meaningful instruction.

market forces. Rather, wood production should be assured through government legislation for controlling forest use. This was accomplished through abolishment of the multitude of local arrangements for forest ownership and use by means of political centralization (Van Maaren, 1993). For instance, one of the events leading to the inception of forestry as a discipline is often considered to be the formulation of the French Forest Ordinance of 1669 by Colbert (Glacken, 1976; Westoby, 1989). The purpose of this ordinance was to supercede the many and diverse local rules and regulations, and to establish state priority in managing forests. The acceptance of state legitimacy in forest conservation and management was further increased when in the 19th century the environmental values of forests with respect to climate regulation and watershed protection were recognized.

In the 20th century it became acknowledged that forestry should be focused also on other functions than timber production and environmental protection. However, the recognition of additional functions such as recreation, landscape amenity and ecological conservation brought with it no change in the doctrine of political legitimacy and state custody. In view of the extensive production areas and long production cycles in forestry with consequently low financial returns, as well as the fact that many forest benefits are non-marketable (Windhorst, 1978), it was considered that forests could best be managed as public goods under government control. An example of this continued dependence on political legitimation of forestry is the fact that in the USA the five traditional components of multiple-use (wood, water, forage, recreation and wildlife) were only fully incorporated in forestry after they were identified by policy-declaration (Behan, 1966).

The perspective of political legitimacy of forestry did not only have a strong influence on the identification of what resource values were to be considered in forest management, but also on the perspectives about social organisation of forestry. Forestry did not only become dominated by comprehensive government resource control, but it was also primarily identified with management of forests under state custody. State management of forests could only be taken over by the private sector if professional management of forest resources was ensured.

Thus, the perspectives which define the content of conventional forestry are to an important extent not internal to science, but they are based on social and political considerations. Within this perspective professional foresters were ideally considered to be employed by state forestry services, where they served as the implementors of state resolve to maintain forests. Against this background, they should act in an objective, non-partisan way by making rational decisions on how to conserve and manage forests on the basis of their technical expertise (Fairfax & Fortmann, 1990; Brown, 1995). The perspective that foresters should objectively identify which forest management practices are scientifically best, created a strong professional bias of foresters being the guardians of the forest. (cf. Zivnaska, 1963; Fairfax & Fortmann, 1990). A vision emerged that "forestry calls pre-eminently for the exercise of the providential functions of the state to counteract the destructive tendencies of private exploitation", with rational, objective, and independent "omnipotent foresters" being in the best position to determine which forest management practices are in the greater public interest, as well as what is best for the forest

lands (Behan, 1966; see also Pleschberger, 1981; Kennedy et al., 1998).

2.4 Exemplars

The shared perspectives on problem situations and on how to solve problems resulted in four major types of ideal-typical exemplars for conventional forestry.

In the first place, in line with the prevailing perspective of political legitimacy and state custody, most attention was given to policy measures as exemplars how to control resource conflicts, while much less attention was given to options for market regulation. And no exemplars were developed on possible means for social negotiation.

Secondly, as a result of the identification of state authority over forests little attention was given to possible relations between specific types of forest ownership and specific types of forest management. It was considered that the professional management systems developed for state forest lands were an ideal example for all forest management. No consideration was given to the possibility that such standards might not be universally applicable, e.g. for small private forest owners who normally have a set of different objectives for keeping forests than state forest enterprises (Van der Ploeg & Wiersum, 1996).

Thirdly, due to the fact that the question of social organisation was considered to be solved by the identification of state primacy in forestry, little attention was given to the societal position of forestry. Consequently, the exemplars focused mostly on biological and technical standards for forest management.

Finally, as a consequence of the conception that forestry problems should be politically legitimated, in forestry attention became focused specifically on problems as identified by the power elite. In view of the strategic importance of timber, this product became the major exemplar of how to manage forests. The primal focus on timber production was strengthened by the opinion of timber production being a financial income generator in whose wake other forest functions could be delivered (Glück, 1987).

2.5 Conclusion

From the foregoing it may be concluded that the disciplinary matrix of conventional forestry as a practical science as well as professional activity traditionally consisted of the following integrated elements:

- * Forestry is basically perceived as a type of resource management guided by the enlightenment philosophy with its content being based on standards of welfare and well-being of mankind.

- * Forestry is conceptualized as a science and a practice of composite interdisciplinary nature involving the total set of technical and social arrangements in the use, protection and manipulation of forest resources.
- * The basic problems to be solved by forestry is the lack of balance between social demands on forests and the actual state of forests. The identification of the nature of time and location specific problems should be politically legitimated.
- * For solving the problems professional activities are needed; these activities have to be guided by scientific knowledge. The basic characteristics of the sought-for solutions are multiple-use and sustainability.
- * Due to the multi-resource character of forests and the fact that many forest functions cannot be regulated through market mechanisms forests should preferably be managed under state control.

As a result of these perspectives the ideal-typical exemplars for forestry activities were developed on the basis of forestry problems as identified at national level by politically powerful groups. Professional foresters were represented as a technically trained elite in charge of rational management of forests which were either under custodial or legal state control. Within this social setting foresters' activities could mainly focus on forestry as a biological and technical undertaking, with timber production having primacy.

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Chapter 3

200 YEARS OF SUSTAINABILITY IN FORESTRY: LESSONS FROM HISTORY

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Abstract

Since the end of the 1980s the concept of sustainable development has gained general acceptance, but much uncertainty still exists on how to operationalize this concept. In forestry the concept of sustainability has been an accepted principle since the 18th century. The experiences with its application in forestry may contribute towards obtaining a better insight in the implications and operational significance of the concept of sustainability. This article describes the history of sustainability in forestry, including the various social values on which its interpretation has been based. The original principle of sustained yield has gradually been broadened to a more inclusive principle of sustainable forest management. The dynamics in social valuation of forest resources resulted in various attempts at practical operationalization of the principle. Notwithstanding 200 years of efforts to operationalize the concept of sustainability, its exact application in forestry remains troublesome. Three lessons are drawn: (1) the need to recognize the different nature of ecological limits and social dynamics, (2) the role of dynamic social values with respect to forest resources, and (3) the significance of operational experiences in trying to attain sustainability within a concrete context.

3.1. Introduction

Since the publication of the Brundtland report on *Our Common Future* (WCED, 1987), the principle of sustainable development has gained general acceptance. This acceptance illustrates the growing awareness of the inherent fragility of the world's ecosystems. The Brundtland report defined sustainable development as meeting the requirements of present generations without undermining the natural resource base, which would compromise the ability of future generations to use these resources. Although the term is widely used, it is still unclear whether it represents a political rallying point (or even simple development rhetoric) or a concept that can be used to define operational norms for the behaviour of mankind. Several authors who tried to elucidate the principle have come to conclusions such as "Sustainability is invariably used to describe a goal which, superficially at least, is indisputably desirable. On closer examination, however, it is found that the concept is defined so broadly as to be open to widely disparate interpretations, which creates potential for misunderstanding" (Dixon & Fallon, 1989). Thus, one is faced with a situation that, although the concept of sustainability is increasingly being accepted as an ethical principle in relation to the utilization of natural resources (e.g. Shearman, 1990), it has so far been found difficult to operationalize it as a guide to decision-making within a specific context.

Although the principle of sustainability has only recently received general recognition, it has been a major concept in forestry for over two centuries. Forestry thus offers empirical information on the implications of sustainability in a specific context. As early as 1977 it was suggested that the principle of sustainability in forestry could also be of significance in other economic sectors (Basler, 1977). The experiences in trying to operationalize the concept may contribute towards further enlightenment about its more general implications. With this aim the paper will present an overview of and reflection upon the experiences in forestry with respect to the sustainability principle.

3.2. Concise history of the principle of sustainability in forestry

3.2.1 Origin and dynamics in interpretation

In his book *Traces on the Rhodian shore* Glacken (1976) reviews the history of Western ideas about the relation between nature and culture. In ancient times man considered himself a geographic agent: "man through his arts and interventions was seen as a partner of God, improving upon and cultivating an earth created for him" (Glacken, 1976, p.viii). Up to the 17th century, it was generally believed that "the long-thought-for application of theoretical knowledge to the control of nature was being realized. The application of knowledge was beneficent because it was purposive, men knew what they wanted and what they were about" (Glacken, 1976, p.484). Although it was recognized that certain forms of resource utilization were wasteful or incompatible with new types of use that emerged in response to new economic conditions, it was not until the middle of the 17th century that systematic attempts were made to understand the unplanned, often detrimental, consequences of the modifications in the environment undertaken for rational economic reasons. Glacken (1976) mentions two famous documents illustrating these new

views, i.e. John Evelyn's *Silva, or a discourse on forest trees* from 1664 and Colbert's *French Forest Ordinance* from 1669. Both documents indicated the negative influence of past utilization practices on forest resources, as well as the needs for future generations for continued use of these resources. These documents are often considered as important starting points in the development of forestry science (Westoby, 1989). Forestry may therefore be considered as the first science that explicitly incorporated concerns about safeguarding finite natural resources for future generations.

The concept of sustainability was already explicitly formulated as the "Nachhaltigkeitsprinzip" in the 18th century German forestry literature (Peters & Wiebecke, 1983; Rubner, 1992). In 1804 the German forestry lecturer Hartig described sustainability as follows:

"Every wise forest director has to have evaluated the forest stands without losing time, to utilize them to the greatest possible extent, but still in a way that future generations will have at least as much benefit as the living generation" (Schmutzenhofer, 1992).

Since that time, the concept of sustainability has been elaborated in forestry as the principle of sustained yield. This principle has been called the 'focal point of faith in forest management' (Duerr & Duerr, 1975) and one of the main forestry doctrines (Glück, 1987). In 1975 the principle was described as:

"To fulfil our obligations to our descendants and to stabilize our communities, each generation should sustain its resources at a high level and hand them along undiminished. The sustained yield of timber is an aspect of man's most fundamental need: to sustain life itself" (Duerr & Duerr, 1975).

Although the concept of sustainability has already for a long time been one of the central principles in forestry, up to the present forestry scientists have pondered upon the precise meaning and operational definition of the concept. For instance, in 1983 seven different definitions of the German concept of "Nachhaltigkeit" were identified (Peters & Wiebecke, 1983). More recently Gale & Cordray (1991) suggested eight possible answers to the question "What should forests sustain". The answers vary depending on whether attention is focussed on:

- the maintenance of a dominant product or product mix,
- the sustenance of production capacity,
- the conservation of total forest ecosystems rather than only specific components of such ecosystems, or
- the maintenance of human systems which are forestry-dependent.

Thus, there are different answers to the question what should forests sustain, with each answer resulting in a distinct (although sometimes overlapping) management regime.

As illustrated by this example, since the formulation of the concept of sustained yield, the normative interpretation of sustained yield has evolved to become more broad (Parry et al., 1983; Alston, 1992; Zürcher, 1993). At first, attention was focused on maintaining a regular production of wood products. In the middle of the 20th century the interpretation was broadened to include the principle of multiple use. Under this broader view, forest

management should not focus only on timber as a commercial product, but also should aim at the provision of an optimum mix of human-valued products and services. One of the most influential formulations of this principle of 'human benefit sustainability' (Gale & Cordray, 1991) was the Multiple-Use Sustained Yield Act, enacted in the United States in 1960 (Koch & Kennedy, 1991). In this act the following five categories of human benefits were identified: timber, fish and wildlife, outdoor recreation, range and fodder, and watershed protection.

In the middle of the 19th century it became already recognized that sustainable yield should not only focus on regulating the yield of forest products, but on regulating the growing stock as well (Parry et al., 1983; Zürcher, 1993). Consequently, the principle of sustained yield became interpreted as not only incorporating the norm of maintaining a certain production output, but also the norm of maintaining the production capacity. This last norm has been perceived as relating to the maintenance of the production capacity of forest lands and/or to the maintenance of the natural renewal capacity of forest vegetation (Maini, 1992). The Multiple-Use Sustained Yield Act illustrates this combination of the norms of sustained outputs and maintenance of the production capacity by defining sustained yield as follows:

"Sustained yield of several products and services means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forests without impairment of the productivity of the land" (Alston, 1992).

More recently, it has been argued that the supply-oriented concept of sustained yield is no longer appropriate. Several newly emerging forest values, such as biological diversity or regulating and mitigating climate change do not depend on forest products, but on intact forest ecosystems (Brooks & Grant, 1992). Consequently, it has been argued that sustained yield should be replaced with the concept of sustainable forests/forestry. This concept emphasizes that the long-term maintenance of biodiversity and functional integrity of the forest ecosystem is the central norm for forest management (Alston, 1992). Within this approach, a distinction can be made as to whether the forests should be maintained as a dynamic ecosystem or whether specific and/or unique ecosystem characteristics should be preserved (Gale & Cordray, 1991).

By the 1930s, also a social dimension of sustainability had been recognized, especially in the United States. New norms for sustainability were developed that related the concept to the stability of human systems, such as timber-dependent communities, forest-related occupations, and wood working industries, that are economically dependent upon the flow of forest products. This interpretation of sustainability in the sense of community stability (Parry et al., 1983) focused attention on sustaining human systems rather than on maintaining forest production and utilization (Gale & Cordray, 1991). In 1948 the USDA Forest Service adopted the norm of community stability as an explicit goal for forest management.

The concept of sustainability in forestry is the subject of discussion not only in temperate regions, but also in tropical regions. Great international concern is at present expressed

about the loss of tropical rain forests with their unique ecological values. Consequently, considerable attention is being given towards the development of the concept of sustainable forest management as a means to address the forestry problems in tropical regions. In parallel with developments in temperate regions, the need to maintain the ecological integrity of tropical forests in addition to the maintenance of their wood production capacity, is now well recognized (e.g. Sharma et al., 1992; Maini, 1992).

In the tropical countries much attention is also given to the elaboration of the social dimension of the concept of sustainability. In this respect, some features of sustainable forest management have been identified in the tropics that have received limited attention in temperate regions. For example, since the mid 1970s it has been recognized that many commercial forest management systems have several disadvantages. In contrast to original expectations, the development of commercial forest estates and related timber manufacturing enterprises hardly contributed to socio-economic development of people living in tropical forest areas (Douglas, 1983; Westoby, 1989). Furthermore, many of these management systems had not been geared towards satisfying the forest-related needs of local people in the form of fuelwood, food, fodder, and other non-timber forest products. Consequently, since the late 1970s the concept of "social or community forestry" has gained prominence (e.g. FAO, 1985; Gregersen et al., 1989; Arnold, 1991). This approach to forest management is based on an ethical concern for socio-economic development of underprivileged communities in tropical countries, as well as an understanding that forest resources cannot be properly maintained if local people are not actively involved in managing the forest resources on which they depend. One of the prerequisites to enable these people to carry out effective forest management is that proper enabling forestry institutions exist. For instance, Sharma et al. (1992) identify the following types of action needed to ensure sustainable forest management in tropical regions:

- promote commitment and participation;
- establish legal and policy frameworks related to land and tree tenure rights, management responsibilities, etc.;
- consider explicitly equity and gender issues;
- develop appropriate institutional mechanisms that take into account true scarcity values associated with forest outputs (goods and environmental services).

Thus, in tropical countries the social dimensions of sustainability has been extended to include not only the stability of communities dependent upon forest resources, but also the maintenance of proper forestry institutions (Brinkerhoff & Goldsmith, 1992).

In conclusion, since the inception of the concept of sustainability in forestry in the 18th century, its interpretation has gradually become more inclusive. This principle has been defined as the need to maintain the productive capacity and ecological integrity of forests, the need to ensure an equitable distribution of forest management inputs and outputs, and the need to arrange for such external conditions that forest managers are able to sustain these management practices (Wiersum, 1990). Table 1 summarizes the various norms which have been identified as being involved in the principle of sustainable forest management.

3.2.2 Operationalization

In view of the diverse and changing norms that have been attributed to the concept of sustainability in forestry, it is not surprising that there is no universally accepted interpretation of how to operationalize the concept. For instance, it was recently stated by Alston (1992) that

"Sustained yield has a long history of a political bromide, but the ill-defined concept has never been capable of providing reasonable guidance to resource managers in the field. It has variously been interpreted to require:

- protection of the health, beauty, and biological productivity of the ecosystem;
- a 'cut one, plant one' scheme of timber harvesting scheduling;
- an uneconomic brand of intensive forestry;
- a relatively even flow of forest outputs, particular lumber;
- a balance between private and public timber harvests to provide stability of employment in timber dependent communities; and
- a buffer against large fluctuations in the price of lumber."

A decade earlier it had already been noticed in similar vein: "For 50 years the social meaning of sustained yield has had an important effect on its operational definition, despite a lack of evidence to show that desired ends are, in fact, linked to their operational means" (Parry et al., 1983).

This does not mean that the concept of sustainability has only been paid lip-service. Rather, many efforts have been undertaken to translate the term into rational forest management activities. As early as the late 18th century the sustained yield norm was operationalized in the principle that, for planning and control of management practices, the forests should be regulated in separate stands with a 'normal' age and size distribution. Such a normal distribution did not relate to the ecological structure, but rather to a regulated age-distribution of even-aged stands within the total forest or of separate trees within an uneven-aged stand. In such regulated forests, it was possible to apply a rotational system of annual cutting such that harvests equalled growth increment (Brandl, 1992; Zürcher, 1993).

This operationalization of the concept of sustained yield, where harvest equalled growth increment, was developed in the 18th and 19th century in Europe in conjunction with the development of plantation forestry. When this system was applied to old-growth forests in the United States, it was found that limiting harvests to increment did not make sense, since actual increment was low. With the application of the harvest equals growth principle, only limited cuttings would be possible. Consequently, in the United States efforts were undertaken to develop methods for ensuring sustained yield that were not solely based on growing stock and rotation age, but also on the silvicultural condition of the growing stock. Attention focused on how to convert old growth forests into more immature stands with a higher production potential (Parry et al., 1983). In contrast, in Europe increasing attention focuses on how to transfer first and second generation forest plantations into more ecologically diverse forest types. Many of these forest plantations have been established on degraded lands and thus resemble mostly early-successional

forests. However, as a result of careful forest management, these forest plantations can be gradually transferred to forest types that resemble old-successional forests.

During the 1930s, in the United States a third operational interpretation of sustained yield was developed, i.e. the provision of equal annual timber supplies to the wood products industry as a means to ensure community stability. A consequence of this principle was that timber yields on federal lands became planned to stabilize the fluctuating output of private timber harvests (Parry et al., 1983). In many social and community forestry projects in the tropics, this operational principle has been further modified in the sense that harvests should be balanced in relation to the demands for locally needed forest products rather than be determined by the increment of timber commodities only. However, this principle is constrained by two factors. In the first place, because of fluctuating demands managing supply does not guarantee stability. Care should be taken that the long-term production potential is not overreached occasionally. In the second place, it is technically much more difficult to ascertain allowable cuts of non-timber products, such as branchwood for fuel and leaves for fodder under multiple-product harvesting regimes, than for timber.

With the increase and diversification of the norms for sustainable forest management, it became increasingly difficult to develop consistent forest management practices. An example of the diversity of factors that at present are thought to be involved in sustainable forest management is given by Bass (1993), who lists the following data sets as being needed to ascertain whether forests are sustainably managed:

- * Information on balanced land use patterns: net changes of land into and out of forestry;
- * Information on maintenance of global ecological services such as biomass and net growth;
- * Information on sustainable management of forests: resource extent, size, condition and management intention and quality of its execution;
- * Information on forest resilience: ecosystem integrity (such as biological and structural diversity) and on the multiple uses of the forests;
- * Information on minimizing external inputs and waste: ecosystem capability and health;
- * Information on equity aspects and management accountability: forest ownership, use rights and legal status, actual use of forests.

However, he does not indicate how such diverse information can be combined into a consistent set of criteria for operational practices.

An illustration of the still ongoing efforts at developing an internationally accepted system of guidelines for sustainable forest management is provided by the present efforts at timber certification. Such a certificate would allow consumers to select timber products that have been produced sustainably. Various organizations such as the International Tropical Timber Organization (ITTO, 1990; ITTO, 1992), the Forest Stewardship Council (FSC, 1993), and others have tried to develop guidelines for such timber certification. The guidelines include criteria on both forest policies and forest management practices, but these guidelines give little indication about the relative significance of the

different criteria. In the recent report of a Dutch expert group on sustainable forestry it was concluded that there does not yet exist a comprehensive, scientifically justifiable assessment system for weighing these different criteria into an objective end judgement. The evaluations can only be quasi-objective and have to be based on best professional judgments of experts. The choice of which experts to involve is a political decision (DDB, 1994).

These experiences demonstrate that between and within countries important differences in opinion exist as to which factors should be considered in assessing sustainable forest management and how they should be balanced in a final judgement. For instance, differences in socio-economic conditions between countries lead to different standards regarding the need for maintaining the integrity of forest ecosystems, the need to maintain commercial timber production capacity as a means for economic development, or the need for sustenance of forest-dependent human institutions including the protection of the cultural integrity of forest-dwelling tribes.

Thus, despite 200 years of sustainability as a concept in forestry, its operational application in forest management remains troublesome and further attention needs to be given to its full implications. Nonetheless, several general lessons may be drawn from the experiences, i.e. (1) the need to recognize the different nature of ecological limits and social dynamics, (2) the role of dynamic social values with respect to forest resources, and (3) the significance of operational experiences in trying to attain sustainability within a concrete context.

3.3. Ecological limits and social dynamics

Forest management may be characterized as involving interactions between populations of natural objects and populations of users of these natural objects (Leary, 1985). Thus, the concept of sustainable forest management does not relate exclusively to forests as ecological systems, but to forests as human-influenced environments which are in many respects subordinated to the socio-economic environment (cf. Chorley, 1973). Consequently, the norms for sustainability in forestry may relate to both ecological characteristics and social characteristics, as well as to the reciprocal relations between these categories (Table 3.1). A fundamental difficulty in understanding the operational meaning of sustainability in such interacting systems is the fact that the ecological and social dimensions of sustainability are basically subject to different dynamics. Forest ecosystems are dominated by negative-feedback loops and homeostatic processes. But social systems are predominantly characterized by positive feedbacks and consequently time-dependent features in response to the evolving needs of mankind. An illustration of such time dependency is the changing norms in respect to the interpretation of the concept of sustainability. Thus, the operationalization of sustainable forest management means that one is faced with the challenge of devising management systems that ensure ecological balance and stability under negative-feedback mechanisms, yet are capable to adapt to long-term changes under positive-feedback mechanisms involved in social development (cf. Chorley, 1973).

Table 3.1 Norms identified with respect to the concept of sustainability in forestry

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1. Maintenance of forest ecological characteristics*
 - 1.1 Maintenance of the production capacity of forest soils
 - 1.2 Maintenance of the vegetative renewal capacity
 - 1.3 Maintenance of specific and unique forest components
 - 1.4 Maintenance of biodiversity and natural forest ecological processes

 2. Maintenance of yields of useful forest products and services for human benefit
 - 2.1 Maintenance of production of a dominant commercial good
 - 2.2 Maintenance of ecological benefits in relation to non-forest areas
 - 2.3 Maintenance of a production mix of diverse products and services for human benefits
 - 2.4 Maintenance of production of goods for those categories of the population who depend on forest for their basic needs
 - 2.5 Maintenance of forests as an insurance or buffer against possible ecosystem disasters

 3. Sustenance of human institutions that are forest-dependent
 - 3.1 Maintenance of cultural integrity of tribal communities
 - 3.2 Maintenance of equitable distribution of forest products and services to different categories of population
 - 3.3 Maintenance of labor- and income-generating benefits derived from forests

 4. Sustenance of human institutions that ensure that forests are protected against negative external institutions
 - 4.1 Maintenance of effective legal and organizational frameworks for forest protection
 - 4.2 Maintenance of proper socio-economic conditions for populations living near forest areas
 - 4.3 Maintenance of involvement of local forest users in forest management
-

* The interpretation of the exact meaning of these ecological norms is dependent upon the temporal and spatial scales being considered (Fresco & Kroonenberg, 1992)

In view of this basic dilemma, the inability to arrive at a scientific consensus of the operational significance of the concept of sustainability in forestry is understandable. On the one hand, its operational meaning needs to be developed in interaction between the forestry theories and practice on the basis of an agreed set of values. But on the other hand, its normative meaning is constantly evolving in response to social and political developments. Much progress has been made in increasing understanding about the various factors involved in the concept of sustainable forest management and their operational significance, but due to the evolving social valuation of forest resources, no consensus exists about the relative importance of them. There are no indications how

these difficulties might be solved in a scientifically rational way. Instead, it has become increasingly clear that the values that determine an individual's or society's concept of sustainability depend upon its worldview. Thus, the achievement of sustainable forest management ultimately depends upon the reconciliation of different social values with respect to forest resources.

3.4. The role of social values

During the history of forestry, several new social norms have emerged, which emphasize ecological and cultural values over commodity production in respect to sustaining forest resources (Behan, 1990; Brooks & Grant, 1992). During most of the last 200 years, social demands for forests were predominantly utilitarian, and their social value could be expressed in market prices. However, as Western countries urbanized, romantic and symbolic forest values which emphasize ecological values over commodity production increased. The social values of forest recreation, landscape amenities and non-game wildlife are increasingly perceived as more important than material outputs. In contrast, in tropical countries the role forests play in maintaining socio-economic well-being and the cultural integrity of people living in or near forests are increasingly valued.

These changing values on forest resources resulted in changed interpretations of sustainable forest management. This is not surprising as forest management is aimed at fulfilling human needs and aspirations. Forestry has been defined as the management of forest resources to provide a satisfactory amount and mix of social values for clients living, while protecting these values and use options for future generations (Kennedy, 1985; Koch & Kennedy, 1991). The multiple-use nature of forest resources has as a corollary that forest utilization is characterized by the presence of many user categories. Historically, only the needs of dominant user groups were recognized, but increasingly, the interests of less-dominant user-groups have become acknowledged. New forms of utilization and user groups also have emerged. Consequently, forestry is faced with an increasing diversity of sometimes conflicting "forest constituencies", each having their own social values and, subsequently, different demands with respect to the provision of ecological services or forest commodities. The opinions of these various constituencies understandably differ over which of the various objectives of sustainability should be reached, and which factors should be considered as constraints to be overcome.

The recognition of increasingly diverse norms for sustainability means that several, sometimes conflicting, values and changing expectations exist with respect to forest resources (Behan, 1990; Brooks & Grant, 1992). This acknowledgement implies that it is less likely than ever before that a scientific consensus will be reached about sustainable forest management. A balance in the different values embedded in this concept can come about only through political discussions rather than through scientific efforts. Indeed, throughout history forest values have originated in society and have been communicated to foresters (Koch & Kennedy, 1991). The value systems and domain assumptions that define the concept of sustainable forest management are thus to a large extent society-based rather than intrinsically related to forestry science.

3.5. Significance of operational experience

Although the normative interpretation of sustainability becomes manifest in a dynamic political context, it is the task of forestry science and practice to operationalize the newly emerging social values into concrete forest management practices. For effective operationalization of the concept of sustainable forest management, it is necessary to fix its normative meaning. In developing sustainable forest management practices, a compromise needs to be found between efforts to operationalize sustainability on the basis of existing normative management models and efforts to understand the significance of emerging values for developing new conceptual models. It may be hypothesized that as a result of the attention given to operationalize historically identified sustainability norms, the forestry sector has been slow to react to the recently emerging new social values with respect to sustainability. As a result, various calls are now being made for a re-evaluation of the basic principles on which forest management practices are based. These calls concern not only the need for identification of further elaborated forest management practices, but also the need to change the normative values of forestry. In other words, the need to change from a multiple-use to a multiple-resource paradigm (e.g. Behan, 1990; Brooks & Grant, 1992) or a change from a forest-centered to a people-centered paradigm (Gilmour et al., 1989).

This does not mean, however, that in developing new operational guidelines former experiences of operationalizing the concept of sustainability are no longer relevant, even if they are based on paradigms which are considered outmoded. The history of forestry illustrates the importance of continuously analyzing anomalies between newly arising social values and existing operational principles with respect to sustainability. Although it is far easier to show ex-post what was not sustainable than to identify ex-ante what would be a sustainable activity (Dixon & Fallon, 1989), practical experience can significantly increase the understanding of the contextual significance of various factors when operationalizing the principle of sustainability.

The relevance of using past experiences with respect to operationalizing newly emerging values regarding sustainability is demonstrated by the recent discussions over whether utilizing tropical rain forests for non-timber products would be more sustainable than timber exploitation (e.g. Gradwohl & Greenberg, 1988; Peters et al., 1989). On the one hand, such views should be interpreted by foresters as indicating a growing social valuation of non-timber products and increased significance of specific user groups, and consequently a need for further adjustment of forest management practices. But on the other hand, the experience of forestry may also be used to analyze whether such claims are sufficiently context-specified. Unfortunately, it appears that the claims with respect to sustainability of non-timber product extraction are based on analyses on selected products only and on selective criteria with respect to sustainability. Little attention has been given to the social context of forest exploitation or to the institutional dimensions of sustainability (Richards, 1993).

3.6. Conclusions

The concept of sustainability has long been an important guiding principle in forestry. The implications and operational significance of this principle has changed considerably with time as a result of changing social values regarding forest resources. These values became manifest through political rather than scientific discussions. As a result of these changes, at present different interpretations exist regarding the precise meaning and scope of operationalizing this principle. Consequently, various calls for a re-evaluation of the basic principles of sustainable forest management have been made.

As illustrated by the history of the changing interpretation of the meaning of sustainability in forestry, it is not unlikely that future generations may have other opinions about the meaning of sustainability than the present generation, but as it is impossible to carry out discussions with yet unborn generations, it is impossible to determine the social meaning of sustainability for future generations.

This does not mean, however, that ethical concerns for future generations implied in the concept of sustainability cannot be used as a guiding principle for striving to develop improved management systems that meet present day perceptions of sustainability. Although the concept of sustainability is phrased with respect to concern for future generations, its origin lies in the awareness that many of our present practices of natural resource use are ecologically unsound and detrimental to posterity. Therefore, attention should be given to scrutinizing the present activities of mankind as to the reasons why they are considered to be non-sustainable. Such information, together with the understanding of the implications in respect to future activities (Shearman, 1990) will form a sound basis for further operationalization of the sustainability principle.

The experiences of forestry thus offer a good empirical-analytical basis for understanding the extent to which the principle of sustainability can be used as a new norm for rational human behaviour. These experiences demonstrate:

- * The concept of sustainability basically embodies an ethical concern about the need to maintain a proper ecological infrastructure for future generations. When looked at in more detail, the concept is found to involve a variety of sometimes conflicting norms and social values. The interpretation of its implication is contextual and depends on changing social values. The operationalization of the concept should be based on a thorough analysis of the perceptions of different user and interest groups of natural resources and a balancing of these views through political discussions.
- * It is important to analyze what anomalies have emerged between the theory and practical operationalization of the concept of sustainability. This will not only allow for further development of existing resource management practices, but will also bring enlightenment about the reasons why, at present, so much natural resource use is perceived as being non-sustainable. Such enlightenment is important in better understanding why the presently dominating scientific paradigms underlying environmental sciences apparently have had so little effect on ensuring sustainability (Ludwig et al., 1993).

- * Although the concept of sustainability is formulated as a universal principle, its operationalization should be context-specific and flexible with respect to local social, cultural and political as well as ecological conditions.

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Chapter 4

TROPICAL FORESTRY POLICIES: FROM COLONIAL FORESTRY TO RURAL DEVELOPMENT FORESTRY

Some parts of this paper have been modified from
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Abstract

When in the 19th century colonial powers enunciated the first forestry policies in tropical countries, these focused on safeguarding commercial timber production and maintaining protection forests. Predicated by these colonial and environmental concerns, the colonial state reserved extensive areas of forest land, and foresters were given the task to manage these forests by scientific practices. Forest utilization by local communities was allowed to continue as long as it was not detrimental to the colonial interests. After the tropical countries gained independence initially this approach to forestry did not change much. National interests were considered paramount and took precedence over those of local communities. Under influence of the modernization theory of economic development, it was considered that forests should contribute in an optimal way to economic development. This was to be accomplished by improving productivity and establishing forest plantations with related wood industries. In the second half the the 1970s it became recognized that this approach did not contribute as expected to rural development. A combination of new theories about how to achieve rural development and increasing concerns about the ongoing processs of deforestation and land degradation resulted in the identification of new approaches to forestry development. Since the early 1980s much experience has been gained with such rural development forestry policies, which focus on addressing the forest-related needs of local communities and on stimulating active community involvement in forest management. At first attention was mainly given to reforestation activities, but this approach was gradually diversified to include the management of existing forests. As a result of these experiences, various distinctive features of rural development forestry in comparison with conventional forestry have become recognized regarding both their technical and their organizational features.

4.1 Introduction

The original development of tropical forestry policy and management had strong roots in European forestry (Dargavel et al., 1985; Westoby, 1989; Brandl, 1992). When in the 19th and beginning of the 20th century the first colonial forestry activities were started, the prevalent perspectives of European forestry with respect to political primacy and state control were adapted to the colonial conditions. After independence some changes in forestry ideologies occurred, especially regarding the role of forestry in economic development. During both periods state interests took precedence over the forest-related needs of local people. However, at the end of the 1970s more attention became focused on the potential role of forestry in rural development. This history of forestry policy will be reviewed in this chapter. Also the experiences gained in implementing the new approaches to rural development forestry will be summarized. This information will be used to make a preliminary assessment of major differences between conventional forestry and rural development forestry.

4.2 Conventional forestry in the tropics

4.2.1 Colonial forestry policies

The first deliberate colonial forestry activities were directed at gaining control over those timber resources, which were needed for effective exercise of the colonial power and/or which were commercially valuable. For instance, in Indonesia activities focused on teak supplies for ship construction (Peluso, 1991), in India on timber supplies for military cantonments and public works such as the railway system (Dargavel et al., 1985; Hopley, 1996b), and in West Africa on wood resources along railroad lines and navigable waterways (Bellouard, 1955). Because of the important strategic and commercial value of timber, in many colonies the colonial government expropriated large tracts of forest lands. On those lands the valuable timber species were managed without seriously considering tree species needed by local people. For instance, in the Himalayan region of the British East Indies the cultivation of pines was stimulated to the detriment of oak species preferred by local people (Guha, 1991). Normally, in the reserved forests all tree cutting by local people was even prohibited.

In addition to securing access to timber supplies, colonial forestry policies focused on environmental matters. By the end of the 19th century the protection functions of forests were already recognized. For instance, in Java, Indonesia, the negative climatic effects of deforestation was already a matter of concern in the 1880s. Whereas the first Forest Ordinance of 1865 dealt mostly with measures to maintain teak forests for timber production, in the second Ordinance of 1874 the need to establish 'jungle' reserves for protective purposes in mountainous areas was also mentioned as a forestry task (De Haan, 1930). In the first decennia of the 20th century, attention shifted to hydrological and erosion aspects (Coster, 1941). These environmental aspects were especially of concern in relation to the functioning of the colonial cultures. Forest conservation was considered essential for the maintenance of the climatic conditions needed for colonial cash-crop

production such as cocoa and tea or the maintenance of water supplies for lowland agriculture including colonial sugarcane cultivation. Consequently, in accordance with European ideas that a forest cover of 30 percent was the minimum for maintaining environmental conditions, in many countries it was considered that an important percentage of the lands should remain under forest cover (Coster, 1941; Bellouard, 1955; Parren, 1994; Hobley, 1996b). Thus, the reservation of forests was not only based on commercial timber interests, but also on a strong conservation ethic¹.

The result of the colonial forestry policies was a gradual expropriation of control over both forest lands and tree species. The control over land represented the foundation of the legitimacy of the forestry services. The need for professional management to protect these lands and to regulate their exploitation justified their claim on the land. The exploitation of trees in the production forests both provided revenues to the government and covered the costs of the forest service. These benefits further strengthened the legitimacy of the forest service. Thus, the forestry services became empowered to determine the use of the reserved forest lands, and the manner in which these lands were to be managed, including the type of timber species to be cultivated (Guha, 1991; Peluso, 1992). To secure profitable exploitation of trees on the forest lands in many cases the forest service also gained control over the forest labour (Peluso, 1992).

The expropriation of forest lands did not mean, however, that all access to these lands was prohibited to local people. Their subsistence needs for forest products such as fuelwood and fodder were generally recognized. Local people were normally allowed to collect dead wood to be used as fuelwood, as well as various non-timber products such as fodder, fruits, and medicinal products. Even though these products were major resources within the livelihood strategies of the local people they were labelled as 'minor forest products' (Dargavel et al., 1985), and their use was usually not formalized within the official forest management plans (Peluso, 1986). Other local practices, such as using forests as a means for soil regeneration in shifting cultivation, were condemned as old-fashioned and a form of 'plunder cultivation' wasting both timber and soil resources. Only in some cases was food production allowed to be carried out in forest reserves, but the main purpose of such taungya cultivation was to ensure cheap plantation establishment (e.g. Kartasubrata & Wiersum, 1993).

To ensure sustained yield of timber resources and maintenance of protection reserves, a major task of the forest service was to combat the social obstacles to these objectives. As many of the local forest utilization practices were considered to be detrimental to the

¹ The conservation ethic was also displayed in the involvement of the forest services in the establishment and management of nature reserves and game reserves. In Indonesia, lobbying by biologists and foresters resulted in 1919 in the first gazetting of nature reserves. In contrast to the situation in the colonial motherland, where nature reserves were chiefly private affairs, in Indonesia the reserves were established by the government and partially administered by the forest service. This was because no extensive ownership of land was permitted to non-native private individuals, while the establishment of nature reserves on the basis of long-leases was considered inadequate (Dammerman, 1929). Also in India colonial forestry included concerns about wildlife management (Hobley, 1996b).

management objectives, they had to be controlled. This often resulted in "a positivist criminology in respect to local people" (Guha, 1991) with local people sometimes being put in a same category as natural risks, wild animals and pests and diseases as a hazard (Guha, 1991). To exercise control, the activities of the colonial forest services became characterized by territorial duties and policing actions restricting forest utilization by local people (Bertrand, 1985; Dargavel et al., 1985; Thompson, 1988; Peluso, 1992). The access for local people to the forest reserves was restricted by various regulations on collection of fuelwood, fodder, foodcrops and other non-wood forest products, while other activities such as the cutting of timber trees were totally forbidden. In many countries the control over timber trees was even extended from the forest lands to all lands, with local people having to obtain permission from the forest service to cut timber species on their private lands (Bertrand, 1985; Thompson, 1988).

Although colonial forestry policies were dominated by an ideology which considered local forest utilization practices as essentially wasteful, in some countries initiatives were undertaken to legalize community forest management. In India, in the second half of the 19th century, a debate took place as to whether all control over forests should be vested in the state or whether it would be better to set aside forests for community needs and management (Hobley, 1996b). The Forests Act of 1878 allowed villages to own and use forests for their own purposes. An example of such officially recognized community forests were the "civil forests" (*Van Panchayats*) established in the Himalaya region in the 1920s. The purpose of these forests was to overcome tribal resistance to forest reservation by acting as a buffer between the state forests and local villagers (Tucker, 1984; Guha, 1991).

In some other colonies a similar dual concern for forestry development existed. For instance, in Ghana (Gold Coast) the government wanted to control forest lands for using its resources, but also to protect the heritage of the local people. Consequently, selected forest reserves were placed under the Native Administration Bye-laws, which legalized local property rights to these forest resources (Parren, 1994). Also in Indonesia the possibility of introducing community forest management systems was discussed in the 1920s. It was suggested that forest management could be divided between the Forest Department, being in charge of crucial watershed protection forest and commercial timber production reserves, and local communities being in charge of the remaining forests (Persoon & Wiersum, 1991). These ideas were not implemented however.

Such initiatives to legalize community forest management remained subordinate to the commercial and protective activities of the colonial forest services. In the French colonies such initiatives were not even considered, due to the French policy of public authority control over private sector activities, and of full economic, political and cultural integration of the overseas territories and the mother country (Parren, 1994; Buttoud, 1997). In 1825 an ordinance claimed all public property, including forest land "vacantes et sans maître" as belonging to the French king and later to the French state. In other colonial countries, such as the British ones, where public authority was less centralized, community rights to forests were usually restricted to areas not deemed commercially profitable; e.g. in India they were so-called third-class forests (Guha, 1991). Moreover, even in

cases where community forestry was allowed, the ideology of professional forestry prevailed. Community management should be implemented on basis of government regulations and technical assistance from the forest department, which could delimit the harvest amounts of fuel, fodder and other products (Guha, 1991; Hopley, 1996b).

In conformity with the European perspectives on forestry, the perceptions on which the colonial forest management strategies were based may be summarized as follows:

- * Forests can provide both productive and environmental services of interest to the colonial power. To ensure that the benefits of forest are effectively realized, the forests should be under state control.
- * To ensure an optimal balance in forest benefits, they should be managed on a scientific basis by a professional forest service under colonial administration.
- * Forests provide important products for the subsistence of local people. Local forest utilization should therefore be allowed to continue as long as it is not detrimental to the commercial and protective values of forests. Destructive forest utilization practices should be curtailed.

Thus, predicated by ideologies of colonial interests and environmental concerns, the colonial state reserved extensive areas of forest land, and foresters were given the of reordering the traditional methods of forest utilization and management by 'scientific' practices.

4.2.2 Forestry policies in the early-independence era

The basic approach to forestry did not significantly change when tropical countries obtained their independence, although several changes in emphasis did take place (Table 4.1). In some countries such as Indonesia foresters who had lived for a considerable period as independence fighters in rural areas, recognized that attention should be given to the people's needs for housing material, fuelwood and grazing resources (Peluso, 1992). Such recognition fitted well within the socialist policies in many of the newly independent states. However, other concerns were dominant in shaping their forestry policies. A major factor contributing towards a further strengthening of forestry policies which emphasized state stewardship over forest resources and commercial timber production, was the prevalent belief in the modernization theory of economic development (Rostow, 1961). According to this theory, economic development (characterized by the economic growth at national level) should be attained through structural transformations of the economy involving a transfer of resources from the traditional agrarian sector to modern industrialization. This approach was strongly endorsed and promoted by the various United Nations agencies, which had as their task to assist the newly emerging states in their development.

In forestry, the modernization theory resulted in the belief that the forest sector should contribute in an optimal way towards economic development of the newly independent countries (Douglas, 1983; Dargavel et al., 1985; Westoby, 1987). This contribution was considered to be insufficient due to the low productivity of natural forests and lack of forest industries. The capital from "the frozen form of natural resources" (Zivnuska,

Table 4.1 Comparison of forestry policy in colonial and early-independent India (Hobley, 1996b)

	Major goals of 1894 policy	Major goals of 1952 policy
Access & rights	Colonial interests as priority; forest access of local communities to forest restricted and regulated.	National interests paramount; and take precedence to those of local communities
Conservation	Protected Forests maintained on mountain slopes to preserve climatic and watershed conditions	Continued conservation emphasis with stipulation that 60% of land in mountainous areas to be maintained under forests
Revenue	State revenues from exploitation of valuable timbers	State revenues to be increased by improving productivity and establishing forest plantations
Forest management categories	Reserved forests Protection forests Community access to 'inferior' forests allowed under regulations to protect them from their own improvidence	National forests for serving defence, communications, industry and other purposes Protection forests Village forests for meeting community needs Tree lands for land amelioration

1966) should be made liquid so that it could be invested in various sectors of the economy. Investments in forest industries would trigger a self-sustained growth of wood processing industries, and would allow benefits eventually to trickle down to all strata of the population. The processing of wood from natural forests and from newly established plantations of fast-growing industrial tree species would provide valuable export materials and assist in improving the negative import-export balance of the countries. Thus, through the provision of raw material for export and/or industry, forestry would contribute to the much desired socio-economic development. And because forests formed an important resource for national economic development, they should be maintained as a national asset rather than being subject to private profiteering.

As a result of this modernization theory, the macro-economic orientation of colonial forestry as well as the policy of state control over forest resources became even stronger than in the colonial times. Even in countries where colonialism never set foot, forest became nationalized. For instance, in Nepal in 1953 a law was promulgated, such that all

non-cultivated lands became state property (Hobley & Malla, 1996). And notwithstanding the rural background of many foresters, the local forest-related needs were considered subordinate to the need of national development. For instance, in the Indian National Forest Policy of 1952 it was explicitly declared that the needs of the local population should be met to a reasonable extent, but that local communities should not be permitted to use forests at the cost of the national interests of defence, communication and vital industries. And the rights of future generations should not be subordinated to the improvidence of the present generation (Chambers et al., 1984). To achieve these policies, much was expected from science. The prevailing positivist attitude towards science as a major tool to bring about rational resource use is also reflected in the Indian National Forest Policy of 1952, which stated that the task of the Forestry Department is "to scientifically conserve and prudently exploit" forest resources (Chambers et al., 1984).

Unfortunately, in the attempts to use forests as a means to national economic development, the development of the forest management often lagged behind the development of forest exploitation. In order to 'unlock the frozen assets' of natural forests, increasingly new forest areas were opened up to exploitation by giving them out in concession to private logging firms. Although these forests were officially under state property, many of them were only nominally brought under management control of the forest service. Consequently, in the haste to obtain earnings from the forests, a dual situation developed. In some forest reserves, many of them gazetted in colonial times, the state had a virtual monopoly over activities on the forest lands. But in more-recent opened-up forests, the state was content to receive royalties from logging companies and exercised only limited control over the execution of forest exploitation (Stewart, 1985).

An illustration of the prevailing perspectives on the role of forestry to socio-economic development at the end of the 1960s is given in an article based on a fact-finding mission in various Asian countries, which was organized in 1969 in preparation of a FAO/Government of Cyprus/SIDA seminar on social relations in forestry, see Box 1.

4.3. Changes in thinking on forestry and rural development

In the second half of the 1970s it became recognized that the prevalent approach to tropical forestry did not contribute much towards rural development and that if forestry wanted to do so, a changed approach was needed (FAO, 1978; World Bank, 1978; Douglas, 1983; Westoby, 1987). Several factors contributed to this reappraisal of forestry policies and a search for new forest management systems. Some factors related to changes in thinking about the concept of rural development and others to increasing concerns about the ongoing process of deforestation.

Box 1 The role of forestry in social development as perceived in 1969

* The forest is a living community of plants, a biological complex, which, through the scientific and rational intervention of the forester, can be made to yield goods and services to the community. The task of the forester is to try to ensure a harmonious balance between the increasing and changing demands of man from the forest and to improve the capacity of this resource through rational management.

* The human/forest relationship is never static. It changes with the evolution of human society. (...) Looking at the situation in Asia today, one meets all stages in this evolution of human/forest relationship existing side by side in every country. For (many local communities) forests are a free gift from God to each and all, to fell, clear, cultivate, graze or hunt its fauna for subsistence. The need for food and the survival of the individual has precedence over all other considerations and leaves no room for concepts of the community benefits of forestry. (...) To a rural society on which lies the burden of producing more food, the restrictive laws and measures prohibiting the clearing of "jungle" which does not produce food but only harbours wild beasts, is incomprehensible.

* The system of shifting cultivation is generally condemned by foresters and agriculturists: by foresters because the system results in waste of wood and a steady deterioration of the forests; by agriculturists because the outturn of food is poor in relation to the area and effort involved. (...) The most substantial contribution of forestry to food production does not lie so much in the liquidation of forest cover to release more soil for cultivation, but in the prevention of wind and water soil erosion; in the control of floods and the regulation of stream flow; in providing the wood fuel requirements of the rural communities and thus releasing dung for fertilizing crops; in providing the raw material for the industries that either earn or save foreign exchange.

* The fact that in most Asian countries forest resources are generally publicly owned gives the forest sector special significance in the administrative framework of these countries. Where the resources constitute frozen capital it makes it easier for government authorities to liquidate them to feed their overall development programmes. This, however, creates certain obligations, in that long-term public benefits must be placed before short-term interest or party politics. The importance of the forestry sector as a potential source of capital to feed the development process is recognized but, unfortunately, there is a lack of appreciation of the fact that the forest is a renewable resource and that adequate funds must be ploughed back into the forestry sector to keep alive the "hen that lays the golden egg".

* The foresters have a major task, to make (local people and politicians) aware of the dangers and adverse repercussions of allowing the depletion of the forest resources to continue at the present rate. The strengthening and up-grading of the status of forest administration and the delegation to them of more power to enforce legislation and promote sound policies command a priority for forestry public relations programmes. (...) Organized public relations activities are likely to assist the foresters in their effort to strike an harmonious balance between resource supply and human demands for forest products and needs for indirect social benefits.

Excerpts from: K. Nowak & A. Polycarpou (1969) Sociological problems and Asian forestry. *Unasylva* 23(3): 19-23

4.3.1 Changing concepts of rural development

Since the start of international programmes to assist the development of the newly independent tropical countries in the 1950s, a change in the concept of development has taken place. Gradually it was recognized that the belief that economic development could be accomplished through an infusion of capital and technology, was too simple, and that more attention should be given to social and institutional aspects. Within the development policies the emphasis shifted from the need for economic growth, to the need for proper distribution of this growth and the need for fulfilment of basic human needs, to the need for active participation of rural people in their own development process (Long, 1977; Hettne 1982).

As discussed above, in the early development strategies economic growth through the creation of a modern economic sector was a major objective. At first, the attention focused specifically on industrial growth, later the emphasis shifted towards agricultural development. Subsequently, it became realized that an increase in production does not automatically result in a proper distribution of the products. In several cases the one-sided attention to the creation of a modern economic sector resulted in a growing gap between the modern and traditional economic sectors and marginalization of various groups of people. To counter the effects of this growing inequality more attention needed to be given to distribution of economic assets, focusing specifically on provision of basic human needs and poverty alleviation. The main objective of this basic needs strategy was to fulfill the needs of underdeveloped groups of the population for food, clothing, education and health. This strategy was based not only on humanitarian objectives, but also on the theory that economic growth will be stimulated once basic needs are met. Later still a third aspect received increasing attention, i.e. the possibility for rural people to participate actively in their own development process rather than being a subject of development. The objective of such local participation is to stimulate the emancipation and self-reliance of the local people. Such self-reliance is not only a development objective in itself, but it will also enable a more efficient utilization of development efforts and funds.

These changes in thinking on the meaning of development have influenced the ideas about the role of forestry in rural development in several ways.

- * In line with the critical assessment of the results of the modernization approach, it became recognized that the supposed contribution of forestry to economic development through the creation of employment and income from timber plantations and wood-working industries often does not materialize. The supposed forward and backward linkages of such enterprises were mostly smaller than originally anticipated. Too often, local people hardly profited from such enterprises and, if realized, profits were siphoned off to urban elites and/or foreign investors (Douglas, 1983; Westoby, 1987).
- * In conformity with the basic needs development strategy, it became recognized that wood products such as fuelwood for cooking and heating, and timber for house construction are essential for human survival. The sharply increased concerns with energy in the early 1970s had as a consequence that attention also became focused on the 'other energy crisis' (Eckholm, 1975) in the form of the critical fuelwood situation in many tropical regions.

- * The growing interest in providing basic needs for rural people also increased awareness about the need to improve food production on marginal lands. On these lands forests and/or trees often play an important role (Bene, et al., 1977; Wiersum, 1985). They have important protective functions in moderating climatic and soil conditions. They also provide a wide range of forest products which are essential for the livelihoods of local people, not only fuelwood and timber for construction, but also wood for agricultural implements, fodder, and a multitude of 'minor forest products' (edible leaves and fruits, edible and oil-bearing seeds and nuts, honey, medicinal plants, gums, tannins, dyes, waxes, bark products, etc). All of these products may be used for local consumption, or they may be sold to augment farm income.
- * As a result of the growing interest in stimulating participation, it became recognized that rather than restricting local people's access to the forest resources, their involvement in forest management should be stimulated. Forest benefits for local people can best be assured when they can manage the forests themselves (FAO, 1985).

4.3.2 Deforestation, desertification and forest degradation

Simultaneously with the changes in thinking about the best approach to rural development, concern also grew about the rate of uncontrolled deforestation and forest degradation in tropical countries. This loss of forest resources results in many undesirable ecological and environmental effects and influences the livelihood of many rural people in a negative way. In the humid tropics deforestation has resulted in land degradation and the advent of waste lands, in mountainous areas in erosion and increasing flood damage, and in the arid tropics in desertification. Especially after the disastrous drought years of the 1960s in the Sahel, these environmental processes received increasing international attention.

Although the forestry strategies had been based on the principle of sustainability, the prevailing policies had not been able to control the process of deforestation. Many factors contribute to deforestation: increase in population, growing demands for commercial forest products and land for subsistence farming and commercial crop production, and opening-up of forests to meet needs for a national infrastructure (Plumwood & Routley, 1982; Repetto, 1988; Jepma, 1995; Barraclough & Ghimire, 1995). As a result of these processes, formerly isolated forest areas became incorporated in the national economy and were subjected to various kinds of exploitation. The forest service was often unable to deal with these pressures. For instance, in spite of the policy to maintain forest reserves as a national asset, the practice of giving state forest lands in concession to commercial logging companies without ensuring sufficient control by the state forest service, resulted in many cases in the liquidation of these assets (Stewart, 1985; Repetto, 1988). After finishing exploitation, logging companies could shift to other regions. This is more difficult for local people and consequently they often bear the brunt of deforestation. It may therefore be expected that local communities will be more careful in maintaining forest resources than logging companies. The more so, if it concerns their ancestral lands (Colchester & Lohmann, 1993).

4.3.3 Re-appraisal of forestry policies

The various new insights on alternative approaches to development and on the ongoing process of environmental degradation reinforced each other as regards the development of forest policy. It became increasingly recognized that important discrepancies do exist between the forestry principles of sustainability and multiple use and the actual situation with respect to the conservation and utilization of tropical forest resources. Notwithstanding the principle of sustainability, the conventional approach to forestry policy had not been able to prevent deforestation and forest degradation. And in spite of the principle of multiple-use, forest management practices were also not providing "the greatest good to the greatest number of people"; the forest-related needs of underprivileged groups in society were often neglected. The acknowledgement of the inability of the conventional approaches to forestry to effectively conserve forest resources and to contribute towards rural development indicated a need to reappraise these approaches.

As a result of this recognition, a re-evaluation of the relation of forestry to rural development took place during the 1970s, and various assumptions on forest policy and management became challenged. For instance, the assumption that forest protection and management should be based on central policy and planning within an authoritative and hierarchical forest service having important territorial and policing functions, was reappraised. A need was identified to complement the strategy of forestry development based on national interest and industrial growth with new strategies focusing on basic needs, equity and popular participation². A dualistic forestry development strategy should be pursued, in which the emphasis on developing modern forest industries with their related industrial wood production areas is matched by efforts to develop forestry for rural development by focusing on the needs of the local communities and their active involvement in forest management (Steinlin, 1977; Douglas, 1983; Taylor & Soumaré, 1983; Wiersum, 1984a; Westoby, 1987).

4.4. Forestry for rural development: practical experiences

Since the need for new forestry strategies to stimulate rural development was identified, much attention has been given to formulating and implementing rural development forestry programmes. At the end of the 1970s both the FAO (1978) and the World Bank (1978) officially indicated their intent to stimulate such programmes. An important stimulus to the acceptance of the new approach was also provided by the results of the 8th World Forestry Congress held in 1978 at Jakarta which had as its theme "Forests for people". Many international donor agencies quickly accepted the new approaches and since the early 1980's an increasing number of social/community forestry projects have

²An interesting prelude to the discussion of the principle of political legitimation and state control resulting in a neglect for the forest-related needs of local communities, is the protest in the 1840s of the young Karl Marx against the application of the Prussian laws on theft of wood. He argued that under customary law 'human poverty deduces its right to fallen wood', but that these customary rights were abolished and even criminalized under the new Prussian state regulations and changed property relations (Linebaugh, 1976).

been implemented. As a result, much practical experience and empirical information has been collected about the specific characteristics, potentials and constraints of rural development forestry strategies (e.g. FAO, 1985; Shepherd, 1985; Arnold, 1987, 1991; Chambers et al., 1989; Gilmour & Fisher, 1991; Poffenberger, 1990; Guèye & Laban, 1994; Skutsch, 1994; Wiersum, 1994; Hobley, 1996a). It is possible to distinguish three phases in the development of rural development forestry: an experimental phase, a consolidation phase and a diversification phase (Table 4.2). At first, most attention was directed at reforestation, but increasingly the focus became enlarged to involve more diverse aspects of forest conservation and management.

Table 4.2 Phases in rural development forestry development
(modified after Skutsch, 1994)

Period	Rural development forestry approach
Experimental phase (late 1970's to mid 1980s)	Emphasis on establishing village woodlots and individual tree growing based on scaling-down of conventional forestry practices as a means to address fuelwood and desertification problems
Consolidation phase (2nd part 1980's)	Increased understanding about the role of trees in livelihood strategies of villagers Less emphasis on firewood, more on multi-product systems and integration of tree growing with agriculture Increased recognition of significance of indigenous agroforestry practices Less emphasis on community forestry approaches Growing attention to village-level manufacturing of forest/tree products
Diversification phase (early 1990's)	Increased emphasis on conservation and management of existing forests, including controlled utilization of non-wood forest products New understanding about the role of common property Recognition of the need to conserve the cultural integrity of tribal forest dwellers Development of joint and collaborative forest management Increased attention to integration of forestry activities in local-level land-use planning

Lohman, 1993). The traditional land rights and forest management systems of tribal people should therefore be officially recognized. These concerns resulted in a strategy of handing over of forests from the state to tribal groups to be managed as extractive reserves. This strategy was developed in Latin America, and is gradually extending to other regions.

4.5 Conclusion

Since the first rural development forestry policies were enunciated at the end of the 1970s many activities have been undertaken to pursue this policy and much experience has been gained in implementing it. These experiences have greatly increased knowledge about different options for rural development forestry. Many new insights have emerged about both its technical and social aspects (e.g. Arnold, 1991; Wiersum, 1990, 1994). Almost two decades of rural development forestry has increased understanding about:

- * The diversity in approaches to rural development forestry, each having its own specific characteristics, advantages and limitations with respect to various forest management and social development objectives.
- * The importance of giving attention to all relevant technical aspects of forest management (forest land-use planning, forest rejuvenation, forest protection, controlled forest utilization) rather than to some selected practices such as reforestation only³.
- * The need to focus also specifically on organizational arrangements for the protection and controlled utilization of forests resources.
- * The variable ways in which rural people depend upon forest and tree resources within the scope of their livelihood strategies. Often they have organized themselves already, either at household or communal level, for carrying out forest management activities. Forestry development projects may be assist in further adaptation of such indigenous forest management practices in order to adjust them to changes in external conditions (e.g. new forest legislation, increased commercialization).

As a result of this understanding a better insight has also been obtained into the major differences between conventional forestry and rural development forestry with respect to social and technical norms (Table 4.3). In comparison to conventional forestry not only does a greater variety of forest conditions and products need to be considered, but also a greater variety of forest management organizations. Thus, rural development forestry needs to focus on a greater variety of people - forest interactions than professional foresters were used to.

³ The range of activities to be considered also includes the household or community-level manufacturing of forest products and improved marketing of forest products (Arnold et al., 1987).

Table 4.3. **Normative assumptions in conventional and rural development forestry, a first approximation**

	Conventional forestry	Rural development forestry
Role of actors involved		
Forest users	Mainly urban people & forest industries	A large variety of rural and urban groups
Forest managers	Professional foresters	Both community groups, farmers and professional foresters
Function of professional forester	Omnipotent manager	Either advisor or co-manager with local people
Technical characteristics		
Natural systems	(Semi)natural forests and timber plantations with emphasis on trees, soil & water and wildlife	All kinds of (semi-) natural and cultivated woody biomass and associated forages, crops and/or livestock
End products	Mainly timber, some commoditized minor forest products, regional environmental services	All possible wood & non-wood forest products for subsistence and commercial use; environmental services at local & regional scale
Problem identification	Government based	Village-based
Ecological sustainability	Sustainable output of required products & regional environmental protection	Maintenance of production capacity of forests and associated agricultural lands
Organizational characteristics		
Forest ownership	State or commercial enterprises	Either state, communal or private
Planning process	Professional blueprints	Process approach at local level
Control functions	State forest service backed by legislation	Combined local and state control
Arrangements between manager & user	Formal	Both formal and informal

4.6. References

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Chapter 5

THE CONCEPTS OF SOCIAL AND COMMUNITY FORESTRY

An earlier version of this chapter has been included in:

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Abstract

Since the inception of rural development forestry, several terms have been suggested to represent this new approach to forestry, notably 'social forestry' and 'community forestry'. Some authors consider these terms to be synonymous, but others interpret them in a specific way. This lack of general understanding of the precise meaning of the terms indicates a need for their better conceptualization. The meaning of the terms is analyzed by considering the various meanings of the adjectives 'social' and 'community', and by assessing which kinds of actors and practices are involved. Two main categories of actors are distinguished: professional foresters and members of local communities. Also two categories of practices are indicated: forestry policy measures and forest management activities. The terms of social forestry and community forestry are defined as referring to forestry policies strategies and forest management practices respectively. This allows the conceptualization of the terms by a specific set of logically related objectives, practices and institutional arrangements. The main characteristic of such social forestry policies and community forest management are discussed with respect to each of these factors.

5.1. Introduction

As discussed in chapter 3, rural development forestry has quickly gained acceptance in forestry since the end of the 1970s. When this new approach was suggested, various terms were used to represent it, notably 'social forestry' and 'community forestry'. Some authors consider these terms as synonyms, but others interpret them in a specific way. An important reason for the different use of the terms is that in some countries they have acquired a specific meaning, which is difficult to change. And as indicated in Chapter 3, notwithstanding this lack of universal definition of the various approaches to rural development forestry, much progress has been made in developing them in operational terms. However, the lack of clear understanding about the exact meaning of the terms indicates the need for their better conceptualization. This will assist in obtaining a clearer insight into the various perceptions underlying rural development forestry. Therefore, in this chapter the various meanings of social and community forestry will be scrutinized. By considering which actors are involved in the different activities and in what kind of activities they are involved, the two terms will be conceptually differentiated.

5.2 Social and community forestry: early interpretations

One of the first reports in which the new ideas about forestry development were expressed, was the 1976 report of the National Commission on Agriculture in India. In this report the term social forestry was introduced. The meaning of this term was explained as follows:

"One of the principle objectives of social forestry is to make it possible to meet the needs (for forest products for rural people) in full from readily accessible areas, and thereby lighten the burden on (industrial) production forestry" (GOI, 1976 in Chambers et al., 1984).

In the same year FAO started a new programme on Forestry for Local Community Development. In an overview paper for this programme the term community forestry was introduced. This term was indicated to refer to

"any situation which closely involves local people in a forestry activity either through activities by individual households or through activities involving a community as a whole" (FAO, 1978).

The report advocated the development of community forestry as a means

- to provide fuel and other goods essential to meeting the basic needs at the rural household and community level;
- to provide food and environmental stability necessary for continued food production; and
- to generate income and employment in the rural communities.

The objectives for social and community forestry formulated in these reports indicate different concerns in the development of rural development forestry. The Indian report stressed its role in improving forest management, while the FAO report focused on its rural development context and its contribution to improved land-use. Thus, the concerns

leading to the identification of the new approach to forestry were diverse. Nonetheless, a basic aspect common to all concerns was the idea that it is necessary to stimulate improved community involvement in forestry. It is therefore questionable whether the terms of social forestry and community forestry should be considered to refer to identical schemes or not, and what they precisely represent.

Several authors (e.g. Gregersen et al., 1989; Wiersum, 1990; Peluso et al., 1994) have suggested that the terms should be considered as synonyms; they both refer to "any forest management activities or situations, which closely involve local people in forestry and tree growing activities, for which rural people assume (part of the) management responsibility, and from which they derive a direct benefit through their own efforts" (Pardo, 1985). In this interpretation both terms are considered as generic names for a broad range of tree- or forest-related schemes and activities that aim at providing forest products and services to rural landowners and community groups, as well as at active participation of local organizations and people in the management of forest resources and woody biomass.

Others authors, however, use the terms in a more specific meaning. For instance, in a recent textbook (Hobley, 1996) the terms are described as follows:

Social forestry: An umbrella term for various schemes aiming at forestry for local needs, especially individual farm forestry, for communal village planting and for forest management by villagers.

Community forestry: A broad term which includes indigenous forest management systems and government initiated programmes in which specific community forest user protect and manage state forests in some form of partnership with the government.

Arnold (1991) argues that the term social forestry is often used in an implicitly narrower sense than community forestry by referring to activities that have a predominantly welfare function. This interpretation is reflected by "the often exclusive focus on meeting subsistence needs of the poor found in many early project documents, and the strong negative reactions to the emergence of tree cash cropping within some social forestry programmes" (Arnold, 1991). In order not to limit the interpretation of the new forestry schemes to such narrowly circumscribed interpretations, he proposed the term community forestry as the more appropriate one.

These different opinions demonstrate that up till the now no general consensus has been reached on whether to differentiate between social forestry and community forestry or not, and if yes, how this should be done. It is unsatisfactory that many different interpretations of the names and definitions for such schemes exist. Due to the lack of a generally agreed nomenclature, misunderstandings develop in many discussions, and comparative evaluations of schemes in different countries are hampered. Attempts have been made to remedy this confusion by identifying new terms such as "participatory forestry" and "rural development forestry". But such proliferation of terms obscures understanding rather than clarifies the issues; rather than the identification of new terms, a clearer conceptualization of what the terms represent is needed.

5.3. Social and community forestry: a reconsideration

The possible meanings of social and community forestry may be assessed in two ways. Firstly, the meaning of the adjectives "social" and "community" may be considered, and what repercussions this has on the possible interpretations of the related forestry terms. Secondly an assessment can be made about which categories of actors are involved with what kind of activities. Such actor analysis may assist in better conceptualization by indicating whether the terms refer to a set of logically related objectives and practices.

5.3.1 Meanings of the adjectives social and community

The term social has two main lexical meanings (Concise Oxford dictionary):

- living in companies or organized communities; not fitted for or not practising solitary life;
- concerned with the mutual relations (including problems) of (classes of) human beings.

The first meaning refers to a situation and is often used in a descriptive sense. The second meaning refers to a relation; in this meaning the term is often used in a policy context, i.e. social policy. Consequently, the term social forestry can be interpreted as having a descriptive meaning in the sense of referring to the active involvement of community groups in forest management, or a normative meaning in the sense of referring to a social norm for forestry development.

These different meanings are reflected in different interpretations of the meaning of social forestry. It is questionable whether this concept should be considered as referring to a means for improved forest management, or an objective for development of rural people. Two extreme interpretations may be distinguished:

- * The concept refers to a new strategy for effective forest management with the adjective 'social' referring to public involvement in forest management. Such involvement is mainly seen as a means to reach the objective of effective forest management. The adjective "social" is interpreted in an instrumental way.
- * The concept refers to a new strategy for using forestry as a means for rural development. In this interpretation the adjective 'social' indicates a social development norm: the objective of social forestry is to fulfil basic human needs. Public involvement in forest management is a means to this goal. The adjective "social" is interpreted in a normative way.

The term community, too, has various meanings (Lee et al., 1990):

- a locality in the sense of a human settlement with a fixed and bounded local territory,
- a local social system involving interrelationships among people living in the same geographic area,
- a type of relationship characterized by a sense of shared identity.

The term community forestry may therefore also be interpreted in different ways. It can be used to refer to the management of forest resources which are shared or held in common. Usually, however, the term communal forestry is preferred for such schemes. It may also be used to refer to any scheme involving members of a local community in the

management of the forest resources that are present within the territory of this community, irrespective of whether these resources are privately, communally or state owned. This interpretation prevails in the common usage of the term.

As the terms 'social' and 'community' have various meanings, it is not surprising that the concepts social forestry and community forestry are interpreted in several ways. To assess whether it is possible to define these concepts in an unambiguous way, it seems useful to consider whether they could be systematically differentiated on the basis of the kind of actors and activities involved in such schemes.

5.3.2 Actors and activities involved in social and community forestry

When scrutinizing the various definitions proposed for social or community forestry, it appears that in many cases they are not unequivocal with respect to the kind of actors and activities to which they refer. As demonstrated by the various definitions given earlier, on the one hand the definitions refer to activities of rural people, but on the other hand to development activities of forestry departments or development agencies. This ambiguous mixture of references to forest management practices and forestry policy measures is illustrated by the following example:

"The term social forestry covers a broad range of tree or forest related activities that rural landowners as well as other users and community groups undertake in order to provide products for their own use and to generate local income. (...) Social forestry is distinct from conventional production forestry, in that, in the former the primary focus is on people or community involvement" (Roberts, 1990).

This example demonstrates that two different sets of activities of two separate actor categories are often lumped together when describing the meaning of social/community forestry (Wiersum, 1994):

- * Forest/tree management activities undertaken either individually or cooperatively by the local people either on their own or on leased private lands, on communal lands or on state lands;
- * Activities of professional foresters or development organizations aimed either at stimulating the forest/tree management activities that are under the control of local people, or at adapting the professional management practices in official (public) forest reserves, in order that this management becomes more explicitly directed towards an improvement of the welfare of rural communities.

It is important to clearly differentiate between these actor categories and to conceptually separate the perspectives of professional foresters and local communities. Local community members and forestry administrators have different objectives for being involved in forestry. The recognition of such differences is important, as the term social forestry has a strong policy connotation. Several authors have stressed that the significance of this concept lies in its being a reaction to the conventional approaches to forestry, which were dominated by the ideology of forest conservation and production forestry under state stewardship, which legitimated forest service control over forest lands and tree species (Gilmour & King, 1989; Peluso & Poffenberger, 1989). This policy connotation is

illustrated by the lively debate on the assumption that the term "social" refers to activities that have primarily a welfare function. Questions have been raised as to whether "social forestry is yet another big farmer perversion of a rural development effort, intended to bring benefits to marginal farmers and landless, but in fact putting additional income into the pockets of the rural rich" (Blair, 1986). And it has also been stated that "Social forestry activities are very unlikely to be able to make greater progress in either group management or redistribution of wealth than society as a whole, and it is unrealistic to expect this" (Arnold, 1987). Even if one is of the opinion that the interpretation of the term social forestry as referring to social welfare functions, is too narrow (Arnold, 1991), this does not negate the more general policy connotation. This normative connotation is also reflected by the idea that social forestry involves professional foresters working in a new social context, and that it therefore refers to the need to develop new forestry professionals (Gilmour & King, 1989; Fairfax & Fortmann, 1990; Van Gelder & O'Keefe, 1995).

However, the motives of local people for being involved in forestry are not related to normative considerations with respect to social development and/or professional activities. Their interests are to maintain forest resources as part of their livelihood strategies. In many tropical regions management of forest and tree resources is a long standing component of indigenous land-use systems (Wiersum, 1997). It seems short-sighted to reserve the term community forestry only for forest management practices which have been proposed by official forestry development schemes, and not to such indigenous activities.

The confusion about the precise point of reference of the concepts of social and community forestry may be solved by separating the concepts on the basis of whether it involves

- policy development activities or management practices,
- activities of professional foresters or of local communities.

In this way it is possible to define each term on the basis of logically related referents. In view of the normative connotation of the term "social" it makes most sense to relate the concept of social forestry to the policy activities of professional foresters (and other development workers).

Social forestry may thus be defined as a development strategy of professional foresters and other development organizations with the aim of stimulating active involvement of local people in small-scale, diversified forest management activities as a means to improve the livelihood conditions of these people.

Community forestry can be defined as any forest management activities undertaken by rural people as part of their livelihood strategies.

This conceptual differentiation between social forestry and community forestry can further be clarified by the identification of social forestry as a development strategy aimed at the stimulation of more effective community forestry.

5.4. Main features of community forest management and social forestry policy

5.4.1 Community forestry as a management activity

Forest management refers to the organization and control of the creation, maintenance and/or sustained utilization of forests, trees and associated resources (Duerr et al., 1979). A forest management system involves a set of technical aspects and organizational aspects. The technical aspects involve a set of deliberate practices for the conservation and possible enhancement of forest resources and the controlled utilization of those resources. The organizational aspects encompass the process of decision-making as regards the objectives of forest management and on the kinds of activities to be carried out by certain persons at certain times, and of ensuring the proper execution of these activities.

In community forest management the responsibility for making proper arrangements as regards both technical and organizational aspects rests primarily with rural people. They do so on the basis of their own objectives, e.g. to fulfil household needs or to obtain inputs for agricultural and livestock production. Or as a means to obtain marketable products or because of cultural and religious values. Community forestry may therefore also be defined as the process of making and implementing decisions with regard to the use and conservation of forest resources within a local territory, with the organization of the activities being based on shared norms and interests of the people living in that local territory. The activities which are involved in community forest management include not only regeneration and maintenance of trees in either forests or agroforestry systems, but also controlled harvesting of forest products and even local manufacturing of these products. In many rural communities such management activities have existed for a long time already. Social forestry projects can often use such indigenous forest management practices as a starting point for stimulating further development (FAO, 1985; Kajembe, 1994; Van Gelder & O'Keefe, 1995). But community forestry should not be considered only as an outcome from social forestry interventions, it may also evolve in response to endogenous developments (Wiersum, 1997).

Types of community forestry

Various types of community forestry can be distinguished. This was reflected in the different types of community forestry mentioned in the original Indian and FAO reports introducing the concepts of social and community forestry (Chapter 4.2). The Indian report included farm forestry, extension forestry and rehabilitation of scrub lands and degraded forests. The FAO report mentioned farm forestry, woodlot management, forest product manufacturing and forest utilization by forest dwellers. In these categorizations, several variables are used as indicators for specific types of community forestry. The differentiating terms relate either to certain forest types and certain types of forest utilization, or to different kinds of management organization (farm forestry relates to forestry practices of private farmers, while woodlot management relates to communal practices for plantation forestry).

In line with the idea that different kinds of rural development forestry activities may be distinguished on the basis of the kind of actors involved in them, it is logical to differentiate various community forestry types on basis of responsibilities of the different categories of local people in respect of forest management (Wiersum, 1984; FAO, 1985). A distinction can be made in

- the degree of power over land: the degree of control, use or ownership of land (and tree) resources:
- the degree of power of decision: the degree of management responsibility for forest/tree resources.

Broadly speaking, management responsibilities, as well as the control over tree and land resources, may belong to the community (including communal groups), to private groups such as households and individuals, or to the state. Consequently, three general categories of community forestry can be recognized:

- communal forestry,
- farm forestry,
- joint or collaborative forest management of public lands.

5.4.2 Social forestry as a policy strategy

Forestry policy consists of the process of formulation and implementation of measures to stimulate the wise utilization and management of forest resources. It embraces not only the political process of formulating national forestry policies, but also the planning and implementation of forestry development interventions. Such forestry development interventions can be characterized as systematic efforts to reorient the forestry situation in a direction deemed desirable by the policy makers. This definition emphasizes that the organizations which formulate social forestry policies or which implement social forestry interventions have specific assumptions for doing so. As discussed in Chapter 4.2 there are two kind of reasons for embarking on social forestry, i.e. the need for improved forest conservation and management and the need for rural development. These assumptions can be further detailed into different assumptions (Table 5.1), which are partly overlapping and partly divergent. For instance, assumption 1.1 is based on a belief that indigenous management is usually sustainable, while assumption 1.2 considers that many local forest utilization practices are destructive due to a lack of proper control on resource utilization.

Due to the different assumptions regarding how social forestry can contribute to solving either forest management or rural development problems, there is not just one objective for stimulating this new approach to forestry, but rather a group of objectives (FAO, 1985):

- * To increase the utilization of human resources for managing degraded and marginal lands to counteract the process of deforestation;
- * To contribute to the general socio-economic development of rural people through employment generation, institution building and by promoting agricultural production;

Table 5.1 Assumptions on the rational for social forestry development

1. Assumptions with respect to forest conservation and management
 - 1.1 Small-scale forest exploitation by indigenous people better ensures sustainable forest management and forest conservation than large-scale commercial timber exploitation by concessionaries.
 - 1.2 Changing open-access forest exploitation to community controlled forest exploitation ensures more effective forest conservation.
 - 1.3 Local participation in forest management ensures optimal use of human resources in forest management and therefore provides better prevention of forest degradation and improved rates of forest rehabilitation.
 - 1.4 Allowing local forest utilization in certain concentrated areas takes the utilization pressure away from other areas and therefore ensures better forest and nature conservation.

 2. Assumptions with respect to social development
 - 2.1 Community management of natural forests provides opportunities for the local people to use and manage forests better for locally needed forest products and allows equitable distribution of those products.
 - 2.2 Community forest management contributes towards increased self-reliance of local people in producing valuable forest products.
 - 2.3 Community management of natural forests allows the preservation of the cultural integrity of tribal people and contributes to the empowerment of tribal communities to gain control over their own traditional resources.
-

- * To ensure that rural people can produce, or have better access to, certain basic needs in the form of essential forest and tree products and services;
- * To increase the participation of rural people in the management of forest and tree resources as a means of increasing their self-reliance;
- * To address the needs and aspirations of specific underprivileged groups within the rural population, such as subsistence farmers, landless families or other sectors of the rural poor.

As with assumptions, these objectives do not necessarily exclude each other. Some of them may be congruent or may reinforce each other. But others are broadly divergent. The following important divergent aspects may be noticed (FAO, 1985):

- * Due to the poor growing conditions and the need for the vegetation to establish itself before it can be utilized, reforestation of denuded and overutilized lands will usually not provide high yields, at least not initially. Consequently, such schemes may not be financially attractive for smallholders interested in the production of commercial tree products.
- * In schemes to stimulate farmers to grow trees to meet specific market demands, it may be difficult to achieve democratic participation, especially of poor, landless

people. In this case, equity objectives and distributive benefits may have inconsistent impacts among different sectors of the rural population.

- * The provision of specific tree products (such as wood, fodder or fruits) to local people may be assured by individual trees, even if standing alone or scattered in backyards or agricultural lands. But for securing other forest-related benefits (e.g. environmental services) it is often necessary to maintain forest reserves as complete and well-functioning ecosystems.

5.4.3 Social forestry activities

Social forestry activities may broadly be divided into two kinds of activities: planning and implementation. As there are several objectives for social forestry, in the process of planning such programmes careful attention needs to be given to the proper identification of location-specific needs to be addressed in a specific scheme. An important consideration is also which kind of community forestry practices need to be stimulated: communal forestry, farm forestry or joint forest management. In many social forestry programmes not one specific type of community forestry is advocated, but rather a combination of several types. This may ensure proper management of the different kinds of woody vegetation in the various land-use and tenurial niches present within a local territory (local level land-use management).

Once the objectives for stimulating social forestry have been formulated, a further identification of a consistent set of specific project activities can be made. Social forestry interventions may not only be focused on improving forest management, but also at improving local manufacturing and/or marketing of forest products, and the provision of social amenities to communities living on state forest lands. Whatever category of forestry activities is selected, the basic proposition of social forestry is that local communities rather than outside agencies are primarily responsible for carrying out these activities. An important question then becomes what kind of measures are needed to assure that these practices will be implemented. Several policy measures may be needed to accomplish this. Two different categories of such measures may be distinguished (FAO, 1985; Van Maaren & Wiersum, 1988; Wiersum, 1994):

- * Provision of external inputs, such as secure access to land, financial incentives, technical support or extension, which stimulate local communities to intensify and/or improve their forest management;
- * Arrangements of a proper institutional and organizational framework, including legal codes, tenure policies, forestry extension organization, in which community forestry can proceed .

5.5. Conclusion

By relating social forestry to forestry policy strategies and community forestry to forest management activities, these concepts can be characterized by a specific set of logically related objectives, practices and institutional arrangements. These are summarized in Figure 5.1. In this figure the interactions between these elements are also indicated.

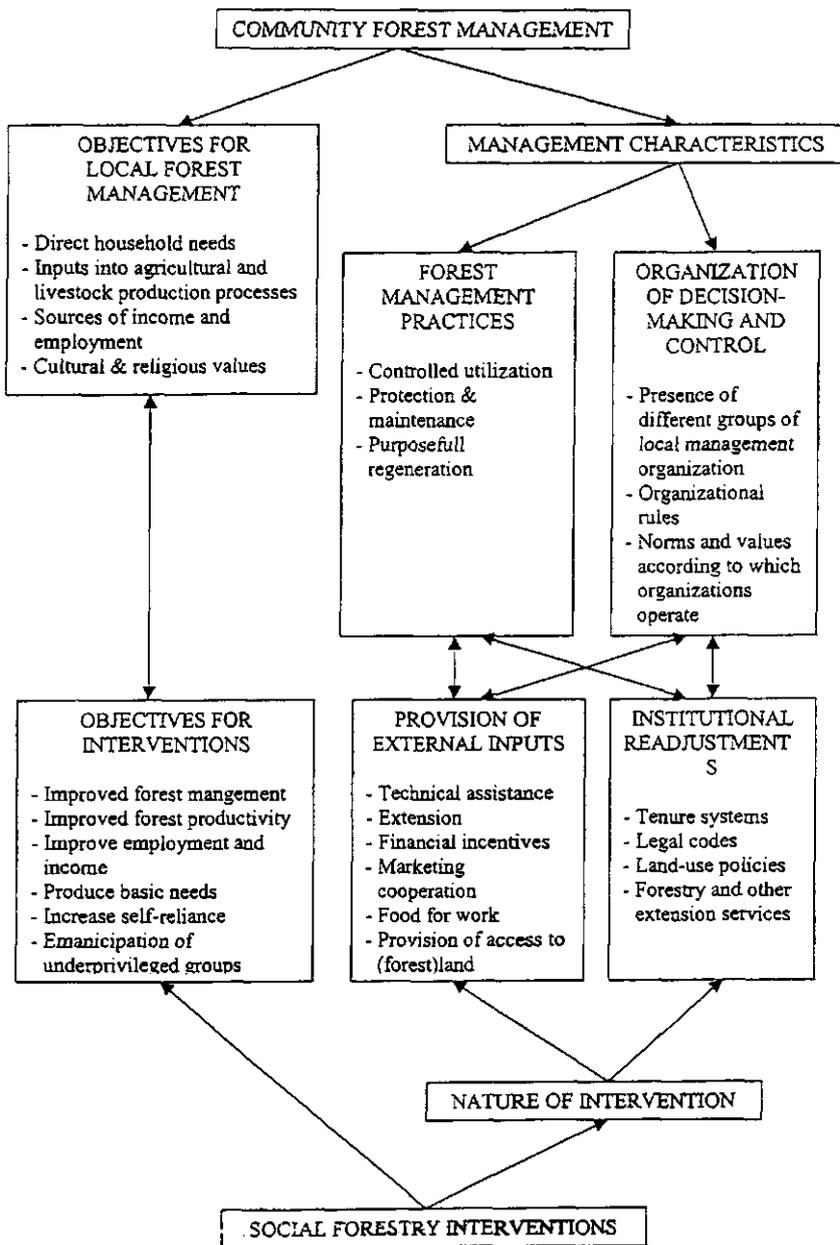


Figure 5.1. Framework of characteristics of community forest management and social forestry interventions

There are three important arguments concerning why it is useful to make an explicit distinction between social forestry as a policy measure and community forestry as a management activity. Firstly, it is consistent with the lexical meaning of the adjectives social and community. It also does justice to the normative connotation of the term social and the more descriptive connotation of the term community. Secondly, it resolves the ambiguity of many of the present definitions, especially with respect to the term social forestry. The definitions formulated here include clear referents to the kind of actors and activities involved and allow clear differentiation between the policy and management dimensions of rural development forestry schemes. Thirdly, it emphasizes the different objectives of rural communities and development workers as regards participating in such schemes and their different tasks. Making a clear analytical distinction between the different objectives and practices involved in planning and implementing social forestry interventions and in the planning and implementing community forest management may assist in better understanding of the different norms and perspectives which are involved in rural development forestry.

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Chapter 6

FARMER ADOPTION OF CONTOUR HEDGEROW INTERCROPPING, A CASE STUDY FROM EAST INDONESIA

K.F. Wiersum, 1994. Farmer adoption of contour hedgerow intercropping, a case study from east Indonesia. *Agroforestry Systems* 27: 163-182

Abstract

The results of a study to assess the initial impact of the introduction of contour hedgerow intercropping on the Indonesian islands of Lombok and Sumbawa are described. The study focused on the reasons for adopting this technique and its initial effect. The results of detailed case studies in four villages indicated that the process of adoption is heterogeneous. Land-use conditions in the four villages were much more diverse and dynamic than the project anticipated. Rather than being an 'off the shelf' technique as assumed by the project, hedgerow cropping proved to be a 'prototype' technique; the farmers' ability to adapt the practice to their specific farming conditions such as subsistence food production or cash crop cultivation was an important motive for its adoption. In some cases the introduction competed with the extension of other promising land-use practices. Several farmers adopted the technique not because of its productive benefits, but as a means to gain access to land or credit, or to demonstrate their allegiance to social networks. The results indicate that there were significant discontinuities between what the project intended to achieve by introducing the technique and the farmers' motives for adopting it.

6.1. Introduction

Since the recognition of agroforestry as a land-use technique worthy of scientists' attention, much attention has been focused on the development of hedgerow intercropping (also called alley cropping) (Lal, 1989; Kang et al., 1990; Kang, 1993). This technique may be considered as one of the first prototypes of a scientifically-developed agroforestry technique. Initially, research focused mainly on the potential of using hedgerow cropping on level land to maintain soil fertility by supplying organic matter and redistributing minerals to the topsoil. However, it has recently been suggested that it is unlikely that it will be widely adopted for such purposes in practice (Young, 1993). The situation is different on sloping lands, however. If planted along the contours, hedges of woody perennials not only help to maintain soil fertility in a similar way as on level land, but they also assist in controlling erosion. On slopes, the major function of the hedgerows is to impede surface runoff and transport of sediments, and thus to retain nutrient and water in the cropping system (Young, 1989). This erosion control practice was already introduced on the island of Java at the end of the 1930s (Schuitemaker, 1949). The fact that farmers on the Indonesian islands of Flores and Timor (Metzner, 1976; Prussner, 1981) and on Cebu island in the Philippines (Tacio, 1993) have practised such contour hedgerow cropping for decades indicates the relevance of this agroforestry technique. At present, many agroforestry development projects are introducing this practice with reasonable success into new tropical areas (e.g. Fujisaka, 1993; Tacio, 1993). However, still only limited assessments of the actual impact of this agroforestry practice on the local land-use systems have been reported. Perhaps this is because up till the present most agroforestry research has been directed towards the evaluation of the performance of agroforestry techniques under experimental conditions (Scherr & Müller, 1990) and towards the development of suitable methods for planning and designing agroforestry interventions (Budd et al., 1990; Müller & Scherr, 1990). Less attention has been given to on-farm assessment (Scherr & Müller, 1990; Scherr, 1991), although interesting results from farmer-participatory research on contour hedgerow cropping have been reported from Nigeria (Dvorák, 1991) and the Philippines (Fujisaka, 1989 & 1993). The evaluation of the impact of different agroforestry development efforts has also been neglected. Key questions in such impact studies are what new practices are being adopted, by whom, at what scale and for what reasons; and what is the socio-economic and ecological effect of the adoption of these new practices (Scherr & Müller, 1991). This article will address some of these questions, by presenting a case-study on about the reasons for adoption and the initial effect of the introduction of contour hedgerow intercropping on the Indonesian islands of Lombok and Sumbawa.

6.2. The *Leucaena*-based Farming Systems project on Lombok and Sumbawa

6.2.1 Geography

The Indonesian islands of Lombok and Sumbawa belong to the Smaller Sunda islands of Indonesia; they are located east of Java and Bali (Figure 6.1). Both islands are volcanic in

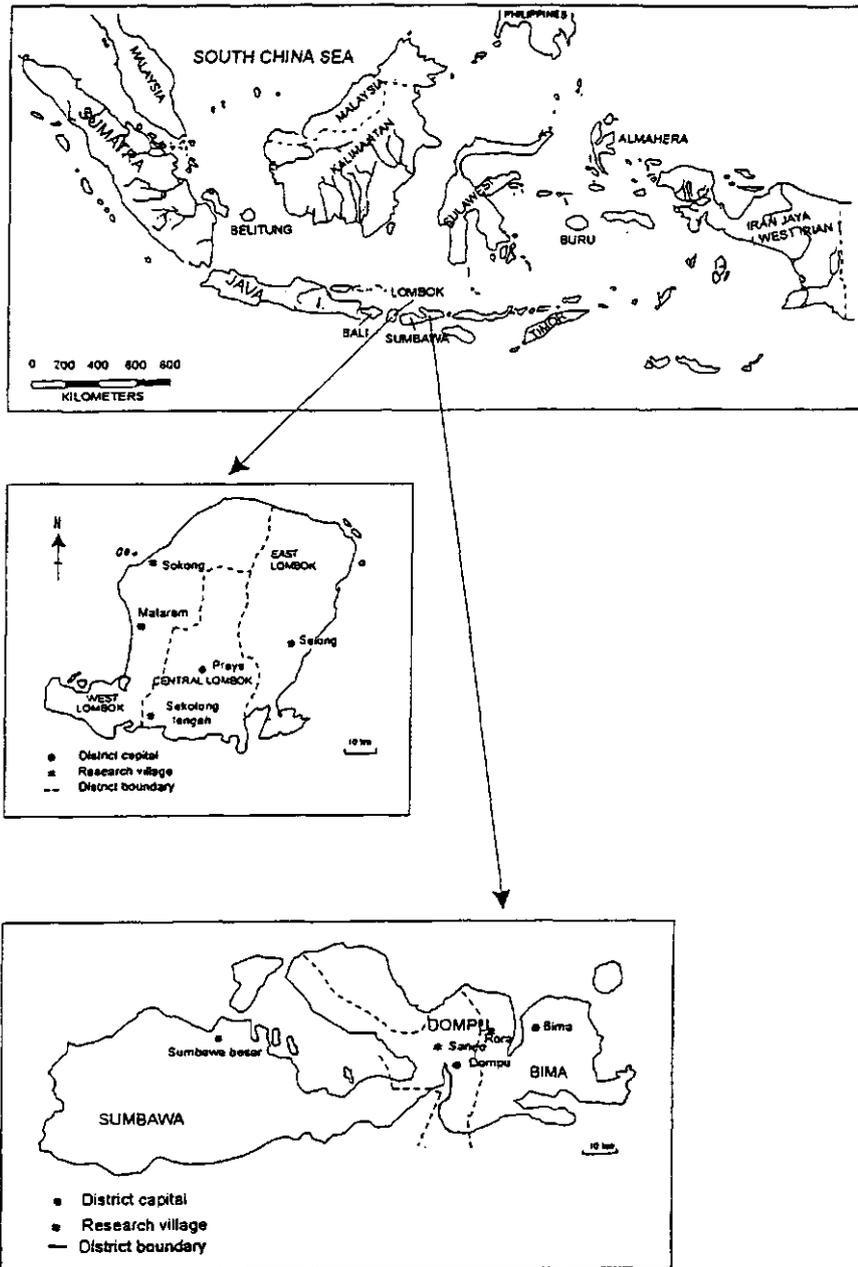


Figure 6.1 The location of the four research villages

origin. In the mountainous regions of the islands the soils are derived from volcanic parent material; in the lowlands soils developed on Tertiary and Quaternary sediments predominate. The rainfall on the islands varies between 1200 - 1400 mm/year at sea level to 2500 mm/year at higher elevations. On the drier eastern parts of the islands rainfall drops to 500 - 900 mm/year. The rainfall is seasonal with a distinct dry season of 4-6 months. The island of Lombok is much more densely populated than Sumbawa. In the early 1980s the average population density on Lombok was about 400 persons / sq.km. with local variations from less than 100 to around 2000 persons/sq.km. (Leeman & Röhl, 1985). While in the interior of Sumbawa population densities of 50 - 100 persons/sq.km. are still common (Dove, 1984).

Agriculture is the main economic activity on the islands. The proportion of the population with agriculture as their main occupation is about 60% on Lombok, and even higher on Sumbawa. Until a few decades ago slash and burn agriculture was the dominant agricultural practice (Goethals, 1967; Röhl & Leeman, 1983; Dove, 1984), although locally wet rice cultivation has developed where soil conditions are favourable and irrigation water is available (mainly in the coastal areas and in the central part of Lombok). In recent decades many shifting cultivation fields have been gradually converted to rainfed cultivation of foodcrops or perennial plantation crops (e.g. coconut, coffee) (Röhl & Leeman, 1983; Dove, 1984). On Sumbawa grasslands for hunting and grazing were traditionally also an important form of land use, accounting for about 17% of the total land (Dove, 1984). Shifting cultivation continues in some parts of the islands. In the early 1980s it was estimated that this type of agriculture still occurred in the extremenorthern and southern parts of Lombok, covering less than 10% of the land area (Röhl & Leeman, 1983). In Sumbawa the practice was still more widespread, covering about 36% of the total land area (Dove, 1984). As a result of the slash and burn agriculture large areas have become covered by degraded secondary vegetation consisting of *Imperata cylindrica* (alang-alang grass) and shrubs. Most of the shifting cultivation is currently limited to such areas (called *belukar*); it is prohibited in the forested regions. It is generally believed that the declining soil fertility and decreasing crop yields in the areas where shifting cultivation still prevails have caused farmers here to find it increasingly difficult to obtain an adequate standard of living from their farms.

6.2.2 Project history and organization

In 1983 the international development organization CARE in cooperation with the provincial government started a Leucaena-based Farming Systems (LFS) programme on Lombok and Sumbawa. This programme was identified in response to the findings of an earlier sanitation and local water supply project about the seriousness of the erosion problem in the project area. This land degradation was attributed to soil erosion and deforestation resulting from the slash and burn agriculture, and to the increasing pressure of the growing population on fragile land. The purpose of the LFS project was therefore to increase the standard of living of farmers in areas where the combined pressures of population increase and shifting cultivation had severely reduced soil fertility and crop yields. This was to be accomplished by introducing Leucaena hedgerow intercropping as a means to control erosion and enhance soil fertility, and thus increase crop production. It was decided to introduce this technique because of success of LFS

programmes on adjacent islands (Prussner, 1981). It was expected that the introduction of this agroforestry practice would have a positive impact on food production and thus on local livelihood conditions.

The LFS technique consists of the making of contour bunds at a vertical distance of about 0.5 - 1.5 m, and planting them with fast-growing varieties of *Leucaena leucocephala*. The contour lines are set out using an A-frame; along these contours a narrow ditch and a 50 cm high ridge are established. After the hedges are established on the ridges, they are coppiced every 3 - 5 months to provide mulch and green manure for the crops cultivated on the 3 - 10 m wide terraces. The combination of the contour bunds and mulching is intended to promote soil and water conservation and maintain soil fertility (CARE, 1985). The ditches and ridges need to be carefully maintained, especially if annual food crops are grown on the terraces.

In order to stimulate the adoption of the LFS technique the project employed a multi-method extension approach. The first step in this approach consisted of selecting and training pilot farmers who were willing to establish a demonstration field on their farm. In order to facilitate the training of these farmers, the second step consisted of forming groups from the farmers who had shown an interest in adopting the technique. This grouping was partly based on customary practices of joint farming. On Sumbawa, for example, where there are free-roaming livestock and feral animals (especially pigs), swiddens are clustered in units of contiguous fields enclosed by a common fence and guarded continuously (Dove, 1984); this can be accomplished most efficiently through communal action. Within each LFS farmer group a leader was selected for additional training on how to coordinate and guide the group's activities. This training included visits to other villages, even on adjacent islands, where the *Leucaena* contour hedgerow cropping practice has already been successfully introduced. These leaders were also responsible for distributing the seeds and seedlings provided by the project. In the first year, CARE also provided goats as an incentive to the LFS participants. However, this was discontinued after the first year, when it was realized that such incentives diverted the attention of participants away from the soil conservation focus.

From the outset response to the project was good. In the first year a total of 115 farmers from 8 villages participated and hedgerows were established on a total area of 18 ha. By 1985, 749 farmers from 10 villages had planted a total area of 245 ha, while by 1986 1275 farmers from 16 villages had planted 468 ha. This growth was much quicker than anticipated and it started to overstretch the resources of the project. Consequently it was decided not to expand further to new villages, but rather to stress further quality improvement in the existing project area. An important factor contributing to this decision was the fact that in 1986 the area had become infested with the *Leucaena* psyllid (*Heteropsylla cubana*). This forced the project to diversify its activities and modify the LFS technique. This was reflected in a change of project name to Dryland Farming Systems project.

6.3. Research methodology

6.3.1 Aim of the research

During 1985-1987 a study was carried out to appraise the initial impact of the introduction of the LFS technique under different farming conditions. Its objective was to assess why local farmers did or did not adopt this practice, and also how this technique affected local farming conditions. The following questions were posed:

- What are the major farming systems and livelihood strategies in the project villages?
- Which farmer categories are adopting the new technique?
- Why are these people adopting the technique?
- Where and in what form is the new technique applied?
- What is the effect of such adoption on the local farming systems?

6.3.2 Framework for research

As the study focused specifically on understanding the impact of the LFS technique at the farm level, no use could be made of the methodology for on-farm diagnostic research on the adoption and adaptation of contour hedgerow cropping at field level as used by Dvorák (1991) and Fujisaka (1993, 1994). Instead, the Farming Systems Research and Development methodology (e.g. Hildebrand, 1986) was used as a research framework. This methodology was originally developed in response to the need to design user-specific land-use practices. This research and development method tries to ascertain what the farmers are doing, and why. Appropriate measures for possible improvements are identified on basis of this knowledge. The major proposition of this methodology is that a farming system is considered as a holistic entity. The households are considered as the central units of decision making about the allocation of household production factors to various farming processes within the farming system, as well as to any available off-farm employment. The method recognizes the interdependencies and interrelationships between the natural and the human environment in farming. It also recognizes that a change in one of the individual production processes may affect the whole farming system. The analysis of the farming system involves the following:

- * Description of the setting of the household in respect to biophysical environment and demographic, cultural, socio-economic and political conditions; this setting is taken as an exogenous factor which the individual household cannot influence directly;
- * Evaluation of the availability of production factors land, labour, capital and management organization;
- * Description of the main production processes (crop production, animal production and off-farm employment);
- * Analysis of the decision making process in relation to land-use management, paying special attention to
 - allocation of the production factors to the various production processes
 - strategies for risk avoidance
 - the need for generating household income (cash production) versus the need for subsistence production.

Originally, in farming system analysis studies only the crop and animal production processes were considered; however, tree production processes can easily be integrated in the analytical framework. The Agroforestry Diagnosis and Design methodology (Raintree, 1987 & 1990) is based on this principle. When evaluating the relevance and development options for tree production processes in local farming systems, it is important to consider that trees may have a variety of functions within farmers' land-use systems. Tree production processes may serve either as an input for crop or animal production, or tree products may be used for household consumption or to generate income. But in addition, trees may also be grown in order to gain access to certain production factors. For instance, trees may be used to claim land and to delineate boundaries. Or they may function as a saving bank to be used in times of emergencies or social obligation.

When applying the farming systems approach to study tree growing by farmers, a proper identification needs to be made of the various land-use zones in which trees may be grown (Rocheleau, 1987; Persoon & Wiersum, 1991). Originally, farming systems research was limited to the study of privately owned farmland. But trees are not only grown on such land; farmers often use trees growing on communal or public land. Consequently, when analysing the role of forest resources at an household level, the analysis should not be limited to private farming systems, but should be extended to an evaluation of the use and management of all forest resources to which farm households have access. This means that the analysis should be extended from the farming system level to a land-use system level. The household's access to and use of all relevant tree resources should be taken into consideration, whether these resources are on private land, communal land or land control by the state. The decisions on the management practices and utilization rules of the latter two categories of land are taken not only at household level, but also at supra-household level. Thus, for proper understanding of the scope for tree growing by farmers, decision-making processes at both farm and community level should be considered. This is of particularly relevant when studying the mixed land tenure land-use systems (Grandin, 1989) common to various regions where agroforestry is promoted.

The Agroforestry Diagnosis and Design methodology was initially designed as a research and development methodology. But it has also been found to be applicable in extension projects (Raintree, 1990). In our research, we used the analytical concepts of the methodology as a basis for making an impact assessment.

6.3.3 Methods of data collection

The research was carried out in two phases. In the first phase during February - March 1985 a rapid appraisal was carried out in six project villages with the aim of obtaining agricultural and socio-economic information about the project sites and of making a preliminary evaluation of the results of introducing the LFS-technique (Van der Poel & Schinkel, 1985). During the second phase four hamlets were selected for more detailed studies of the local farming processes and of the factors that influenced the adoption of the LFS technique (De Wolf, 1988; Den Heyer & Van den Hombergh, 1990). These studies were carried out from January - March 1986 in the

Table 6.1 Land-use conditions in the 4 research hamlets

Hamlet	Altitude	Geomorphology	Soil conditions	Population density (pers/km ²)
Bengkoang (Lombok)	200 m	Undulating hills (slopes up to 40%)	Regosol (volcanic sands) badly eroded	200
Lemer (Lombok)	100 m	Moderately undulating (slopes up to 50%) limestone hills	Mainly luvisol, still relatively fertile	96
Padende (Sumbawa)	900 m	Rolling to steep (30-100%) slopes	Regosol, reasonably fertile	102
Pelita (Sumbawa)	350 m	Plateau with rolling relief, deeply incised rivers	Cambisol, reasonably fertile	47

hamlets Bengkoang (*kelurahan*¹ Sokong) and Lemer (*kelurahan* Sekotong tengah) in Lombok, and from August - November 1986 in Padende (*kelurahan* Rora) and Pelita II (*kelurahan* Saneo) in East Sumbawa (Figure 6.1). In all hamlets the first LFS activities started in 1984 and were extended in 1985. The main land-use conditions in each hamlet are summarized in Table 6.1. In each village a team of two students (one Indonesian and one Dutch) carried out the research. After becoming acquainted with the village, three categories of farmers were identified, i.e. poor, medium and rich. Ten respondents were chosen randomly from of each category: five were participants in the LFS project, the other five were non-participants. Comprehensive interviews were held with each respondent to obtain semi-quantitative and qualitative information about their farming system, access to resources, livelihood strategies, and motivation for participation or non-participation in the LFS project; this information was checked with field observations. In addition, background information was collected from local informants, project staff and village administration and by participant observations while living in the village. Further details are given in De Wolf (1988) and Den Heyer & Van den Hombergh (1990).

¹ A *kelurahan* is the smallest Indonesian administrative unit

The hamlet Pelita (Sumbawa) is situated in an area which used to be one of the main rice-producing areas of the local sultanates. However, after Indonesian independence the area became a centre of cattle thieves. The government tried to gain control over the area by designating the *kelurahan* Saneo as a site for local transmigration and by appointing an army officer as village headman. The hamlet of Pelita 2 was established in 1969 as one of the transmigrant hamlets. The inhabitants originate from the Maria subdistrict in East Sumbawa, where they were already familiar with irrigation and with upland cultivation. The first objective of these migrants was to open up new irrigated fields in Pelita; yearly this area was extended by about 500-1000 m² per family. In order to cover their subsistence needs during this establishment period they also practised shifting cultivation on the reasonably fertile upland soils. However, most of the farmers stopped such shifting cultivation after they had opened up enough irrigated fields to cover their subsistence needs. Only young farmers who do not yet own irrigated fields still depend on shifting cultivation. Some other farmers still continue to use it to obtain an additional income or to maintain their claim on former fields. Cash needs are mainly met by collecting and selling timber from adjacent forest areas.

From the foregoing description it can be concluded that the four hamlets studied differ in physical and in socio-economic aspects. Bengkoang and Padende are relatively long established hamlets with a medium (Padende) to high (Bengkoang) population density; average farm size is 2.8 and 2.5 ha respectively. In contrast, Lemer and Pelita have only recently been established or become accessible. In these two villages the population density is still low (Pelita) to medium (Lemer), but the average landholdings are relatively small (1.5 and 1.8 ha)². In Lombok most land ownership is regulated by state law and has obtained a commercial value (Leeman & Röhl, 1985). This is reflected in the fact that in Bengkoang and Lemer respectively 28% and 31% of the households are landless. In Sumbawa many of the customary local land tenure regulations still prevail, and the land in the research villages has not yet been commercialized to the same extent as in Lombok. Consequently, there are hardly any landless households here. The land-use systems in the hamlets are in various stages of transition from shifting to permanent cultivation and in the degree of incorporation in the market economy. In Bengkoang cash-cropping with coconuts is dominant and there is no shifting cultivation. In this village off-farm employment is an important component of the livelihood strategies and provides 30 - 65% of all household income (Table 6.3). The differences in income in this village are much larger than in the other three villages, where semi-permanent upland cultivation with a grass-fallow period of 1 - 3 years prevails. In Pelita such shifting cultivation is mainly a form of temporary land use during the process of extending irrigated fields. Because this hamlet was settled only recently, agriculture is still expanding and household income is low (Table 6.3). In this village off-farm employment is also important, but in contrast to Bengkoang these off-farm activities do not involve wage labour, but rather the collection and sale of forest products. The socio-economic situation in Lemer and Padende is intermediate between Bengkoang and Pelita (Table 6.3). Farming is the

² In a study of 16 Lombok villages Leeman & Röhl (1985) found mean landholdings of 0.6 to 1.0 ha. The larger size of holdings in the research area reflects the marginal position of these villages in relation to the more fertile irrigated rice areas in central Lombok.

Table 6.3 Average household production income (x 1000 Rp) in the 4 research hamlets

Hamlet		Poor	Medium	Rich
Lemer	agricultural products	250	300	690
	off-farm	30 (11%)	80 (21%)	110 (14%)
Bengkoang	agricultural products	105*	490*	1880*
	off-farm	200 (66%)	225 (31%)	1465 (44%)
Padende	agricultural products	225	460	535
	off-farm	65 (22%)	25 (5%)	25 (4%)
Pelita	agricultural products	115	230	380
	off-farm	85 (42%)	75 (25%)	30 (7%)

* large fluctuations due to variations in coconut prices

Table 6.4 Main livelihood strategies in the 4 research hamlets

Hamlet	Poor farmers	Medium/rich farmers
Bengkoang	Food crop & limited coconut growing, low quality off-farm employment, wage labour.	Cash crop production, little additional food cropping, off-farm employment, partly absentee landlords.
Lemer	Upland cultivation, wood & grass collection,	Irrigated & upland cultivation, livestock, trade, recently also perennial cash cropping.
Padende	Upland cultivation, wood cutting & trade.	Irrigated & upland cultivation, investment in perennial cash cropping, limited woodcutting & trade.
Pelita	Mainly upland cultivation, establishing additional irrigated fields, wood cutting & trade.	Establishing irrigated rice fields, temporary upland cultivation, wood cutting & trade.

major activity in these villages. The semi-permanent upland cultivation is gradually being replaced by permanent rainfed or perennial crop cultivation. These local conditions are reflected in the livelihood strategies of the different socio-economic categories of the inhabitants of the four hamlets (Table 6.4).

6.4.2 Adoption of LFS technology

Notwithstanding the differences between the four study hamlets, the introduction of the LFS system has met with reasonable success in all of them. As the project's activities were not of the same intensity in the hamlets, no unambiguous differences in adoption rates of the LFS technique between them could be ascertained. But there was a differential rate of adoption between various categories of farmers. As illustrated by the example from Lemer (Table 6.5) medium and rich farmers tended to be more engaged with this technique than poor farmers. This seems logical, as wealthier farmers generally have better access to the necessary land, labour and capital resources to apply this practice than poor farmers. It was interesting to observe, however, that both in Bengkoang and Lemer several landless farmers who share-cropped or rented lands had adopted the LFS practice. This finding indicate that under the local land tenure conditions access to land is not a major constraint on adopting the technique. The main reason for adopting the technique was the expectation that within the scope of a farmer's livelihood strategies it would increase agricultural production and income. The magnitude of this increase could not be measured, because it was too soon after the recent introduction of the LFS practice. Nonetheless, it was clear that as a result of the project extension activities (which included visits to neighbouring islands where the LFS practice has already been practised since the 1970s) farmers

Table 6.5 Participation in LFS project in Lemer

	Percent of total population	Percent of LFS participants
Farmer category		
Landless	31	11
Poor	18	5
Medium	47	74
Rich	4	11
Area cultivated		
0 - 0.5 ha	24	21
0.5 - 1.0	41	21
over 1.0	35	58

generally expected positive results. However, such a positive result is more easily obtained by the richer farmers than by poor farmers. Many of the richer farmers had enough land to secure their subsistence food supplies and could afford a temporary decrease in production while establishing the contour bunds and hedgerows. Furthermore, these farmers could also afford the extra labour inputs for this technology: 250-310 mandays/ha (depending on whether one or two crops are cultivated) versus 160 mandays/ha for irrigated rice fields and 180-240 mandays/ha for traditional upland cultivation.

A second reason why the richer farmers found it profitable to adopt the LFS technique was the possibility of adapting this practice to cash crop cultivation. As indicated by the village descriptions, in many areas there was already a tendency for semi-permanent upland cultivation to be gradually transformed to perennial cash crop cultivation. Farmers with a secure staple food production from irrigated rice fields often considered that the relatively high labour inputs for establishing the hedgerow contours were a more lucrative investment for cultivating perennial cash crops than for cultivating annual food crops. In fact, the LFS technique can easily be adapted to such cultivation by managing the hedgerows not primarily as a green manure crop but as nurse and shade trees for perennial crops such as coffee (Table 6.6). A similar transformation of a *Leucaena*-based maize cropping system to a perennial cropping system with

Table 6.6 Perennial crops present on 25 LFS plots in Padende

	Total no. of plots where present	Mean no. of plants per plot
Traditional crops		
Guava (<i>Psidium guajava</i>)	12	23
Banana (<i>Musa paradisiaca</i>)	11	27 (groups)
Jackfruit (<i>Artocarpus integra</i>)	5	3
Kemiri (<i>Aleuritis moluccana</i>)	4	4
Bamboo spp	4	3 (groups)
Aren palm (<i>Arenga pinnata</i>)	3	20
New cash crops		
Coffee (<i>Coffea</i> sp)	17	34
Coconut (<i>Cocos nucifera</i>)	9	14
Clove (<i>Syzygium aromaticum</i>)	5	13
Pepper (<i>Piper nigrum</i>)	3	24

Leucaena shade trees has been reported from the Indonesian island of Timor (Jones, 1983). This option had not been originally envisaged by the project and the response to such farmer adaptation was at first rather ambivalent. On the one hand the project recognized that such perennial crop cultivation involved an important improvement in land use. But on the other hand, the project staff were unsure whether they should stimulate such development by responding to farmers' requests for seedlings of these crops. Furthermore, the much more positive effects of such perennial crops on controlling erosion in comparison to annual food crop cultivation were not directly appreciated by the project. Several extension agents continued to stress the importance of maintaining the contour ridges even after the combination of perennial crops, shade trees and associated herb layer effectively controlled all erosion.

In addition to these expectations about the effect of adopting the LFS technique on crop productivity, there were other reasons why farmers participated in the LFS programme. Both in Padende and Pelita some LFS sites were on lands that had previously been owned by the state; on these lands there were no clearly established traditional rights of land ownership. Under Indonesian law, if farmers can prove that they have been cultivating such land for three years, they can be given legal title to the land. However, the administrative procedure involved is cumbersome (Röll & Leeman, 1983). Consequently, several farmers found it attractive to participate in the LFS programme as a means to claim lands in these newly opened-up areas.

A similar situation existed in Lemer. In this hamlet newly arrived migrants could establish legal rights to land which had been reserved for the transmigrants. Furthermore, several farmers expected that by adopting the LFS technique, they might also become eligible for additional support from CARE. This attitude was stimulated by the fact that during the first year CARE supplied goats as an incentive; in later years several farmers requested CARE to supply seedlings of perennial crops. A third non-technical reason for adopting the practice was the fact that participation in the CARE project could mean added prestige for a local farmer, especially if he was selected as a leader of a local farmer group. Further evidence that the adoption of the practice was partly based on social considerations is the finding, that several farmers participated in order to show their allegiance to their relatives and/or local farming institutions, or to comply with the wishes of local authorities. Especially on the island of Sumbawa upland cultivation can only proceed as a group activity, as it is not efficient to protect individual fields against crop-damaging wildlife. Under such conditions participation sometimes ensued as a result of processes of social control. The formation of the farmer groups involved similar processes of social networking.

6.4.3 Effect of introduction on farming conditions

The research was carried out too soon after the introduction of the LFS programme to be able to assess the programme's full impact on land-use and socio-economic conditions. For instance, it was still too early to measure exactly its effect on increasing crop yields and improving farmers' livelihood conditions. Nonetheless, several potentially significant socio-economic effects were identified. As indicated by the different reasons why various farmer categories adopted the technology, it is clear that it fitted well within the ongoing process of rural transformations. On

the one hand, an increased incorporation in the market economy was going on in the research area, and concomitantly farming was being extended to newly opened-up areas. Because it is versatile, the LFS practice could be incorporated in both trends. Thus, rather than being considered as a stabilizing factor in land use, the technique should be considered as a factor contributing to the ongoing process of land-use development and diversification.

The introduction of LFS had a differential effect on various farmer categories. In villages in which legal rights to land had not yet been fully established, the introduction of this new technique created an opportunity to claim land legally and sometimes even to extend the farming area. The improved access to information and to project or government officials enabled the richer farmers to exploit this opportunity to secure land rights. These farmers were also in a better position to adopt the LFS practice, as they could afford the necessary labour investments as well as investments in the more lucrative cash crop growing on the terraced land. Consequently, if not well controlled, the introduction of the LFS technique may create a more unequal land and income distribution. Such a process has already taken place in the irrigated rice areas in Lombok (Leeman & Röhl, 1985).

Several interesting conclusions could also be drawn about the effect of the introduction of the LFS practice on land-use conditions. It not only affected upland cultivation processes, but in some cases it also affected other components of the farming systems. For instance, in Pelita the changes in labour allocation to various farming activities delayed the extension of more productive irrigated fields. Furthermore, it was found that on the island of Sumbawa the introduction depended on the presence of local agreements on land-use zoning. In order to protect fields effectively against livestock and feral pigs, the fields had to be clustered in blocks surrounded by a protective fence. Thus, the success of the introduction depended not only on the willingness of individual households to adopt this practice, but also on their willingness to participate in planning and implementing communal land-use activities. A similar relation between effective decision-making in respect to land-use zoning and the introduction of Leucaena-based cropping systems has been noted on Timor island (Metzner, 1983).

6.5. Conclusion

As indicated by the results of our study, the results of the introduction of the LFS technique may be characterized by two related features: heterogeneity and discontinuity. Originally, the introduction of the LFS technique was based on the assumption that the combined pressure of population increase and shifting cultivation severely reduced soil fertility and crop yields. It was expected that these problems could be overcome by the introduction of an 'off the shelf' agroforestry technique (*sensu* Scherr & Muller, 1990) of proven viability. However, in reality the agricultural situation in the project is much more complex and dynamic. Irrigated rice cultivation and smallholder cash crop plantations occur in addition to shifting cultivation; in several places shifting cultivation is gradually being transformed to such cropping practices. Furthermore, there are important differences between various villages in respect to degree of

privatization of land and incorporation in the market economy. In addition to this regional heterogeneity there are also important differences between various categories of farmers in respect to access to resources and livelihood strategies.

Although the land-use and farming conditions were much more heterogeneous than anticipated by the project, the introduction of the Leucaena farming system was reasonably successful. This was partly because the LFS technique is versatile and can be adjusted to different purposes: Leucaena growing could be used not only as a means to improve staple food production, but could also be adapted to cash-crop cultivation or used to claim land ownership. But in some cases the introduction of the LFS technique delayed increased production of staple food crops, as its introduction competed with the extension of the more productive irrigated rice fields. And poor farmers who rely on dry field cultivation for food production could not afford to adopt the technique because it required too much labour input. Such aspects had not been originally anticipated by the project. Thus, rather than being an 'off the shelf' technique as originally presumed by the project, the LFS technique proved to be a 'prototype' technique (Scherr & Müller, 1990) lacking precise information on its appropriateness under different conditions, and needing further adaptation to the variety in land-use conditions. Farmer adaptations of contour hedgerow intercropping have also been reported from the Philippines (Fujisaka, 1993; Fujisaka et al., 1994). The need for further adaptation of the LFS practice was also clearly indicated by the unexpected Leucaena psyllid attack. After this attack, the project tried to modify the technique by incorporating alternative tree species (e.g. *Gliricidia sepium*, *Calliandra calothyrsus*) and grass species (c.f. Rourke & Suardika, 1990).

Thus the initial success of the introduction of the LFS technique was only partially based on the soundness of the initial assumptions of the project. The farmers' ability to adapt this technique to their specific farming conditions was at least as important. Although the project had not seriously considered the effects of heterogeneity of land use and socio-economic conditions on the adoption of the LFS technique, the results of the adoption studies and corroborative evidence from internal project evaluations were readily incorporated in the project's activities. The change in the project's activities, which occurred after 1987 not only involved a diversification in respect to the choice of hedgerow species, but also a change in extension from a technical change to a target group approach. This latter approach gives specific attention to adjusting interventions to particular problems of different categories of farmers as well as to the opportunity to react positively to farmer adaptation of the introduced technique.

These findings indicate that the agroforestry interventions may take a different form than that expected from a process of linear transfer of an innovative technique developed on research stations to 'local beneficiaries'. They demonstrate that in the process of extension significant discontinuities may occur between the project intentions of stimulating a certain agroforestry practice and the farmers' objectives for adopting it, and also between the proposed techniques and the techniques actually applied. The presence of such discontinuities in the adoption of land-use interventions is increasingly being recognized (Long & Van Der Ploeg, 1989; Lekanne dit Deprez & Wiersum, 1995). It may be hypothesized that such discontinuities are especially likely

to occur in the development of agroforestry. As our findings indicate, there are three reasons why this can be expected. In the first place, many agroforestry extension projects are located in regions characterized by pluriform tenure conditions and intense socio-institutional dynamics. In the second place, because of their multiple-purpose character, trees may be grown for many reasons: they may be planted and tended for productive or ecological benefits, but also as a means to gain access to new production factors such as land or credit, or as a means to demonstrate a farmer's allegiance to social networks or political ideologies. In the third place, many agroforestry techniques have not yet been fully developed into an 'off the shelf' technique, but rather are still of an prototype or even experimental character. Given this situation of a prototype, multipurpose technique and pluriform land-use conditions, it is more likely that differences in respect to perspectives on land-use developments will occur between farmers and project personnel, than is the case when scientifically scrutinized, monofunctional land-use techniques are applied on private land with undisputed ownership.

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Chapter 7

THE FORESTRY AGENT AT THE INTERFACE BETWEEN LOCAL-LEVEL ENVIRONMENTAL MANAGEMENT AND EXTERNAL POLICIES: REFLECTIONS ON FORESTRY INTERVENTIONS IN THE SAHEL

K.F. Wiersum & B.E.J.C. Lekanne dit Deprez, 1995. The forestry agent at the interface between local-level environmental management and external policies: reflections on forestry interventions in the Sahel. In: J.P.M. van der Breemer, C.A. Drijver & L.B. Venema (eds), Local resource management in Africa. John Wiley & Sons, Chichester, UK, p. 229-242.

Abstract

During the last decade, forestry development interventions in the Sahel have changed considerably in scope from the establishment of woodlots to stimulation of a divers package of forest/tree management practices within the framework of an integrated "aménagement et gestion du terroir villageois". The experiences obtained can serve as a good object for analyzing local-level environmental management in the national context. This paper explores the position of forestry agents as operators at the interface of the local management systems and the supra-local policy level. Such interface situations are critical points at which state development efforts are applied and reshaped into new social meanings. Interface analyses explore the discontinuities resulting from the interactions of different actor groups rather than assuming a linear translation of policy to implementation. The paper describes the various conflicting values of the pluriform social environment in which the Sahelian forestry agent has to work and explores how the agents tend to operate under these conditions. From these observations conclusions are drawn about neglected issues in studying the complex of local and external factors which influence the success of local-level environmental projects.

7.1. Introduction

During the last decade, forestry development interventions in the Sahel have changed considerably in scope from the establishment of woodlots to the stimulation of a diversified package of forest/tree management practices within the framework of integrated environmental management at village level (*aménagement et gestion du terroir villageois*) (Rochette, 1989; Sumberg & Burke, 1991; Bognetteau-Verlinden, 1992). The experiences in forestry development gained in the Sahel during the last decade can therefore serve as a good object for study when analyzing local-level environmental management in the national context. One promising approach for studying the relation between local-level and external factors on the success of environmental management at village level is to focus attention on the interface where government and other development organizations intervene in order to implement a specific environmental development policy. Such development interface situations are critical points at which state development efforts are applied and reshaped into new social meanings by the interpretation and strategies of local actors (Long, 1989).

In forestry development the interface is typically represented by the forestry agent; he (almost never she) is the representative of the national forestry service who has to operate at village level. He has to deal with both official policies and the social meaning which these policies acquire at the local level. In this paper we will argue that by studying the role and behaviour of forestry agents, valuable lessons can be learned about the interaction of local and national factors on the results of local-level environmental projects and about the scope for external steering with respect to local-level management of natural resources. Unfortunately, hardly any such studies have yet been undertaken¹ and only limited empirical information about the "interface role" of forestry agents is available. The paper will therefore be of an exploratory character with the purpose of demonstrating the potential significance of such an approach. First, several theoretical considerations on the position of forestry agents in the planning and implementation of development interventions will be given. The pluralist nature of the social environment in which forestry agents have to operate will then be described along with the way forestry agents tend to operate under these conditions. Finally, from these discussions conclusions will be drawn about neglected issues in studying the complex of local and external factors which influence the success of local environmental projects.

7.2. Theoretical considerations on the position of field agents in the implementation of development interventions

The functioning of a government agency vis-à-vis the rural population is often viewed in essentially unilinear terms, as the policy making, the information stream and the transfer of incentives is conceptualized as going from the national level through several geographic-administrative echelons to the villages. Applied to the forestry service, the local forestry

¹ In Europe and North America, too, only limited attention has been given to the actual behaviour of field-level personnel of forestry services. Only two major studies on this subject have been published: Kaufman (1960) and Heeg (1973). An interesting example of the position and behaviour of forestry agents in Indonesia is given by Peluso (1992).

agent is then perceived as the link *par excellence* between the service and the local population. Villagers may even be considered as virtually the lowest echelons of the organization, where they are deemed to carry out the instructions of the service. The French tradition in West-Africa has coined this notion with the untranslatable term *encadrement*.

Increasingly, the idea is gaining ground in Sahelian countries that the people must themselves participate in the process of forestry development. This should take place through the forestry field agent, who is to convey local information and identify the needs of the population "upwards" within the service. Ideally, a kind of two-way communication model should become solidly rooted in the service. In both presentations the position of the forestry agent is not considered problematic. He is, as it were, the final implementor of the policy of the forestry service, whether in co-operation with the local population or not.

It is, however, questionable whether these notions do justice to the reality of the position of the forestry agent and therefore to the problematic of the steering capacity of the forestry service with respect to the management of natural resources. To answer this question, we may compare two very differing ways of approaching the study of a government organization such as the forestry service (see e.g. Lammers 1983). The first approach sees the forestry service as a coherent organizational system. In doing so, the observer's attention is then focused on looking at the organization as a whole, and on considering that whole as a social-cultural system. This type of analysis is characterized by keywords such as objectives, values, common culture, authority, consultation, cooperation, solidarity, etc. The jargon of the well-known project cycle in development activities (identification, formulation, operationalization, implementation, monitoring, evaluation) also reflects the same vision.

A very different approach sees a government agency as a conglomeration of several parties that pursue their own interests and "projects". This type of analysis works with a different set of keywords, such as competition, protection of interests, conflict, power, coalitions, negotiation, informal relationships, incentives, compromises, coercion, arena, market.

In the official circuit of development programmes, and at the top level of a government agency, one's own organization tends to be seen as a coherent system. The forestry services in Sahelian countries are no exception to this rule, and the forestry agent is the taken-for-granted, matter-of-fact link with the local population. It is precisely this ideological domination in organizations towards thinking in terms of a system that makes the alternative way of analysis fertile, leading, at least, to supplementary insights. However, for the researcher it is a very laborious route paved with difficulties, for the very reason that the organization itself and its subdivisions become the central object of study. Attention is then focused not so much on linear continuities - so eagerly presented as the real core and practice of intervention programmes - as on the discontinuities resulting from the interactions of the different parties involved. In West-Africa this type of research is labelled *delicat* (tricky), and it is no surprise that hardly anything in the scientific literature is to be found in this field. A proposal by one of the authors to carry out such research in a forestry development project in Mali was prohibited, on the argument that it was too sensitive. A staff member in one of the provincial forestry services in Burkina Faso confided that a study of the informal networks that forestry agents use in carrying out their tasks - should it ever be

proposed! - would be entirely unacceptable to the managers. And in discussions we had with the staff of a forestry development project about the development of an *étude de milieu* to be carried out by forestry agents as a means to implement their tasks at village level more effectively, it appeared that there was no interest in understanding the working environment of the forestry agent; its problematic nature was simply denied. This lack of interest in the working environment of forestry agents contrasts with the generally accepted need to carry out research among the local population. As a rule, such research is liberally permitted in development projects, because the population is what is called the target group, once again an everyday password in the glossary of system thinking. Also Dove (1992), referring to Pakistan, notes that sociological research, directed towards the role and behaviour of foresters instead of local villagers is a neglected field.

In fact, the actor-oriented approach advocated here will put less emphasis on the forestry agent in his capacity as implementor of the policies of the forestry service - including the donor-sponsored projects as part of this interventionist scene - and more on the problematic aspects of his job and life environment. This problematic aspect is connected to what in development sociology is called the interface, defined as "a critical point of intersection or linkage between different social systems, fields of social order where structural discontinuities, based upon differences of normative value and social interest, are most likely to be found (Long, 1989). This field of interaction of the forestry agent is to be seen as an arena. In this arena the position of the forestry agent as a "party" inside the forestry service, his own life world (i.e. the personal domain of the forestry agent), and the realities of the local population confront one another. The arena of interactions is often of a conflictive nature. Interfaces reflect differing and often conflicting life worlds (Long 1989; Arce & Long, 1992). In fact, Bryant & White (1982) characterize the environment of the local agent vis-à-vis the local population in terms of a hostile territory and fraught with problems.

That the position of a forestry agent can indeed be problematic, has been demonstrated by Peluso (1986) for Indonesia. She describes how forestry agents are caught between two conflicting pressures, the interests of the forestry department - a bureaucratic state institution based on an enduring ideology of state stewardship over forest resources - and those of the local villagers with an enduring ideology of autonomy. As a result of these conflicting life worlds there are different forms of relations between the villagers and forestry agents, with two types of local perceptions of such agents (Peluso, 1986):

- * A congenial, truce-making viewpoint, with forestry agents considered an inevitable, although sometimes amiable, obstacles to acknowledged illegal activities;
- * A confrontational point of view, in which all forestry personnel are considered as enemies, blocking the villagers access to resources to which they claim traditional or subsistence rights.

The significance of the personal domain of the forestry agent in respect to the outcome of such a confrontation should not be underestimated. As demonstrated by Price (1975) and Arce & Long (1992) kinship ties or political connections may leave their mark on the job performance of civil servants and field-level implementors of development projects. In fact, Peluso (1992) gives a description of forestry agents as modern patrons in Indonesia.

It may be evident that according to the interface approach the local population is perceived as having a world of its own, with its own values, interests and frames of reference, a world equally endowed with a diversity of interests and differential responses to external influences. These worldviews are unlikely to fundamentally coincide with the world of the field agent or the service. This approach therefore provides at least some correction to the linear model of policy-making and policy implementation in forestry development and to the management of natural resources. In this linear model the "target group" is incorporated, as it were, as a mere continuation of the organization to be modelled through extension, consciousness-raising (*sensibilisation*) and manipulation (not to speak of compulsion). But out of an arena of interface encounters, well-intended interventions may take a very different shape to those which might be expected from linear translations of policy to implementation (see e.g. Long & Van der Ploeg, 1989).

The above considerations are largely of a theoretical nature, but there also are practical reasons for demanding more specific research on the functioning of forestry agents and their strategic importance for the success of development programmes and the management of natural resources.

The local population in francophone West-Africa enjoys, in common with the majority of farmers in developing countries, precious little access to decision-making and resource control. As a result, the manifestation of their interests and the crystallization of their strategies occur to a large extent at the output stage of intervention programmes (see Grindle 1980). Rural producers, being no puppets-on-a-string, find the implementation phase particularly suited to reorienting state policies to their own needs. They therefore focus their efforts on agents in order to influence the direct outcomes of policies in terms of allocation and conditions. Looked at from their point of view, it is entirely rational to try to "participate" at the local level in this way, and to try to provide for their interests. This participation may take the form of conscious withdrawal or sheer ritual acceptance, phenomena that are widely known in the implementation of many a forestry intervention in Sahelian countries. For instance, in several cases it has been shown that local villagers were not so much participating in reforestation projects because they expected to receive productive or ecological benefits from these new plantations, but rather as a means to gain access to new production factors such as land or credit, or as a means to demonstrate their allegiance to social networks or political ideologies (Van der Breemer et al., 1993; Haberland, 1993; Wiersum, 1993). And so the implementation phase is the principal arena of interaction between agency and clients, mediated by the forestry agent, where policies are adjusted to the realities of the local situation, and where *de facto* the relations between state and rural producers can be redefined. In a detailed study on the interface between bureaucrats and rural people in Western Mexico, Arce (1993) positions the fieldworker as "a manipulator of circumstances, rather than a controller of standardized agricultural services".

In addition, there is another very practical reason for demanding that specific attention be given to local forestry agents. Over the past decade, forestry services in Sahelian countries have become more involved in development-oriented tasks in the village communities than those related simply to control the proper implementation of state rules on forest resource use. Consequently, more is expected of the quality of the job performance of forestry agents.

For example, in some countries, expectations have been raised that he will give adequate training to the so-called "*paysans forestiers*" (Scholten, 1993) in the villages, and will contribute actively in village-level diagnosis and planning exercises (*étude de milieu*) (Ho, 1990). For an overview of the diversity of expected tasks and activities see Bloemberg (1989). Still, all of these activities are primarily directed at improving his abilities to provide villagers with knowledge on planning and implementation of improved resource management practices. However, hardly any attention has as yet been given to improving his skills with respect to negotiating new local rules and regulations on controlled utilization of forest resources. More attention should be given to the question whether such complex skills may possibly exceed the expertise of the forestry agent, who is primarily appointed to exercise supervision and loyal compliance with the forestry code and to implement a limited number of technical activities. Indeed, in Burkina Faso it was observed that even the presently required technical knowledge of the agents is suboptimal (Bloemberg, 1989).

7.3. The pluriform social environment of forestry agents

The identification of the forestry agent as operating at the interface of the national context and local level interests implies that these persons are operating in a dualistic social environment: the meeting point of local village environment and government institutions. But when looked at more closely, it appears that the position of the forestry agent is characterized by an even greater degree of social pluralism; he is acting in a social environment with several conflicting value systems, which include the following (partly overlapping) dimensions:

- the multiple objectives of forestry policies
- diversity in formal and informal forest utilisation
- a diversity of knowledge systems
- legal pluralism.

The conflicting value systems to which a forestry agent is exposed starts within the forestry service itself, with a set of values that revolve around the dimension of forestry policies and their objectives. In all Sahelian countries, forestry policies are historically based on the principle that sustained forest protection can only be ensured by state control, and that it is the task of the forestry service to ensure proper protection and exploitation of forest resources (Bellouard, 1955). This principle has resulted in the issuing of state permits for the major forms of forest exploitation, and to police-style enforcement of control measures that relate to forest protection and the proper extraction of major forest products. According to the traditional job interpretation, forestry agents have to ensure that only allowable quantities and qualities of wood are taken from the forests. But agents have no distributive responsibility for ensuring that specifically identified categories of the population have proper access to these resources (as elaborated in the case of Indonesia by Peluso, 1992).

For the last decade, an additional policy principle has been introduced for the activities of the forestry service: they are also to stimulate activities among local villagers with respect to the regeneration, protection and proper utilization of forest resources for their own needs (Bertrand, 1985; Lekanne dit Deprez, 1989). Little effort has yet been made to assess, in a

systematic and comparative way, the precise relationship between these new and conventional policy objectives, and to resolve the various discrepancies between them. Most donor-sponsored forestry development projects are inclined to pay greater attention to the development dimensions of the new forestry policies, while disregarding the conventional, and often disdained, policing tasks of the forestry services. In some cases, specific project personnel were employed who actually fell outside the forestry service hierarchy. Although such an approach may be defended for experimental purposes in a somewhat simplified social setting, the approach does not contribute to finding solutions for the proper operationalization of the multiple objectives of forestry policies and the proper integration of development issues and control and rule enforcement in a coherent management strategy (Lekanne dit Deprez, 1989). As a consequence, in practice, it is left to the forestry agent to actually operationalize the multiple objectives for forestry development and to reconcile the various values underlying the different objectives in forest policy.

Although often not explicitly stated, in most Sahelian countries the forest service has yet another role: to act as revenue earner. Such revenues may be collected either through the selling of exploitation licenses or by levying fines on offenders against forestry regulations. In most Sahelian countries this last form of revenue earning is quite important. It is the levying of fines, sometimes indiscriminately or arbitrarily, that has caused the policing activities of forestry service personnel to be so often perceived as repressive. In many community forestry development projects, the task of having to collect revenues by selling exploitation permits and levying fines for the illegal exploitation of forests may be temporarily suspended, provided that the donors supply the required revenues. But several recent examples indicate that this task emerges again as soon as the forestry service is expected to become 'self-reliant' and operate without donor assistance.

Within the forestry service, a second set of ambiguous values can be distinguished, revolving around the principle of multiple use. Most forest policies are based on this principle: forests can provide a wide variety of products and environmental services, and forest management should aim to provide a proper mix of these products and services. In practice, however, when laying down management activities, not all products are given equal consideration. Often, a more or less explicit distinction is made between formal forest utilization practices, which are under the control of the forestry service, and informal use, which is not under their control (Peluso, 1986). Such informal use often concerns so-called 'minor' forest products, which are collected in small quantities, or collection of which is difficult for the forestry service to administer. Often, however, these products may have a great (subsistence) value for the local people. For example, in most Sahelian countries, the collection of dead firewood, medicinal products and fruits or the grazing of livestock in forests is often officially allowed. But these activities do not involve official permits as in the case of timber harvesting or land reclamation. Once again, it is the forestry agents who are confronted with the practical consequences of the lack of coherence in addressing these different forms of forest utilization.

The different value systems implied by the terms "formal" and "informal" forest utilization are closely related to a third dimension of the social environment in which a forestry agent operates, i.e. the diversity of knowledge systems relating to forest management. The formal

management activities of the forestry services are considered to be based on "scientific" principles, which are essential to the rationalization of forest management. As demonstrated by the lack of consideration to informal forest utilization, the knowledge embedded in these scientific principles does not include all forms of forest utilization. But in the efforts of the service to stimulate improved management practices, little consideration is given to the presence of various indigenous methods for utilizing and managing local forest and tree resources. A wide diversity in such indigenous management systems can be found in the Sahel, ranging from private tree management practices on agricultural land, to group management practices on silvopastoral lands. The characteristics of these indigenous management systems and those of state forest management systems show several contrasts with regard to management objectives, the technical activities carried out, and organizational frameworks (Wiersum, 1993). Being a professional who bases his activities on "scientific" knowledge, the forestry agent is often not provided with sufficient subject knowledge and technical equipment to help villagers adapt prevailing indigenous management systems to present rural conditions.

The existence of indigenous management institutions for managing woody biomass resources is an example of the fourth dimension of the pluriform social environment in which the forestry agent is operating, i.e. the pluriform legal situation (Von Benda Beckmann, 1991). Historically, state control over forest resources brought with it the restriction or suspension of the traditional forest utilization rights of local villagers, because these were considered inconsistent with professional management criteria. Also, a list of protected tree species was drawn up. Such trees were not allowed to be cut without the permission of the forestry service, even if they were growing on farmers' croplands. Although the wisdom of this forest legislation (coupled with the police-style enforcement discussed above) has long been questioned (Lai & Khan, 1986; Lawry, 1988; Thomson, 1988), only in Senegal is real development taking place in formulating a more progressive legislation which allows for village-level forest management (Elbow & Rochegude, 1990).

However, the laws and regulations generated and maintained by state agencies are only one of the legal systems which exist at village level. In addition, certain of the rules and regulations which have been generated in the tribal and/or village context are to some extent still maintained. Especially with respect to local rights of access, the ownership and utilization of land and trees, the situation is often complex (Fortman, 1985; Bertrand, 1991). A variety of institutions (e.g. tribal regulations, Islamic law, state law) exist which influence the formulation and control of forest utilization and management (Wiersum, 1993). For instance, in most Sahelian countries forest areas are officially designated on the basis of state law on the national domain and the forestry code. In addition, though, around many villages bush areas occur in which both sedentary agriculturists and transhumant pastoralists collect a variety of tree products under still-extant local community rules or an open-access regime. Sometimes, sacred forests may also be present as a relic of animistic religions. At present, this local arena is even becoming more diverse, because of the emergence of new economic groups, which compete with local people for the natural resources. These groups consist of commercial timber or charcoal exploiters or urban people with, mostly speculative, interests in livestock keeping. Thus, the management of the different kinds of private, common and state forest/tree resources involves many different values regarding the type of organization

involved, rights and responsibilities, rewards and sanctions, benefits and risk sharing, decision-making procedures and settlement of conflicts (Lekanne dit Deprez, 1989). Due to this situation of "legal pluralism", when carrying-out his tasks the forestry agent is confronted by several value systems relating to the control and exploitation of forest resources by villagers.

7.4. Performance of the forestry agent in his pluriform environment

Little attention has yet been given to the question of how forestry agents carry out their tasks in such a pluriform social environment and how they cope with the structural uncertainties of their work environment. From the Sahel, only few specific data are known to the authors of how forestry agents deal with the various value systems which confront them in carrying out their different tasks. But based on discussions with personnel of several forestry development projects coupled with field observations and theoretical considerations, the following hypotheses can be made.

Although there exist differences between the various Sahelian countries, the mode of operation of the field agents takes place within a more or less hierarchical government institution, with the character of a para-military organization. Notions like participation and *auto-promotion* (self-promotion), frequently used with respect to the target group, are hardly implemented within the forestry organisation itself. These institutional characteristics do not make work easy for the forestry agent, especially in such an unstable and unpredictable environment as that of his job. The combination of hierarchy and the unpredictability of the work environment leads to a fear of making mistakes and to the camouflage of problems in the work situation, for inadequacies can be attributed by his superiors to the malfunctioning of the agent himself. This attitude might also partly explain why the forestry services in the Sahel are, as a rule, chronically lacking in monitoring and internal evaluation. The organizational structure and institutional culture create, as it were, ignorance at the level of the higher echelons; the management does not know what is really happening at the grass roots. In this sense they are self-deceiving organisations.

If an agent's factual assessment of alternative courses of action is determined by the prevailing system of supervision, punishments and rewards inside the forestry service, it is obvious that priority will be given to the dominant values within the service. It is well-known that on certain crucial issues, conceptions within the forestry service, through all echelons, run parallel: *feux de brousse*, bushfires, and the uprooting and cutting of trees, *coupe abusive*, are wrong, and violations must be firmly punished. It is therefore not surprising that the control function vis-à-vis the villagers still prevails. But in the application of the forest legislation anomalies have been found to occur at the fieldworker level. Depending on the social position of the local people concerned, the forestry agent may implement the rules in different ways (Intercooperation, 1987). Moreover, there exists a very specific liaison circuit between forestry service and villages, viz. through the institution of informers (*informateurs*, *indicateurs*), villagers, who for a small consideration, report violations by fellow-villagers of official regulations. By its very nature, practically nothing is known about the operation of this network.

It is evident that the conflictive nature of the field of interaction for the forestry agent makes his position extremely vulnerable. This is a very different interpretation from seeing the field agent merely as the link between service and population. He is the primary target when villagers question the legitimacy of certain interventions or their conditions. From the point of view of the rational, knowledgeable villagers, the forestry agent is not the real bridge to the village, but merely the lowest echelon of the service. He, the field agent, is not seen as someone who listens to the needs and priorities of the people, but as, essentially, the implementor of commands from the top, with any possible room for manoeuvre and discretion in implementation being normally used for his personal domain, for example, in supplementing his own, meager salary as a civil servant.

Consequently, the behaviour of the forestry agent could be characterized as a strategy to arm oneself against uncertainty, manifesting itself in a variety of coping patterns: retreat to the stereotypic repertoire, the control of open options vis-à-vis the clients, the negative labelling of the behaviour of the rural people in order to legitimate his own authoritarian action, projection of responsibilities onto others (see e.g. Bryant & White, 1982). One may wonder to what extent, under the present organisational conditions, the actual performance of the forestry service is in accordance with the widely heard wish for the participation of the local population. In the sociology of organizations we know from contingency theory that the way decisions are made internally influences the way the organization relates to the outer world. If this service is organized along hierarchical principles, then there will be a tendency for similar relations with the clientele to dominate. Putting it more bluntly: if a learning-process approach is not characteristic of working relations within the service, the participatory approach towards the beneficiaries is a near-impossible assignment for a forestry field agent. Viewed from an actor perspective this can be reformulated as a question: what does a forestry agent gain, given the rigid structure of his organization, if he opts for a participatory approach towards the clients? And what are the risks he runs? From this angle, it is understandable that forestry agents in the Sahel embody, as a rule, a very conservative and risk-minimizing attitude, and that several institutional changes within the forestry service must be made before it can be expected that forestry agents will truly act as an effective interface between local villagers and state institutions.

7.5. Conclusion

It has been suggested that interface studies can contribute in three ways to gaining a better understanding of the relations between local level and national contexts (Long, 1989): they can help to develop a more adequate analysis of transformation processes of national policies; they contribute to a better understanding of the differentiated responses of local actors to planned interventions; and they assist in relating "micro" and "macro" theories of rural change.

Against this background, what does the above analysis of the role of the forestry agent at the interface between local-level environmental management and external policies teach us?

In the first place, it should be realized that relations between forestry agents and local villagers are not an isolated phenomenon in the socio-political environment of the villagers. Although there are differences in the structure and functioning of state bureaucracies in the various Sahel countries, the relationship between the state and villagers is everywhere one of the basic roots of environmental degradation. That environmental management involves many socio-political aspects, and that large discrepancies in values between state and village exist with regard to these aspects, are facts that are too often neglected. Also, little attention is given to the fact that the relation between the state and the village is often perceived by villagers as not being one of exchange or cooperation, but rather as a power game (Spittler, 1976; Lekanne dit Deprez, 1989). Due to the often prevalent vision of development intervention as a linear process, these discontinuities are often neglected in the operationalization of interventions aimed at improved local-level environmental management. Most often, attention is focused on improving the technical aspects of environmental management. Adjustment of the related regulation and control aspects of environmental management receives much less attention. But even the management practices suggested are often of only limited relevance, because of the discrepancy between the "scientific" management improvements suggested and the locally-preferred resource management utilization practices.

When striving for improved environmental management at village level, the particular responsibilities of state bureaucracies should not be disregarded, however. On the basis of our analysis, several specific policy implications can be indicated to overcome some of the identified discontinuities in the environmental management development process:

- * Accepting that environmental projects are essentially social constructions and recognizing the socially-contested and socially-negotiated nature of these intervention processes.
- * Increasing the coherence between development issues and control and rule enforcement activities, which are an essential component of environmental protection;
- * Upgrading the technical competence of field officers, so that they are better able to assist villagers with the improvement of still viable indigenous resource utilization systems, rather than upgrading their ability to "sensitize" local people to "scientific" practices which do not meet local needs and priorities;
- * Restructuring state bureaucracy in such a way that the field officers are no longer considered as the "end-of-the-line", but as front-line workers.

7.6. References

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Chapter 8

INDIGENOUS EXPLOITATION AND MANAGEMENT OF TROPICAL FOREST RESOURCES: AN EVOLUTIONARY CONTINUUM IN FOREST-PEOPLE INTERACTIONS

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Abstract

Since the early 1980s several new approaches towards forest management, which include active participation of local communities, have been tried out in many tropical regions. As a result of these efforts recognition has increased about the various ways in which many local communities are already actively managing their forest resources. The planning of development interventions to stimulate more efficient community involvement in forest management can often be based on such indigenous forest management systems. This paper aims to improve the understanding about the diversity and dynamics of indigenous forest management. The analysis consists of three parts. First an overview of the various types of indigenous forest management and their dynamics is presented. Subsequently, the basic principles of forest management are discussed. Forest management is characterized as involving a set of both technical activities and social arrangements for the protection and utilization of forest resources and the distribution of forest products. Three major categories of forest management practices are identified, e.g. controlled utilization of forest products, protection and maintenance of forest stands, and purposeful regeneration. The practices in the first category are both socially and biologically oriented, whereas the activities of the last two categories are biologically oriented. These principles are then used to develop a classification model of the various evolutionary phases in forest management. Along the lines of a similar model developed for exploitation of agricultural crops, various stages of forest management are distinguished along a gradient of increasing input of human energy per unit of exploited forest. This gradient represents a continuum of forest-people interactions; it illustrates how the various manifestations of indigenous forest management may be arranged along a nature - culture continuum.

8.1. Introduction

Since the early 1980s various new approaches towards forest management, in which local communities are more actively involved, have been tried out in several tropical countries. These efforts reflect a growing interest in the scope of community participation in forest management. This interest has emerged in response to concerns that have arisen relatively independently in the fields of forestry, nature conservation and development of tribal people (e.g. Allegretti, 1990; Poffenberger, 1990; Arnold, 1991; Nepstad & Schwartzman, 1992; Redford & Padoch, 1992; Colchester & Lohmann, 1993; Wells & Brandon, 1993). Although the scope for community involvement in forest management has only recently been recognized by foresters, ecologists and rural development experts, various types of community forest management have been in existence for centuries. In the past these management systems were rarely taken seriously by scientists and professionals. However, the growing interest in the scope for community forest management has led to an increased interest for indigenous forest management. Several recent studies have indicated that local people living in or near forests should not *a-priori* be considered as mere gatherers of forest products and/or as people who are transforming forests into agriculture. In many cases they are active forest managers who are involved in purposeful activities to safeguard the continuous availability of the valuable forest resources.

The various publications describing a wide variety of indigenous forest management types provide a good empirical data base for further analysis of the characteristics of these systems. This paper will review the existing information. It aims at making a comparative analysis of the various types of indigenous forest management, and at developing a conceptual model for classification of the evolutionary stages of these forest management types. It will focus particularly on the management of vegetation resources and does not include management of livestock and wildlife resources. First, an overview is given of the various types of indigenous forest management, with examples of their dynamics. Secondly, a theoretical framework is developed for systematic, comparative characterization of these different management systems. For this purpose the basic principles of forest management are reviewed. These principles are then applied to adapt an existing model of agricultural development into a conceptual model, in which various phases of indigenous forest management are arranged along a continuum of forest-people interactions.

8.2. Indigenous forest management by tropical people

8.2.1 History

There is a long tradition of humans influencing forests in order to increase the benefits they derive from them. For instance, paleobotanical research has shown that in New Guinea even as long ago as the late Pleistocene, some 30,000-40,000 years ago, people were manipulating the forest by trimming, thinning and ring-barking in order to increase the natural stands of taro, bananas and yams (Hladik et al., 1993).

This example demonstrates that the early activities to manipulate the forests for human benefits were directed primarily at products for local consumption such as fruits and other edible plant products (Hladik et al., 1993). It has been postulated (Sauer, 1969) that cultivating wild food trees can be considered as the first step in the evolution of a domesticated landscape. Such cultivation probably began when the act of collection caused changes in micro-environment which favored rejuvenation of the collected species and the spontaneous growth of plants from leftovers of products which the collectors brought to their camps. Gradually such unconscious manipulation was replaced by more conscious activities such as the deliberate planting of certain species at camp sites to facilitate future collection. Initially the cultivation was probably based on vegetative propagation techniques, later also cultivation by seeding was developed (Sauer, 1969; Boerboom & Wiersum, 1983).

There also exists a long history of forest manipulation by local people to obtain commercial products. For instance, already in the fifth century AD certain forest products, such as gums and resins, were traded in Southeast Asia, and forest management practices were being carried out to regulate their production (Dunn, 1975; Dove, 1994). In addition to forest management practices to secure material needs, in many societies conscious efforts have also been undertaken since time immemorial to protect certain, sacred, forest areas for cultural and religious reasons (Doornewaard, 1992).

These examples indicate that when considering the rural landscapes it is often not appropriate to assume a dichotomy between a natural forest area and a domesticated landscape characterized by agricultural cultivation. Rather, historically many forests have been used and manipulated by local people which resulted in the original forest being transformed into an environment which is enriched by resources useful to the local societies. Such indigenous forest utilization and manipulation has many manifestations with the habitats of the forest communities gradually evolving along a nature - culture continuum (McKey et al., 1993; Dove, 1994). The protection and purposeful regeneration of useful species does not necessarily involve the transformation into an agricultural landscape, but may result in a domesticated landscape (Chase, 1984) characterized by a mosaic of managed forests and agroforestry systems (Posey, 1985; Leach & Fairhead, 1993; McKey et al., 1993; De Jong, 1995).

8.2.2 Types of indigenous forest management

Several authors have attempted to categorize the types of indigenous forest management, e.g. on the basis of structural characteristics of the vegetation. For instance, Anderson (1990) differentiated two basic management strategies of local people:

- * "Tolerant" forest management in which the native vegetation is largely conserved or reconstituted through successional processes.
- * "Intrusive" forest management in which the native vegetation is replaced by mixed tree plantations that are maintained by long-term care.

A more refined classification of 'alternative forest-like structures' in insular South-east Asia (Olofson, 1983) includes the following types: sacred groves, enriched fallows, forest groves composed of domesticated tree species, and home gardens. In Mexico a distinction

was made between managed fallow successions, forest gardens, kitchen (=home) gardens, and semi-managed forests (Gomez-Pompa & Kaus, 1990). And in Africa a differentiation was made between reservations and sacred groves, conserved bushland resources, long and short swidden-fallow systems, and woodlands with selectively maintained and promoted useful species (Shepherd, 1992). The diverse and intricate nature of indigenous forest management is excellently demonstrated by the Kayapó indians in the Brazilian Amazon, who recognize forest islands in savanna areas as well as nine different management zones within the secondary forest (Posey, 1985).

Indigenous forest management types may also be differentiated on the basis of the objectives for manipulating the forest. For instance, the following types of community managed forests have been indicated for Asia (Messerschmidt, 1993):

- * Fallow forest managed in relation with swidden cultivation
- * Native forest in mountainous and semi-arid regions managed for their role in integrated forest-livestock-agriculture systems
- * Natural forest managed for protecting village water sources
- * Natural or planted forest maintained as sacred groves or temple forest.

This classification emphasizes that indigenous forest management should not be considered as an isolated activity, but as forming either a utilitarian or cultural component (Weidelt, 1993) of the local livelihood system. In many cases indigenous forest management consists of practices for modifying the forests within the framework of an integrated system of resource utilization; these practices augment crop cultivation and/or livestock management (cf. Padoch & Vayda, 1983).

A major example of the integrated nature of indigenous forest management and crop cultivation is the system of swidden cultivation coupled with fallow management. In many traditional swidden-fallow systems swiddens are not abandoned after agricultural use, but rather people actively manage and exploit the fallow vegetation by selectively sparing valuable tree species. Also valuable forest plants such as rattans may actually be planted with the crops or at the end of the cropping period (e.g. Clarke, 1966; Olofson, 1983; Weinstock, 1983; Denevan & Padoch, 1987; Hecht et al., 1988; Posey & Balée, 1989). Consequently, when the swidden is abandoned a nucleus of a valuable forest is present. In this way, swiddens may be gradually converted into a forest garden (or 'reconstructed' forest). Swiddens may thus form a logical and rational phase between natural and reconstructed forests (Olofson, 1980; Denevan et al., 1984; Mary & Michon, 1987; De Foresta & Michon, 1993; Dove, 1994). Useful trees may be protected not only in fallows but also in old growth forests, e.g. by marking them and/or clearing around them as an indication of exclusive use rights (Persoon & Wiersum, 1991). Or certain parts of the forest may be protected because of the abundance of useful species, e.g. fruit trees or trees which are a preferred habitat for bees (De Jong, 1995). In such cases less desirable competitors may be removed by weeding and thinning. In addition, valued species may be propagated selectively by sparing seedlings or through propagation from discarded seeds and/or vegetative materials (Anderson, 1990).

Resource-enriched native forests: Native forests, either old-growth or fallow vegetations, whose composition has been altered by selective protection and incidental or purposeful propagule dispersion of food and/or commercial species.

Reconstructed native forests: Wholly or semi cultivated forest stands with several planted useful species, tolerated or encouraged wild species of lesser value and non-tree plants (herbs, lianas) composed of mainly wild species (cf. Gomez-Pompa & Kaus, 1990).

Mixed arboriculture: Cultivated mixed stands, almost exclusively of planted, and often domesticated, tree species.

These different categories are not discrete and gradations from one category to another occur. Nonetheless, this classification provides a first approximation of the varied and often complex ways in which different local communities have been actively engaged in maintaining the forest vegetation and manipulating it to suit their needs.

8.2.3 Dynamics

The term "indigenous forest management" refers to activities that were generated by internal initiatives within a local community; it should not be equated with "traditional" which implies customary or antiquity (Fisher, 1989). Indigenous forest management practices should therefore not be considered to necessarily date from the past. They are often historically and situationally dynamic rather than static, as they have gradually evolved in response to changing conditions. Such changes may involve a variety of factors (Gilmour, 1990; Schmink et al., 1992; Shepherd, 1992; Messerschmidt, 1993; Arnold & Dewees, 1995), which can be categorized as follows:

- * Changed ecological conditions, such as resource depletion or land degradation.
- * Changed technological conditions caused by the introduction of new agricultural and forest harvesting technologies.
- * Changed economic conditions such as development of new markets and increased commercialization, changed demands for forest products and changed opportunities for off-farm employment.
- * Changed socio-political conditions, e.g. population growth and migration, increased interaction with other (ethnic) groups, changed tenure conditions including gradual privatization or nationalization of forest lands, new state organizations for forest management and rural development.

Many of these changes increase pressure on forest and tree resources. In many cases this has resulted in deforestation and forest degradation. But in other cases farmers have reacted by modifying their management strategies accordingly (Messerschmidt, 1993; Ghimire, 1994; Arnold & Dewees, 1995).

Such adaptive strategies have in particular been reported with respect to the fallow management systems in rainforest areas (e.g. Eder, 1981; Raintree & Warner, 1986; Balée, 1992; Dove, 1994). For instance, Clarke (1966) described a succession of fallow management in New Guinea from extensive forest-fallow rotations under conditions of low population density to planted *Casuarina* fallows under conditions of relatively high population density. More recently, more insights have also been obtained about the dynamic nature of the forest management regimes in mountainous and semi-arid regions (e.g. Fisher, 1989; Messerschmidt, 1993; Thomson & Coulibaly, 1995). The types of adaptations that develop depend on the perceived needs of the local communities for

Table 8.2 **Accessibility of forest resources and probable types of community forest management (Gilmour, 1990)**

Resource	Local interest	Management system
Ample forest in or adjacent to village	No interest in forest protection or tree planting	Indigenous management systems exist, confined to defining use rights only. Few trees on private land
Forest becoming depleted or access restricted	Emerging interest in forest development activities	Indigenous management systems exist to define rights of use and in some cases have biological objectives. Few trees on private land, but incipient interest.
Severe shortage of forest products	Genuine interest in forest development activities.	Indigenous management systems well developed, defining both rights of use and biological objectives. Extensive private tree planting and protection likely.

specific forest products. As indicated by Gilmour (1990) with respect to Nepal, and Shepherd (1992) with respect to semi-arid Africa, a perceived change in the accessibility of resource availability may trigger a gradual intensification of management practices (Table 8.2). Similar induced innovations in response to changing socio-economic conditions and resource availability have been noted with respect to tree growing on agricultural land (Arnold & Dewees, 1995). All these examples indicate that the rich variety in indigenous forest management types can only be properly understood if these types are viewed in their historical context. The history of forest utilization and management has ecological implications and clarifies the people's relations with current forests (Dove, 1994; Fairhead & Leach, 1994).

7.2.4 Conclusion

A large variety of often complex indigenous forest management types does exist in tropical countries. They demonstrate the multi-resource character of forest vegetation and the creative role of human culture in regulating these resources for human use (cf. Hladik et al., 1993). The different forest management practices vary in intensity. They evolved in a process of co-evolution between human society and nature. As a consequence of the combined processes of natural and cultural selection a great diversity of human-influenced forest types has been created (McKey et al., 1993; Leach & Fairhead, 1993; Dove 1994, 1995). The different indigenous forest management types are often dynamic, they gradually evolve in response to changes in both ecological, cultural and socio-economic

conditions. Because of the diverse and dynamic nature of indigenous forest management systems, it would be useful to have a classification system which can be used for systematic, comparative characterization of the different management systems, and which can assist in assessing their scope for further development under different conditions of resource availability and socio-economic development. As a basis for such a classification system, it is useful to consider the principles of forest management in more detail.

8.3. Characteristics of forest management

8.3.1 Professional and indigenous forest management

Forest management has been defined as the practical application of scientific, economic and social principles to the administration and working of any area used for forestry for specific objectives (Ford-Robertson & Winters, 1983). This definition illustrates how in western societies forest management has traditionally been equated with professional activities based on scientific principles. These activities were primarily directed at manipulating forests to favour timber production or to provide environmental benefits. Not surprisingly, this normative grounding of the concept of forest management meant that for a long time the forest management practices of local communities were ignored. In order to understand local management regimes, it is therefore necessary to look beyond professional activities and to identify universal features of forest management.

Some authors have equated forest management with silvicultural management. For instance, Anderson (1990) defined forest management as the conscious manipulation of the environment to promote the maintenance and/or productivity of forest resources. According to this interpretation forest management is characterized by purposeful manipulation of the vegetation; extraction of forest products without silvicultural treatment of the forest is not considered as a management system. However, at a low rate of extraction forest may be able to recover from such exploitation. The first question to be asked with respect to maintaining forests is whether forest extraction is controlled in order to maintain its productivity. Forest management should therefore be considered to involve not only silvicultural practices, but all conscious human activities directed at maintaining its production capacity. It can best be defined as the process of making and implementing decisions about the use and maintenance of forest resources and the organization of the related activities (Duerr et al., 1979). It refers to the total set of technical and social arrangements involved in the protection and maintenance of forest resources for specific purposes, and the harvesting and distribution of forest products. **Indigenous or community forest management** may then be defined as the process of making and effectuating decisions about the use and conservation of forest resources within a local territory, with the organization of these activities being based on social interactions and the shared norms and interests of the people living within this territory (Fisher, 1989; Wiersum, 1993). Indigenous management often consists of biologically-oriented practices aimed at protecting and modifying a forest ecosystem with a specific utilitarian goal in mind. But it may also consist of human interventions in the forest that are based on cultural customs which are associated with group identity (cf. Schmink et al., 1992). For instance, the protection of sacred forests is primarily based on religious values rather than

biological concerns. These practices may nevertheless function as a *de facto* forest conservation strategy.

Although forests are defined in scientific terms as ecosystems in which trees play a dominant role, forest management should not be considered to be always ecosystem-oriented. In many cases management practices are primarily directed at forest resources: those attributes of a forest which are considered relevant for fulfilling human needs. These needs are often of material nature, but cultural and religious needs may also be involved. Forest resources may consist either of a forest as a functioning ecosystem or of specific forest components (specific successional stages, specific useful species, endangered species, etc). In professional forestry, the ecological value of forests is currently increasingly appreciated with the forest ecosystem being considered as a major resource. It has been argued that tribal people also view forest management in such a holistic way (e.g. Posey, 1985). But as illustrated above, many indigenous forest management systems involve "a selective respect towards a culturally conceived nature" (Persoon, 1991). In such cases the management practices are directed at selected forest resources rather than at the integral forest ecosystem (e.g. Sow & Anderson, 1996).

Local communities often value forests in a rather different way than professional foresters and state organizations do. For such communities forest management is not a specialized resource management activity as is mostly the case in professional forestry. Rather it forms a part of the local livelihood strategy. Depending on the strategies of resource use of local farmers (Padoch & Vayda, 1983; Gerritsen, 1995) forests may be integrated in the local resource utilization system because they have one or more of the following functions (Falconer, 1990; Messerschmidt, 1993):

- * Production of valuable products for household consumption (construction material, foods, medicines)
- * Production of materials for generating income and employment through possible local manufacturing and sale (selected foods, resins/gums, construction material).
- * Provision of inputs (farm implements, litter, mulching material, erosion control, fodder, bedding material) for agricultural and livestock production
- * Protection of water resources and provision of shelter
- * Cultural functions, such as conservation of tribal lands or role in religious beliefs (sacred forests).

As a result of the discrepancy in perception between local communities and professional forestry organizations on the roles of forests, the management objectives of these two categories of forest managers may be at variance. Often, the professional organizations do not even recognize the presence and nature of indigenous forest management systems. For instance, in Guinea a forest reserve established for biodiversity conservation actually consisted of man-made and old secondary forests. This origin of the forest had, however, not been recognized by the professional conservation agencies (Fairhead & Leach, 1994). While in Sumatra local people invaded a nature reserve by extending their highly profitable mixed forest gardens (Mary & Michon, 1987). In both cases discrepancies arose between the desire of local communities to maintain their traditional claims on the 'domesticated' forests and the state's objective of biodiversity conservation.

8.3.2 Management practices

To date most studies on indigenous forest-people relations have concentrated on describing how the local people actually use forests. Only limited attention has been given to whether and how local people control such utilization and/or manipulate forests by purposeful practices so as to optimize the benefits from the forests. Nonetheless, various studies have indicated that in many cases indigenous people carry out a variety of management practices such as conserving certain patches of forest, sparing or planting desirable species, introducing new species, eliminating competing species, thinning, protecting forests from fire, mulching, stimulating fruit production, etc. (Posey, 1985; Anderson, 1990; Gomez-Pompa, 1991; Gomez-Pompa & Kaus, 1990; Campbell et al., 1993).

It is often contended that the first step in forest management consists of tree planting. Although this is true when bare land has to be reforested, it is clearly not the case for existing natural forests. As indicated above, in natural forests the first phase of management consists of practices to maintain the rate of extraction below the production capacity. This may be accomplished by limiting the rights to use forest products to certain people. Thus, if ample forest resources are present, there is often no interest in forest protection or tree planting and indigenous management practices are confined to defining use rights. Only if forest resources become scarcer, interest in actually manipulating the forests by biologically-oriented management practices may develop (Gilmour, 1990). In these cases management practices characterized by a combination of defined rights of use and biological objectives will develop (Table 2). Recent studies in Nepal (Arnold & Campbell, 1986) have indicated the wide variety of such biologically-oriented control practices in indigenous forest management, e.g. only harvesting selected products and species, harvesting according to condition of products (stage of growth, size, plant density, season, specific plant parts), or limiting the amount of harvested products (by time, quantity, use of tools or area).

If notwithstanding such practices for controlling extraction forest resources are becoming scarce, the biologically-oriented management practices may be further intensified by carrying out measures aimed at increasing the presence and/or productivity of the desired species. Measures may also be taken to favour the useful species indirectly by removing less desirable competitors. Thus, in its widest sense, the technical arrangements in forest management concern a group of deliberate activities for (a) controlled utilization, (b) protection and maintenance of forest stands, and (c) purposeful propagation with either wild or domesticated treespecies.

The kind and intensity of forest management practices may vary considerably depending on the kind of resources being considered. Indigenous practices may involve silvicultural practices, as well as management practices scientifically denoted as horticultural practices. The management practices with respect to fruit production may evolve from collecting wild fruits in the forest to fruit cultivation in enriched fallows and home gardens to fruit production in orchards (Verheij, 1991). A similar progression of practices may occur with respect to other products such as gums or resins, bark products, or timber. During this progression valuable tree species are gradually segregated from the natural forest and

cultivated in increasingly specialized agro-ecosystems. The controlled utilization shifts from priority rights on marked and planted trees to private ownership of land and trees. Concomitantly, the vegetation structure becomes increasingly systematized, with randomly spaced trees of random age giving way to even spacing of even-aged trees. Furthermore, the propagation methods change from using seeds to using clonal material, and the location of planting changes gradually from a forest environment to open-field conditions. In professionally managed tree crop systems, this process of domestication has resulted in a differentiation between fruit orchards, cash-crop plantations and forest plantations. But as indicated by the earlier examples, in many indigenous forest management systems various tree species are cultivated in combination, and no specialization in specific categories of tree crops has taken place. The professional categorization for specialized tree-crop systems does therefore not reflect the diversity of indigenous forest resource management.

8.3.3 Organization of forest management

Forest management not only involves the carrying out of resource management practices, but also the process of making decisions about (a) the objectives of forest management, (b) the kind of activities to be carried out by various persons, and (c) the distribution of forest products. In addition, management also requires the existence of a control system which ensures that the proposed activities are carried out as planned.

In conventional forestry thinking, it has been assumed that professional organizations, mostly under state or corporate control, were needed for effective forest management (Fairfax & Fortmann, 1990; Kartasubrata & Wiersum, 1993). Consequently, little attention was given to the nature and functioning of community-level organizations for forest management. It was generally assumed that the forest utilization practices of local people were governed by the principle of "the tragedy of the commons" resulting in the overexploitation and degradation of the forest resources. It is now recognized, that a differentiation between "open access" and "common property" forests should be made (e.g. Gibbs & Bromley, 1989; Messerschmidt, 1993). Whereas open-access forests are prone to degradation, the common property forests are often actively maintained. These forests are subject to individual use, but not to private ownership. The utilization of these forests is governed by a set of regulations on independent user rights of members of a specific user group (Messerschmidt, 1993). For such common property forest management regimes to function properly, there should exist an indigenous institution for forest management with the following characteristics (Gibbs & Bromley, 1989):

- * A structure for group members to make decisions on the required resource management practices;
- * Group control over the behavior of the group members, which ensures that the planned management practices are carried out;
- * Control over the distribution of collected forest products;
- * Ability to exclude outsiders.

Such an institution need not be a formal forest management organization. A cultural/religious institution may ensure a similar effect. For instance sacred forests may be protected religious taboos. Or a village priest, who can 'communicate with gods', may therefore designate various forest zones for different kinds of use (Kunststadter, 1988).

Indigenous forest practices may be organized not only on the basis of common property regimes, but also on a private basis (Fortmann & Nihra, 1992). In many cultures it is usual that private forest utilization rights are created by investing labour in the establishment of agricultural or tree crops (Shepherd, 1992). However, the differentiation between common property and private forest management regimes is anything but straightforward. Many intermediate situations exist because of the differentiation between land and tree tenure as well as the variety of local rules for using different types of forest resources (Messerschmidt, 1993). For instance, in several tribal societies valuable tree species may be claimed for individual use by marking them, while the remainder of the forest remains common property (Persoon & Wiersum, 1991).

8.4. Classification of forest management as a continuum in forest-people interaction

On the basis of the characteristics of forest management, indigenous forest management may involve the following practices: (a) restricting access to or forbidding exploitation of (parts of) the forests because of their cultural and religious values, (b) carrying out technical measures to ensure controlled utilization and/or possible enhancement of specific forest products. There has been a general evolution from protection and extraction of products from the natural forests to the cultivation of domesticated tree crops. This evolutionary process included institutional changes as well as technical and ecological changes. To date the systematic comparison and classification of these various stages of indigenous forest management has received little attention. More attention has been given to the evolution of people-plant interactions within agriculture. It seems worthwhile to attempt to apply the principles employed in such studies to clarify people-forest interactions.

A major attempt at understanding the processes involved in the emergence of agriculture was made by Harris (1989). He developed a model of agricultural development on the basis of ecological and evolutionary assumptions. The model postulates a series of plant-exploiting activities and associated ecological effects arranged sequentially along a gradient of increasing input of human energy per unit of exploited land. Along this continuum of plant-people interactions a gradual transformation of the natural ecosystem into an agro-ecosystem takes place, and the human intervention in the reproductive biology of foodplants intensifies. Three major thresholds in people-plant interactions are postulated. The first is between 'procurement of wild-food (foraging)' and 'production of wild-food', the second between 'production of wild-food with minimal tillage' and 'cultivation of wild food plants with systematic tillage', and the third between 'cultivation of wild food plants' and 'production with domesticated plants'².

² Such plant domestication refers to the modification of the genetic constitution of an individual plant species and should not be confused with the concept mentioned earlier of domestication of the landscape (McKey et al., 1993).

By analogy with the Harris model, also forest resource exploitation and management activities can be arranged along a gradient of increasing input of human energy per unit of exploited forest. On basis of the three major categories of forest management practices, which were identified earlier, three major thresholds may be postulated between the various phases of forest-people interactions (Table 8.3). The first is between uncontrolled and controlled procurement of wild tree products in the natural forests. As indicated above, the control of forest utilization primarily involves the definition and control of use rights; this requires social transaction costs, e.g. in respect to time spent on mobilization and decision making and control. Control measures with a biological objective are developed in the second instance. The second threshold is between controlled procurement of wild products and purposeful regeneration of valuable tree species. And the third threshold is between the cultivation of wild trees and the production of domesticated trees; the domesticated trees may be propagated through genotype or phenotype variants.

In comparison with the Harris model, the second and third thresholds are analogous to the thresholds separating 'wild plant food procurement' from 'wild plant food production', and 'cultivation of wild food plants' from 'production with domesticated crops' respectively. But a new threshold separating 'uncontrolled' from 'controlled' gathering was introduced. This threshold replaces the Harris threshold separating 'wild plant food production with minimal tillage' from 'cultivation with systematic tillage'. This modification was made to stress the important factor of social control in forest exploitation. Furthermore, soil tillage is less important in tree growing than in crop growing systems.

Concomitantly with the increasing input of human energy per unit of exploited forest land, a gradual transformation of the natural forest into an agro-ecosystem occurs. Also the human intervention in the reproductive biology of tree species intensifies (Table 8.3). This process of progressively closer interaction between people and the forest resources is also associated with various socio-economic trends (cf. Harris, 1989). In the first place the socio-economic conditions relating to forest utilization change: increasing sedentarization, increasing population density, and a gradual shift from a subsistence economy to commercialization. In the second place the complexity of the indigenous rules and regulations change, with common property rights gradually becoming changed into private land and tree tenure rights (Table 8.4).

The conceptual model for classification of the various evolutionary stages of forest utilization and management and their main characteristics is a descriptive one. It should not be regarded as an explanatory model indicating unidirectional and deterministic trends in which the various phases represent pre-ordained steps on a ladder of increasingly 'advanced' stages of general societal development (cf. Harris, 1989). Firstly, in many areas different forest management types may co-exist, with each type occupying a specific landscape (e.g. Posey, 1985) and/or tenurial niche (Fortmann & Nihra, 1992). Secondly, although the model indicates general evolutionary trends, the transitions from one phase to another are not always irreversible. For instance, Balée (1992) describes a 'regression' from shifting cultivation to forest gathering of several Amerindian tribes in the tropical lowlands of South America. Also for some areas of West Africa it has been reported that

Table 8.3 Major categories of indigenous forest/tree utilization and management practices

Threshold	Utilization system	Plant-exploiting practices	Ecological effects
	Uncontrolled procurement of wild tree products	Casual gathering/collecting	Incidental dispersal of propagules, no transformation of natural vegetation composition & structure
CONTROLLED UTILIZATION -----			
	Controlled procurement of wild tree products	More or less systematic gathering/collecting	- ditto-
		Systematic collection with protective tending of valuable tree species	Reduction of competition, limited transformation of forest structure/composition
PURPOSEFUL REGENERATION -----			
	Cultivation of wild trees	Selective cultivation by transplanting of wildlings and/or dispersal of seeds/vegetative propagules in forest environment	Purposeful dispersal of propagules to new habitats, partial transformation of forest structure/composition
		Tree crop cultivation (possibly in combination with annual crops)	Land clearance, total or almost total transformation of forest structure/composition
DOMESTICATION -----			
	Production of domesticated trees	Cultivation of domesticated trees in tree crop plantations	Propagation of genotype & phenotype variants, land clearance & soil modification inputs of fertilizer & pesticides

Table 8.4 Institutional arrangements in indigenous forest/tree management and utilization systems

Plant-exploiting practices	Socio-economic conditions	Indigenous institutions with respect to utilization
Uncontrolled, casual collection of wild tree products	Segmented societies, low population density, subsistence economy	Open access
Systematic, controlled collection of wild tree products	Low population density, incipient social stratification at community level (often coupled with formal state regulations & dual economic system)	Common property rights, sometimes priority rights to valuable tree species
Systematic collection of wild tree products & protective tending of valuable tree species	Increased social stratification & incipient commercialization at local level (often coupled with formal state regulations & dual economic system)	Combined common property rights on forests & private priority rights on claimed trees
Selective cultivation of wild trees	Increased population density & socio-economic stratification	Priority rights to forest plots for tree planters
Tree crop cultivation	Medium-high population density, increased incorporation in market economy	Private land & tree rights
Cultivation of domesticated trees in plantations	High population density, fully commercialized resource use	Private land & tree rights

there has been a process of de-intensification rather than intensification in forest management (Fairhead & Leach, 1994). In both cases the local attitudes to forests have been influenced more by historical processes of land alienation as a result of tribal warfare and colonial land expropriation than by a tradition of gradual intensification of the utilization and management of forest resources. Thirdly, most indigenous forest management systems are mostly a component of an integrated farming system. The evolutionary trends in forest management practices are therefore often related to development trends in agriculture. They may either be intensified or de-intensified in response to agricultural intensification, depending on their role in the local farming systems (Belsky, 1993).

8.5. Conclusion

The existence of a large variety of indigenous forest management systems indicates that the traditional view of equating forest management with professional forest management practices is untenable. To obtain a proper understanding of the full scope of forest management one should proceed from an empirical analysis of how different groups of local people define and value the various components of the forests and how they interact with the forests, rather than from an biological, legal or professional definitions of forests and forestry. In order to clarify the characteristics of various types of indigenous community forest management and their relation to ecological and socio-economic conditions, this paper began with an overview of the variety in indigenous forest management types and their major features. This information formed the basis for a re-evaluation of the basic principles of forest management. Combining the theoretical and empirical bases yielded a conceptual model which illustrates the co-evolution of society and the forest environment (cf. McKey et al., 1993; Dove, 1995).

The model was primarily developed with the aim to contribute to a better understanding of the diversity of indigenous forest management systems and to clarify the different phases in the process of domestication of forested landscapes. It might also be useful for assessing under which kind of conditions indigenous forest management shows promise for incorporation in programmes to stimulate participatory forest management. As discussed above, the management objectives, practices and organizational framework of indigenous forest management systems are often at variance with the characteristics of professional management systems. Such discrepancies should be taken into account when planning for increased involvement of local communities in forest management. Attention should also be given to the fact that whereas in professional systems forest management is conceptualized as an activity taking place in a legally delineated and specialized land-use system, indigenous forest management practices are mostly directed at forests and/or trees as a component within an integrated land-use system. The stimulation of increased community involvement in forest conservation and management activities should therefore not only be based on general forest policy objectives, but on socially differentiated goals in which the different perspectives and priorities of local communities and professional (state) organizations must be balanced (cf. Fairhead & Leach, 1994; Wiersum & Lekanndit Deprez, 1995). Development efforts to stimulate more active local involvement in

forest management can best be considered as the start of a new phase in the long evolution of indigenous forest exploitation and management. They should not be conceived as always involving a radical switch from exploitive to conservative practices. The model may assist in characterizing the nature of still existing indigenous forest management systems and in identifying what further adaptations might be stimulated by development projects in order that they can function optimally under location-specific land-use conditions (cf. Kajembe, 1994; Raintree & Warner, 1986). For to be successful, the development efforts should go with the grain of the historical process of co-evolution of human society and nature.

8.6. References

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Chapter 9

TRADITIONS AND RECENT ADVANCES IN TROPICAL SILVICULTURAL RESEARCH IN INDONESIA

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Abstract

Four phases of silvicultural research in Indonesia may be distinguished: 1) the teak era (1850-1920) devoted to teak production for the colonial powers; 2) the forest plantations era (1920-1970) which focused on forest plantations for wood production and watershed management, with research based on an autecological approach; 3) the era of natural rainforest management (from 1970) where attention turned to silviculture for sustained timber production from natural rainforests, and involved a synecological approach integrating silviculture and harvesting techniques; and 4) the era of community forestry development, which started at the end of the 1970s and involved rural people in the management of local forest resources. Consequently, much attention is given to production systems and tree species preferred by villagers whether growing on private land or on forest lands. These silvicultural systems are characterized by an uneven-aged, multi-species character, but may also include combinations of trees and agricultural crops.

These phases of silvicultural research are described in respect to a) the assumptions on which they were based and the responsibility for silvicultural management, b) the issues in respect of forest resources and silvicultural practices, and c) the methods and principles used to examine these issues. During the first phases, the research attention focused on assessing new silvicultural practices, but during the recent community forestry era, the applicability of new practices by forest managers also was evaluated. This brought with it important changes in research methodology, with research being carried out in cooperation with local people rather than by forest researchers in isolation.

9.1. Introduction

Since the publication of the book "The structure of scientific revolutions" (Kuhn, 1970) it has become recognized that scientists usually operate within a paradigm: "that grand, overarching collection of assumptions and elements of worldview, which defines not only the nature and boundaries of the scientific phenomenon under investigation, but also the type of questions to be asked and the methodologies considered legitimate for answering them" (Raintree, 1989). As indicated by Kuhn, the dynamics of scientific development can be described as involving periods of generally accepted scientific approaches punctuated by a succession of paradigm changes. Although Kuhn's discussion focused on the basic sciences, it may also be applied to practical sciences such as silvicultural research. An important feature of such practical science is, that the nature of the phenomenon to be investigated is usually formulated on basis of a social (or political) problem identification rather than a purely scientific problem identification (Koningsveld, 1987). The purpose of practical sciences is to develop more rational techniques within a specific social setting. In this respect silvicultural research can be described as research aiming at more efficient methods for controlling forest establishment, composition and growth in order to optimize the outputs of desired forest products and services. For the implementation of such silvicultural practices, there needs to be an organization which

- identifies the objectives for forest management,
- decides what kind of silvicultural practices should be carried out, and
- controls that the practices are carried out as planned.

This organisational component of silvicultural management is normally not considered part of silvicultural research. Rather this research takes as its starting point the politically legitimized systems of forest management organization and the prevailing objectives of the national forest policy. These presuppositions for silvicultural research have important consequences in respect to the kinds of forest systems considered as well as the methodologies which are used in the research. In this review of traditions and recent advances in tropical silvicultural research in Indonesia attention will be given to the developments in respect to both the assumptions underlying the research and the basic methodological characteristics of the research. Various phases of silvicultural research in Indonesia will be described in respect to

- * The assumptions in respect to the organizational management structure on which they were based;
- * The type of questions asked especially in respect to which kind of forest resources and which silvicultural practices were considered;
- * The methodological principles which were used in answering these questions.

9.2. History of forest policy and management in Indonesia

Usually it is considered that the first regulations on forest management in Indonesia were initiated in 1808 by the colonial governor Daendels (Smiet, 1990). These regulations were aimed at controlling exploitation of the valuable teak (*Tectona grandis*) forests on the island of Java.

It should be noted, that such a statement reflects a strong colonial bias. It neglects the existence of pre-colonial management systems of indigenous Indonesian societies ranging from the Javanese kingdoms to tribal societies on islands such as Sumatra and Borneo. For instance, the history of the acquisition of teak areas by the colonial powers (Boomgaard, 1992) indicates that local rulers were well aware of the values of the teak forests and that they controlled access to these valuable resources. Several indications even exist that teak is not an indigenous species in Indonesia, but that it was introduced and cultivated already in pre-colonial times (Smiet, 1990). Because of the important strategic value of the teak forests to the colonial naval industries, the colonial power gradually seized control of them. First regulations were formulated to control the exploitation of these forests by concessionaires, but failed to prevent deterioration of the teak resources. Consequently, in 1849 the first foresters were appointed to develop improved cultivation practices for these forests (Boomgaard, 1992). By that time, the principle of government responsibility for management of forest resources for colonial interests, as initiated by Daendels had become firmly established. The ideology that forest conservation was best assured by state stewardship over forest lands made it legitimate, that the control over forest lands, tree species as well as management practices should be in the hands of a professional state forest service (Peluso, 1991).

These (also internationally accepted) assumptions on the role of state control in forest management were maintained after the Indonesian independence. But within this "worldview" a gradual shift of attention has taken place in respect to the types of forests to be managed. The first efforts at systematic forest management focused almost exclusively on sustaining timber production in the teak forests. But after the 1920s increased attention was given to the establishment of additional forest plantations for industrial purposes. During the 1940s a comprehensive plan was prepared for the development of a large area of production forests, including plantations for providing raw materials for sawmills (*Tectona grandis*, *Altingia excelsa*, *Swietenia macrophylla*), pulp and paper industries (*Pinus merkusii*, *Agathis dammara*), turpentine and resin distilleries (*Pinus merkusii*) and tannin industries (*Acacia mearnsii*) (Van Alphen de Veer, 1953). These industrial plantations were mainly concentrated on the island of Java. Although *Pinus merkusii* forests existed on the island of Sumatra, only limited attention was given to management of the (natural) forests on islands other than Java. The production potential of these natural forests had been recognized by foresters in the 1930s (Gonggrijp, 1935; Steup, 1955), but serious attempts at systematic utilization and management of these forests started only after 1966. This change in forest policy was a result of the political changes which took place in Indonesia at that time. The new political regime opened-up the rainforests for large-scale exploitation by concessionaires. At first, exploitation was almost exclusively directed at obtaining timber (e.g. *Shorea*, *Dipterocarpus*, *Dryobalanops* and *Hopea* spp.) for export, but during the 1980s local industries developed and manufactured more valuable wood products. In order to sustain this commercial production, regulations for silvicultural management of these forests were formulated in 1970 (Soerianegara, 1970). Since that time, many attempts have been made to gradually improve sustained forest management of the Indonesian rainforest areas (Soerianegara & Kartawinata, 1985).

All of the above-mentioned forest management activities were based on state control over forest lands and management responsibility of a professional forest service. In the 1930s, foresters discussed the desirability of diversifying forest management by increasing community control over certain categories of forests (Persoon & Wiersum, 1991), but it was only at the end of the 1970s that it became gradually acknowledged that forest management responsibilities might also be exercised by local communities (RWDEP, 1990). This recognition arose in the wake of the so-called "regreening" activities, which were started in the 1970s by the Forest Department in response to the concern about watershed degradation (Van der Poel & Van Dijk, 1987). The Forest Department had the task of maintaining protection forests in mountainous areas since the 1920s. These watershed management activities were first restricted to the protection of the so-called "jungle forests" and reforestation of denuded forest lands. But in the 1970s programmes were started to stimulate tree growing and terracing as a means of erosion control on private farmlands. These regreening activities led to the recognition of many locally-managed farm forest and agroforestry systems (e.g. Wiersum, 1982; Weinstock, 1983; Soemarwoto, et al., 1984; Torquebiau, 1984; RWEDP, 1990). Such indigenous forest management systems may occur both within the official forest reserves and on private farm lands. Furthermore, the importance of forests in fulfilling basic needs (food, fuel, shelter and income) of local communities became better understood, and this stimulated forest management systems in which local communities assume part or total control over forest resources. The development of this new approach was greatly stimulated by the 8th World Forestry Congress which was held in Jakarta in 1978 with the theme "Forestry for the people". The "worldview" of foresters regarding the organizational setting of forest management gradually changed and it became accepted that there is a scope for both state and local community stewardship over forest resources.

In summary, five periods may be distinguished in Indonesia's forest management policy :

- * The pre-colonial period with a large variety of indigenous management systems about which little is known;
- * The teak era which started around 1800 in which forest management concentrated on sustained teak production;
- * The forest plantation era, starting around 1930, in which the main focus of forest management was establishing new plantations for industrial purposes. Attention was also given to maintenance of watershed protection forests;
- * The era of rainforest management, which started in 1966, and aimed to sustain industrial timber production from natural forests;
- * The era of community forestry, which began at the end of the 1970s, and focused on tree production systems managed by villagers for their own forest-related needs.

These different approaches to forest management did not replace each other, but supplemented each other. For instance, the teak forests of Java remain a major forest resource. Since the 1980s efforts have been made to establish large industrial plantations (e.g. of *Acacia mangium*, *Eucalyptus* spp, *Paraserianthes falcataria*) on islands other than Java with the aim to make more efficient use of lands with depleted natural forests and of degraded grasslands dominated by

Imperata cylindrica. The community forestry schemes have revealed the presence of existing indigenous forest management systems, many of which seem to have evolved from pre-colonial management systems (Persoon & Wiersum, 1991).

9.3. Topics in silvicultural research

The appointment of the first colonial foresters in 1849 not only represented the start of state-controlled professional forestry in Indonesia, but it may also be considered the start of systematic efforts to improve the cultivation of timber trees. At first, such silvicultural experimentation took place in an informal manner in conjunction with practical efforts to improve forest management. An official forest research institute was founded in 1913, and developed in the subsequent decades into one of the main centres for forestry research in the tropics (e.g. Wolf van Wülffing, 1938; Japing, 1950; Meyer Drees, 1953).

In accordance with the prevalent forest policies, silvicultural research first focused on teak cultivation, and in 1920 the first dissertation on teak cultivation was published (Beekman, 1920; Becking, 1928). Until the 1970s most silvicultural research focused on plantation forestry as the main silvicultural model. Research was concentrated on establishment and maintenance practices including artificial regeneration, weeding, thinning and protection against pests and diseases. The research had a strong autecological basis stressing the influence of biotic and abiotic elements on the growth of commercial tree species. Although the possible effect of nurse crops and shade trees on the timber trees did receive some attention, it was generally considered that mixed stands were too complex and too costly to establish and maintain (e.g. Van Alphen de Veer, 1953). Consequently, most silvicultural research on plantation forestry was dominated by the view that monocultures are technically and economically superior to mixed stands. This view seems to persist to the present time, notwithstanding the fact that since 1950 concern has been voiced about the influence of monocultures on soil properties and on resistance against pests and diseases (e.g. Steup, 1955).

The state of silvicultural knowledge as it existed at the end of the 1940s is reflected in the silvicultural textbook of Beekman (1949). In this book more than 60% of the text is devoted to silvicultural descriptions of four important commercial tree species *Tectona grandis*, *Altingia excelsa*, *Pinus merkusii* and *Eusideroxylon zwageri*. Since then, much information has been collected on additional species and important advances in the field of plantation forestry have been made, e.g. on tree breeding (Soerianegara, 1974) and symbiotic relations between trees and micro-organisms (e.g. Smits, 1983).

The 1966 decision to exploit the rainforests on other islands marked an important new phase in silvicultural research. Attention focused on natural forests as a silvicultural model. Rather than concentrating only on artificial regeneration, attention broadened to include techniques to stimulate natural regeneration of desirable tree species, e.g. *Dipterocarpaceae*. An important new silvicultural principle emerged: tree harvesting was not considered purely exploitation, but

also an important silvicultural practice. The research basis moved from autecological to synecological processes, with special attention to competition between tree species and synergetic relations between trees and other ecosystem components (Soerianegara, 1973; Soerianegara & Kartawinata, 1985; Smits, 1983).

During the community forestry era further adjustments in respect to the object of silvicultural research took place. Attention focused on production systems and tree species preferred by villagers, both on state forest lands or private farmlands, and including timber, fruit and multi-purpose tree species. It was gradually realized that many farmer-managed indigenous silvicultural systems are present in Indonesia. In contrast to the assumptions of professional foresters about the superior nature of monocultures, many of these indigenous silvicultural systems are characterized by mixed tree stands and/or the integration with agricultural crops. Such mixed stands are preferred by villagers, because they can provide a multitude of useful products for household needs ranging from fuel- and construction wood to edible products for people and livestock and medicinal products. Furthermore, these mixed plantations provide protection against production losses due to pests, diseases and unfavourable weather. The silvicultural significance of these indigenous silvicultural systems are now being recognized (e.g. Wiersum, 1980; Michon & Bompard, 1987). Several studies have described the silvicultural characteristics and dynamics of these systems (e.g. Wiersum, 1982; Weinstock, 1983; Soemarwoto et al., 1984; Berenschot et al., 1988), but efforts to adapt these systems further or to develop analogous systems through silvicultural research have only recently started (Kartasubrata, 1990 & 1991; Bratamihardja, 1990).

There are several indications that the further development of silvicultural research within the framework of community forestry may bring with it very significant changes in the approach of silvicultural research. As the repertoire of silvicultural practices has been augmented with agroforestry practices, several research methods from crop science are becoming incorporated in silvicultural research. Obviously many research questions deal with the interactions of different species (both tree species and agricultural crops), and how to guide silvicultural processes in uneven-aged, mixed-species plantations. In addition to this extension of research methods, it seems that the new research approach may ultimately have important repercussions on a more general level of research methodology.

9.4. Emergence of a new paradigm for silvicultural research?

As discussed above, conventional silvicultural research has always proceeded within a "worldview" in which it was taken for granted that actual silvicultural management was carried out by a professional forest service and under state control. The research on improved silvicultural management of either natural forests or plantation forests could proceed from the assumption that the objective for management had been clearly formulated in forest policy and that it was well-understood by managers. Furthermore, state control over forest areas assured large management units in which management practices could be applied over relatively large

areas. Consequently, silvicultural research could proceed from

- a well-established body of professional knowledge, and
- a general understanding about the objective, i.e. greater production of commercial products at acceptable costs and without undue deterioration of site productivity.

These basic assumptions stayed intact, even when studies were extended from forest plantations to natural forests.

However, within the context of community forestry these assumptions are no longer valid. Much of the new silvicultural research can only partially be built upon established scientific knowledge. In contrast, much information on the feasibility of uneven-aged, mixed species tree cultivation systems is stored in the existing indigenous forest and agroforestry management systems (Persoon & Wiersum, 1991). Therefore silvicultural research within the context of community forestry should combine scientific and indigenous knowledge. The occurrence of indigenous forest management systems is often very location specific. The identification of possibilities for improved cultivation techniques should therefore be based on a location-specific problem analysis rather than on a general scientific problem identification only. Thus it is necessary to carry out diagnostic surveys, to collect information about the presence and functioning of indigenous silvicultural practices and on forest management problems perceived by local people.

Secondly, not only does the knowledge-base for research change, but the objective for silvicultural management may alter. Local communities often have different objectives than professional foresters in managing forest resources, e.g. they may optimize subsistence production of multiple products (including many non-wood forest products) instead of maximizing production of industrial commodities. Or they may manage forests primarily as an input to their farming enterprises rather than for direct production of tangible end products. These objectives may vary according to socio-economic and cultural status. Consequently, in community forestry, a silvicultural researcher is confronted by greater managerial variation than in conventional forestry. This hampers a clear-cut identification of the objectives (e.g. optimization of production of specific main product on a multi-year basis versus optimization of annual outputs of multiple products; yield maximalisation versus risk avoidance).

The changed context of silvicultural research demands adaptations in the planning, design and evaluation methods. The importance of carrying out diagnostic surveys was mentioned earlier. Experimental designs should recognise the different management objectives of local forest managers and their preferences for species mix, planting configurations and maintenance techniques. It may not be possible to cover adequately all this variation in conventional experimental designs. Due consideration should be given to the fact that farmer's opinion about the performance of a system is usually not based on the performance of a single component, but rather on overall system performance. Consequently, it may not be appropriate to test differences between treatments by factorial analysis of production characteristics as is usually done in conventional silvicultural research. Rather, it may be more useful to evaluate trials on the basis of assessments of villagers' perceptions about the usefulness and practicality of systems or techniques. Such new approaches to the design and evaluation of silvicultural trials seem to have

the best chance of success when studies are carried out in cooperation with local managers rather than by silvicultural researchers in isolation. To adjust the experimental situation to the practical setting, it may be appropriate to carry out studies under farmer-controlled conditions rather than under researcher controlled conditions.

9.5. From taungya cultivatin to full rotation agroforestry

The important changes in silvicultural research methodology presently emerging in response to the organizational setting of community forestry, may be illustrated by the history of research on taungya cultivation in Indonesia.

Taungya, the temporary intercropping of food crops by local farmers in young forest plantations, is a common technique for reforestation in Indonesia. It was first used in the 1870s to establish teak plantations in Central Java, and became widespread. During the 20th century it was used to establish plantations of *Pinus merkusii*, *Agathis dammara*, *Altingia excelsa* and *Swietenia macrophylla*. The technique was adopted (Becking, 1928; Beekman, 1949):

- to reduce establishment costs of teak plantations and to earn an income from agriculture during the juvenile stage of the plantation,
- to improve maintenance of young tree stands through intensive weeding,
- to reclaim waste lands with agriculture before establishing tree plantations,
- to help solve local shortages of good agricultural lands.

Taungya cultivation was considered an effective means of reforestation. Its contribution to improving the welfare of local people was considered subsidiary to successful establishment of timber plantations; e.g. in 1953 it was stated that "a prerequisite of taungya is forestry, ... the own objectives of the forest enterprise may not be hindered by increasing food production " (Hellinga, 1953). This view was reflected in research which concentrated on the use of taungya as a reforestation technique. Attention focused on the effect of various crops on teak growth and the effectiveness of the practice in comparison with other regeneration techniques (Becking, 1928; Coster & Hardjowasono, 1935).

Only in the 1970s the possibility of improving the crop component of the taungya system was considered (Kartasubrata, 1979; Wiersum, 1982). Under the "prosperity approach", which formed one of the initial community forestry programmes in Indonesia, efforts were made to achieve a better balance between the needs for local community development and efficient timber production for commercial needs. Within this policy framework, taungya cultivation was intensified through the introduction of high-yielding crop varieties, fertilization and crop protection measures coupled with improvements in land preparation and soil tillage. These improved cropping practices increased dryland rice production from 700 - 1000 kg/ha to 2000 - 3000 kg/ha, with similar increases in maize production. Tree growth also profited from the fertilization. Later studies looked also at the possibility of increasing the spacing of timber trees to lengthen the cropping period. In general, the intensified taungya practices proved to be

profitable to both farmers and the forest service, and in 1990 the system was applied on 75% of the total reforestation area on Java (Simon & Wiersum, 1992).

Notwithstanding the widespread acceptance of intensified taungya cultivation, this silvicultural practice has not yet solved the problems of high population pressure on the Javanese forest areas. Consequently, a new silvicultural practice called "full rotation agroforestry" is now being tested. This practice should allow further increase and continuity in crop production for local farmers in state forest plantations (Bratamihardjo, 1990). The practice is based on the principle of intercropping during the full plantation cycle from planting to harvest. The agricultural crops that farmers are allowed to plant are not restricted to annuals, but include also fruit trees and multipurpose trees. These trees can make up 20% of the stand. Obviously, this approach allows for a wide variation in species mix and planting configuration of the intercrops. The most effective combination will not only depend on site conditions and kind of timber species present, but equally on socio-economic conditions of the farmers who are in charge of managing the intercrops. To ensure effective progress in developing locally adapted systems, important new approaches in silvicultural research methodology have been developed (Kartasubrata, 1990 & 1991) and include:

- * Location specific silvicultural trials based on diagnostic surveys;
- * Involving farmer groups in the management of experiments rather than relying on researcher controlled conditions;
- * Evaluating experiments on basis of both quantitative production data and qualitative information about farmers opinions.

The diagnostic survey formed an essential part of the research methodology. The purpose of this survey was to be able to plan trials on a location specific problem identification instead of on a generalized scientific problem identification. The objectives of this survey were:

- * To assess the benefits enjoyed by villagers from the forest as well as local opinions about how these benefits could be improved in a sustainable manner;
- * To understand the social dynamics which underlay the differential needs of various forest user groups;
- * To discover existing indigenous forest management and utilization practices.

The findings of this survey served as a basis to design actual field trials at different experimental sites. Farmer groups were established to facilitate the design and management of these trials. The purpose of these groups was not only to promote cooperation between researchers and local farmers, but also to stimulate self reliance of the farmers in forest management and community development activities. Quantitative data were collected on the survival and growth of both forest trees and agricultural crops under different conditions of tree spacing, fertilizing, and pruning/thinning regimes, as well as on erosion rates. Additional data collected reasons why farmers elected or declined to participate in the experiment (e.g. in relation to socio-economic status and functioning of the farmer groups) (Kartasubrata, 1990 & 1991).

9.6. Conclusion

Indonesia has a history of over a century of silvicultural research. Important changes in the nature of this research included the change from even-aged monocultures to natural forests and multi-species, uneven-aged forest plantations and agroforestry systems. This evolution in the nature of the object under study had important repercussions on the choice of silvicultural techniques to consider as well as the ecological models on which studies were based. For a long time the research was defined by the assumption that silvicultural management could only be carried out by professional foresters and under state control over forest lands. These assumptions focused attention almost exclusively on developing efficient techniques for production of timber and other industrial products. Since the end of the 1970s this "worldview" underlying silvicultural research has gradually started to change and the research focus has also been directed at forestry systems providing (subsistence) products for local villagers with management responsibility in the hands of local communities and private farmers. These new assumptions about the scope of silvicultural management brought important changes in the general research approach. Originally, research was based exclusively on scientific knowledge, carried out under scientist-controlled conditions, and focused on the technical feasibility of silvicultural practices. Under the new approach, research is not only directed improving practices, but also at evaluating the usefulness and practicality of these practices by various forest managers. Studies are often based on a combination of scientific and indigenous knowledge with experiments carried out jointly by researchers and local people.

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Chapter 10

SOCIAL FORESTRY: DIVERSIFICATION OR REVOLUTION IN FORESTRY

10.1 Introduction

The central research objective of this study is to elucidate whether the emergence of the concept of social forestry has brought about a paradigmatic change in either forestry science or forestry as a professional institution. A paradigm refers to a disciplinary matrix which covers the entire constellation of disciplinary values and beliefs; this disciplinary matrix includes a basic world-view and group commitments, as well as related ideal-typical exemplars. The research objective was therefore operationalized in four main research questions:

1. What are the major characteristics of the disciplinary matrix of conventional forestry?
2. What events resulted in the emergence of social forestry? How did this emergence compare to the 'normal' development of conventional forestry, and did it involve a major change in world-view?
3. Did any changes in the constellation of group commitments of conventional forestry emerge as a result of the development of social forestry? If yes, what was the nature of those changes?
 - 3.1 What are the major characteristics of social forestry, and how are these reflected in conceptual generalizations?
 - 3.2 What new basic concepts for problem solving are implied in social forestry?
4. Do any changes in disciplinary matrix relate to forestry as a science or to forestry as a professional institution?

In order to answer these questions, first in Chapter 2 a tentative outline of the disciplinary matrix of conventional forestry was constructed. The prevalent perspectives in conventional forestry were further elaborated by sketching the history of one of the major concepts for problem-solving, i.e. the concept of sustainability (Chapter 3). Secondly, a review of the historical context of the development of social forestry was presented (Chapter 4) and the social forestry approach was systematically conceptualized (Chapter 5). Thirdly, the roles of, and the relations between, professional and non-professional practitioners in social forestry were expounded (Chapters 6, 7 and 8). In addition, some of the implications of social forestry with respect to research on technical forestry issues were explored (Chapter 9). In this chapter 10 this information will be further assessed as regards the question whether, and to what extent, social forestry brought with it changes in the disciplinary matrix of forestry.

As the first research question was addressed already in Chapter 2, the chapter will be focused mainly on the research questions 2, 3 and 4. The discussion is structured as follows. First, in Chapter 10.2 the emergence of social forestry and its relation to the 'normal' development of conventional forestry will be evaluated. Next, in Chapter 10.3 an assessment will be made of whether during the development of social forestry new group commitments did emerge. Attention will be given to whether changes occurred in either major conceptual generalizations and/or perspectives on problem solving. On the basis of the information from these two sub-chapters, in Chapter 10.4 the repercussions of social forestry on forestry science and forestry as professional practice will be evaluated,

and the emerging new disciplinary matrices for forestry science and forestry as a professional institution will be constructed. Finally, in Chapter 10.5 a conclusion will be drawn concerning whether, and to what extent, social forestry involved revolutionary changes in the disciplinary matrix of forestry science and/or forestry as a professional institution.

The answers to the research questions obviously depend on the interpretation of the concept of social forestry. As discussed in Chapter 5 in many publications the concept is used in a general way as referring both to forest management practices and forest policy measures. For analytical purposes it was proposed to differentiate the term into two more specific concepts, e.g. social forestry in a restricted sense as a development strategy of professional foresters, and community forestry as forest management activities undertaken by rural people. However, the discussion on whether 'social forestry' involves a paradigmatic change in forestry is based on the prevailing use of social forestry in a general sense rather than on its more restricted meaning as a development strategy. It might even be argued that the rather ambiguous definition of the term has contributed to the lack of precise understanding of its meaning and thus to the question of its significance. Consequently, unless otherwise specified, the term 'social forestry' will be used in this chapter in its all-embracing, but ambiguous sense.

10.2 Emergence of the concept of social forestry

The development of the concept of social forestry was based on two separate, but in outcome equivalent, considerations (Chapter 4). In the first place it was recognized that the principle of social justice demanded that more attention to the forest-related needs of rural communities and to the optimal fulfilment of these needs should be given. In the second place, on pragmatic grounds it was decided, that in view of the failure of state forestry adequately to control deforestation and forest degradation, more community involvement in forestry was needed. Thus, the identification of social forestry was to a large extent in line with the conventional perspective on problem situations, i.e. the ineffectiveness or inefficiency of prevailing practices to conserve and properly regulate the use of forests. No major denial of the group commitments regarding basic problem situations was involved, but rather the prevailing operationalization of the perspectives on problem solving through multiple-use and sustained yield were found to be wanting in addressing major forestry problems. Social forestry was identified as an approach towards further diversification of problem solving techniques in response to operational weaknesses in the conventional approaches to solving forestry problems. Rather than relying on government action only, community involvement in forest management should also be stimulated. As demonstrated in Chapter 3, as a result of changing social values on the one hand, and operational weaknesses of the prevailing forestry approaches on the other, a similar process of diversification in forestry took place with respect to the concept of sustainability. Thus, the perspectives on the basic problem situation inherent in social forestry paralleled those of conventional forestry.

The need to further amend the prevailing approaches to forest management was primarily perceived and articulated by policy institutions and not by scientific institutions. Thus the

identification of social forestry did not result from a scientific crisis in the sense of Kuhn, but rather from a problem identification at policy level. To solve this problem forestry policymakers expressed the idea that several current forestry problems could best be solved by more actively stimulating involvement of local people in forest management. This political grounding of the new approach to forestry was also in full agreement with the prevailing perspective in conventional forestry on problem solving being based on political legitimacy (Chapter 2).

The emergence of social forestry did also not challenge the basic world-view of forestry. As demonstrated by the above discussion, forestry was still considered to be focused on the rational and efficient management of scarce forest resources for human benefits. Furthermore, scientifically developed forest conservation and management practices were still being considered as essential tools for rational management. This is demonstrated by the lack of conceptual differentiation between community forestry as a management practice of local people and social forestry as intervention practice by professional foresters (Chapter 4). Thus, similar to conventional forestry, the world-view of social forestry can be characterized as a vision of enlightenment with scientifically developed forest conservation and management being considered as an essential tool for rational management of forest resources in order to contribute to human welfare and wellbeing. However, due to changing social conditions the interpretation of what to consider essential human benefits were amended. Moreover, because of pragmatic considerations it was found necessary to stimulate participation of local communities in what still were basically considered as professional forestry projects.

10.3 Group commitments in social forestry

Although the emergence of social forestry was consistent with several major normative perspectives of conventional forestry, as discussed in Chapter 4 during the operationalization of this concept gradually several new normative assumptions emerged. The question thus arises, to what extent the new insights gained during the development of social forestry have brought about new disciplinary perspectives on either conceptual generalizations and/or new concepts for problem solving.

10.3.1 Main conceptual generalizations in social forestry

The most distinctive feature of the concept of social forestry is the notion that local communities should be more intensively involved in forest management. As discussed in Chapter 4, during the operationalization of this concept it became recognized that the stimulation of community involvement in forest management can only be successful if attention is given to the full range of forest - people interactions rather than to selective interactions as was the case in conventional forestry. Consequently, a much wider variety of forest managers is considered than in conventional forestry. Moreover, professional foresters are not considered exclusively in a role of forest manager, but also in a role of facilitator of forest management by local communities. In order to clarify the different

categories of actors involved in social forestry (in its generic sense) as well as their specific tasks, in Chapter 5 it was proposed to define social forestry in a restricted sense as a policy strategy and community forestry as a management activity. This conceptual distinction was subsequently used in Chapters 6, 7 and 8 to assess the emergent characteristics of social forestry in more detail. From this information it can be inferred that two major new conceptual generalizations became identified during the operationalization of the concept of social forestry: diversity in forest management situations, and normative pluriformity.

Diversity in forest management systems

As discussed in Chapter 2 a major normative perspective underlying conventional forestry was the notion of forest management being ideally based on state custody and professional management organization. In contrast, social forestry is based on the understanding that a much greater variety of social arrangements for managing forest resources are possible in the form of either state custody, common property, private property or joint/collaborative management schemes (Chapter 4). The various types of community forest management cannot be considered as down-scaled versions of forest management systems under state custody and/or professional control. Rather they have their own specific features, not only regarding organizational features, but also regarding perspectives on relevant forest resources and objectives of forest management (Chapter 4) and technical management practices (Chapter 8 and 9).

Normative pluriformity in forest resource management

As illustrated in Chapter 6, when the first social forestry projects started, in most cases it was considered that to ensure local participation it would be necessary to make local communities better aware of the values of forests and to provide them with appropriate knowledge on forest management practices. However, as elaborated in Chapter 6 and 7, it gradually appeared that in many cases the main hindrance to effective community forest management was not primarily the lack of community knowledge on forest management practices, but rather the lack of understanding of professional foresters to understand the community perspectives on what to consider relevant forest resources and relevant types of forest management.

As discussed in Chapter 5 and 8, between local communities and professional foresters managing public forests or commercial estates, significant differences in approach to forest management exist. The local forest managers have mostly rather different motives, objectives, skills and knowledge than the professional foresters, and they are usually operating under entirely different societal (institutional) and technical conditions, as compared to conventional forest management. In many cases local resource management systems are implemented by communities which are not yet firmly incorporated in political-administrative systems. Moreover, in some cases they are (semi-)subsistence oriented. As forest resources form an integral part of the community's living environment, within local communities the decision-making on forest management forms an integral part of the local livelihood strategies. Management objectives are focused on the maintenance of forests and/or trees as a component of an integrated village or household land-use systems or as a component of their cultural system. In contrast, professional forest management is considered as a distinct activity with decisions on

management being made within the framework of a specialized forestry organization. And in the case that professional foresters plan interventions to stimulate community forestry, they do so mostly on the basis of objectives which are related to general social and environmental considerations such as rural development and forest conservation rather than on the basis of local considerations.

This normative pluriformity regarding forest resource management (Wiersum, 1997) involves not only different perspectives on the values of forest resources and objectives for forest resource management, but also different perspectives on what to consider as relevant vegetation types and management practices (Chapter 8). As a result of this normative pluriformity, social forestry projects are often faced with the question of whether development interventions should primarily be based on the community's perspectives or on the professional perspectives regarding relevant forest types, management objectives and practices, and organisational structures.

10.3.2 New perspectives concerning problem solving in social forestry

The emergence of social forestry did at first not challenge the major disciplinary perspectives on problem solving such as political legitimacy and even professional action (Chapter 10.2). However, concomitant with the emergent new conceptual generalizations about diversity in forest management situations and normative pluriformity regarding forest management, it also became recognized that a number of basic concepts for problem solving needed to be readjusted. As illustrated by the discussions in Chapters 6, 7 and 8, the major lesson learned concerned the recognition that the conventional organisational standard for social coordination in forestry in the form of public forest management did not suffice. Instead new standards of social coordination in forestry need to be developed in order to deal with the issue of normative pluriformity.

In response to the need to give more attention to the dimension of social coordination in forestry, much attention has been given to the identification of appropriate concepts on how to effectively arrange coordination between the various categories of forest users and forest interest groups. The impetus for this search originated from questions generated during the implementation of social forestry development interventions (Chapter 6 and 7). In trying to address the issue of social coordination increasingly concepts from social science were incorporated into forestry (Peluso et al., 1995; Shepherd, 1997). During this process four, partly interrelated, new theoretical perspectives emerged: (i) actor-specific approaches to forest management, (ii) specific features of community forest management, (iii) embeddedness of community forestry in larger social processes, and (iv) platforms for resolving forestry conflicts.

Actor-specific approaches to forest management

In conventional forestry one of the main perspective on problem-solving concerns the concept of multiple use (Chapter 2). During the development of social forestry it was recognized that a corollary to this perspective is the perspective of multiple users. In order to understand the user-group specific commitments to forest management and to

stimulate user-group specific management practices an actor-oriented approach is needed. As discussed in Chapter 1.6 the actor-oriented approach in development sociology aims at the understanding of the specific characteristics of various actor categories engaged in development projects, as well as the interactions between these actor categories (Long, 1989). It focuses on the deconstruction of the empirical reality of development projects, and on the identification of the different ways in which actors deal, organizationally or cognitively, with problematic development situations. It assumes that local communities have their own agency. Within this approach therefore much attention is given to the identification of indigenous knowledge and practices (Warren et al., 1992). As illustrated in Chapters 6, 7 and 8 this theoretical perspective has proven to be very useful for obtaining a better understanding of the scope of social forestry.

Specific features of community management organizations

As discussed in Chapter 4, many community management systems are based on some form of communal or group activity. Up till the middle of the 1980s it was usually believed that communal forest lands were subject to 'the tragedy of the commons' and that effective forest resource management could only be accomplished under either state or private ownership. This perspective was challenged when, in the middle of the 1980s, a distinction was made between open-access resources and common-property resources (NAS, 1986). This brought with it a renewed scientific interest in the concept of common property forest management, and in the question under which conditions and organisational settings this is feasible (e.g. Berkes, 1989; Ostrom, 1990). These new scientific insights proved to be very valuable for improving understanding about the options for community and collaborative forest management based on communal or group action (e.g. Arnold, 1998; Borrini-Feyerabend, 1996).

Embeddedness of community forestry in larger social processes

One of the major objectives in social forestry concerns the equitable distribution of forest-related benefits (Chapter 2). Whether this can indeed be accomplished, depends on the social relations between various actor groups engaged in community forestry. For assessing whether in actual cases this objective is fulfilled, use can be made of the theories of political ecology. This analytical approach emphasizes the social relations within which different categories of resource users are embedded and its effect on the ways they use the environment. It assumes that larger social structures and political-economic processes affect the actions of local resource users. Therefore it analyses the linkages between these actions and broader political processes that structure the social and physical environments of those resource users (Peluso, 1992).

Platforms to regulate conflicting normative perspectives

In the forest - people relation three types of conflicts may develop (Leary, 1985): biotic - biotic, biotic - human, and human - human. In view of the organizational setting of conventional forestry, traditionally the attention of foresters focused mainly on addressing the first two types of conflicts (Chapter 2). In conventional forestry it was considered that professional foresters were in charge of forest management. They had a legal mandate which gave them direct control over the forest resources. This enabled a concentration of the attention in decision-making on technical manipulation of these resources. The objectives for these manipulations were derived from their perceptions about the

expectations of the various categories of forest users. It was taken for granted that these expectations were communicated in a fairly clear manner through the political and economic (market/price) systems. In response to these communications, forest management objectives regarding the production of raw material (especially wood) and/or protection of the natural environment were formulated. Thus the activities of professional foresters were predominantly biologically, technically and business economics oriented.

The major characteristic of social forestry is the fact that professional foresters do not have direct control over the natural resources as is the case in conventional forestry. These resources are controlled by managers from local communities. Moreover, the professional foresters are confronted with a normative pluriformity regarding forestry. Consequently, during the development of social forestry attention became increasingly focused on solving human - human conflicts, and on the question how the divergent values underlying different approaches to forest management can be resolved. Rather than government legislation or market regulation, social negotiations are increasingly considered as a suitable means to overcome such conflicting values.

Indeed, from the experiences in social forestry, it has been learned that various stakeholders have, and probably always will have, different experiences, positions, opinions and objectives as regards forest management. There is no single, absolute and permanent solution to what should be considered as the most rational technical and organisational approach to forest management (Andersen et al., 1998). Moreover, due to the past lack of scientific attention to many forestry practices favoured by local communities (Chapter 8), in many cases there may also be lack of agreement on the technical feasibility of management practices (c.f. Chapter 9).

		Values regarding resources and management objectives	
		Agree	Disagree
Beliefs concerning technical feasibility	Agree	Computation by professionals	Bargaining in representative structure
	Disagree	Majority judgement in collegial structure	Inspiration in non-normative structure

Figure 10.1 Platforms for decision-making on forest management by different stakeholders under various normative conditions (modified from Brown, 1995)

In view of this normative pluriformity surrounding forest resource management, it will mostly not be possible to base negotiations regarding the most appropriate form of forest management on impartial application of technical computations by professional foresters, as was considered the norm in conventional forestry. Rather, depending on the degree of (dis)agreement on resource values and management objectives or on technical feasibility of practices, various other options for conflict negotiation should be considered, such as collegial judgment, or bargaining in representative structures (Figure 10.1). Consequently, in social forestry new methods for conflict resolution are being considered such as the establishment of communication platforms and the creation of a mediating system of organizational checks and balances (Röling, 1994; Daniels & Walker, 1996).

10.3.3 Conclusion

Although the original identification of the concept of social forestry cannot be considered as a 'revolutionary' new development in forestry, the implementation of this new forestry approach gradually brought about modifications in several normative perspectives of conventional forestry:

- * A change from a normatively-defined to an empirically-defined focus on forest management.

The perspective of multiple use has been enlarged by the consideration of multiple users and multiple organisational approaches to forest management. The ideal-typical exemplar of forest under state custody being managed by professional foresters was abolished, and a larger variety of forest - people interactions than conventionally considered are now taken into account. It became recognized that in many cases local communities have developed their own specific types of forest management systems. These may have quite different characteristics with respect to both resource values, management objectives, forest types and management practices than professionally-managed forests. As a consequence of the development of social forestry attention became therefore focused on the total empirical range of forest management systems rather than on a selective range of normatively-defined forest management systems only.

- * A differentiation between 'professional' and 'non-professional' forestry practice as well as within 'professional' forestry practice.

As a result of the lessons learned during the process of stimulating community involvement in forest management, the own specific nature of community forest management systems have become recognized. Many indigenous forest management systems have been identified which evolved within local communities without any external professional assistance. Scientifically developed forest practices are therefore not any longer considered as the norm for forest management but rather as a tool. Moreover, the task of the professional forester is not longer conceived as acting as a resource manager, but also as acting as a facilitator assisting local communities in attaining effective forest management.

- * Increased attention to the dimension of social coordination in forestry.
The perspectives on political legitimacy and state custody have been replaced by a

perspective of involvement of all relevant stakeholder groups. The conventional perspective of state regulation added with market regulation as a means to resolve forestry conflicts was augmented by an approach of social negotiation and consensus building. And the perspective of professionals acting as guardians of the forest on the basis of their ability to 'compute' the most rational management regimes has been changed to a perspective of diversity in platforms for decision-making on forest management.

10.4 Repercussions on forestry science and forestry as professional practice

The emerging new perspectives on forestry have impacted on both forestry as a professional practice and forestry as a science. They also resulted in a gradual institutional differentiation between forestry scientists and professional forestry practitioners.

10.4.1 The impact of social forestry on forestry as professional practice

The development of social forestry has led to the recognition that the organisational setting of forest management should no longer be normatively defined, but empirically grounded in a pluriform social setting. Consequently, the ideal-typical exemplar in which public forest management represents the optimal organisational and technical standard for forest management has changed. The conventional perspective of professional foresters as guardians and managers of forests acting as impartial judges on the question of how to balance the various demands for forest products and services has been diversified into a perspective in which all relevant stakeholders are involved in guarding and managing forests. The attention of professional foresters cannot be focused any longer solely on the management and regulation of forests within a pre-defined social setting. Rather, attention should be given to the identification and options for developing forest management activities under pluriform conditions as regards forest use by various user groups and as regards organizational settings. Activities should focus on stimulation of a whole range of location-specific forest - people interactions involving different stakeholder groups. In this perspective professional foresters have the task either of managing the forests themselves or of stimulating and facilitating management by a variety of community organisations.

Thus, social forestry has brought about a new role orientation for professional foresters. Their role evolved from a focus on output quantity to a focus on servicing different forest-user and management groups and on negotiating different perspectives of stakeholder groups on the required quality of forest resources and forest outputs (Kennedy et al., 1998). Rather than being rational and objective guardians of forests focusing specifically on manipulating biophysical resources on basis of pre-defined social norms, they are increasingly becoming social value brokers and conflict management facilitators.

As demonstrated in Chapter 7, their new role requires that professional foresters have knowledge on the forest management objectives of different forest user groups, and on

how to facilitate pluriform organizational structures for managing forests under a wide variety of tenure conditions. They should also have knowledge on how to use various types of incentives for stimulating community forest management effectively. Thus, the development of social forestry has not only brought with it an important change in the role-orientation of professional foresters, but also in their activities (Van Gelder & O'Keefe, 1995; Hobley, 1996). The object of their decision-making can no longer be defined in terms of a natural system, but should be defined in terms of a man-nature system. Furthermore, it cannot be assumed any longer that the technical knowledge of professional foresters is of universal validity, and can be extended in an unaltered way to stimulate the development of community forestry. Rather, the professional expertise needs to be adjusted and balanced with community perspectives and knowledge. This means that in stimulating community forestry it will often not be relevant to apply the existing technical approaches. Innovative management practices should be developed by finding inspiration in location-specific empirical conditions rather than by relying on the conventional normative assumptions.

In summary, whereas in conventional forestry professional practitioners were mostly focused on developing and implementing biological and technical standards under predefined organisational settings, in social forestry they are focused on developing and implementing a set of interrelated biological, technical and organisational standards. This required a major change in the rule-orientation of professional forestry practitioners.

10.4.2 **The impact of social forestry on forestry science**

The operationalization of the concept of social forestry has brought with it important new challenges for forestry science. In attempting to design measures for the conservation and manipulation of forests to provide products and services for village-level benefits, forestry scientists are confronted with a set of community perspectives regarding the nature of forest resources and options for their management, which are rather different from the ones considered in conventional forestry. They are also confronted with the fact that competition between different user categories for different types of forest resources, as well as the number of forest interest groups acting as constituencies for the conservation and use of more or more specific forest products or services, is increasing. As a result two major scientific questions have emerged during the operationalization of the concept of social forestry:

- * What are the various norms and practices to which various categories of either professional and non-professionally trained stakeholders adhere with respect to forest conservation and utilization,
- * How can these varied and often even conflicting values and interests be fairly represented in developing more effective forest management.

As discussed in Chapter 10.3, these questions have resulted in the incorporation of several new perspectives in forestry and the development of new conceptual issues and methodological approaches. These developments impacted to quite some extent on forestry science, especially with regard to issues pertaining to the dimension of social coordination in forestry. These changes have been emphasized by the claim of social forestry involving

the development of a new 'people-centred' paradigm (Gilmour & King, 1989).

However, it may be questioned whether the new perspectives indeed involved a major shift in the disciplinary matrix of forestry science. Forestry science has been defined as concerning the management of forests and forest lands for the continuing use of these resources. As indicated by this definition, forestry science should not be considered as being object related, but rather as being relation-related: neither the forest nor human society is the focal point of forestry science, but the relation between these two objects. The mission of forestry science is to contribute towards rational problem-solving with respect to scarcities which derive from insufficiently controlled utilization of forest resources. With the increase in forest-related scarcities, this basic conceptual generalization of forestry is now more relevant than ever before. Furthermore, the basic identification of the problem, i.e. scarcity of forest resources, has remained unchanged. Within the constellation of group commitments underlying forestry science, these two elements cannot be considered as being in a state of crisis. Rather, the occurrence of new scarcities has resulted in the need to look for new perspectives in problem-solving. Moreover, some of the conventional conceptual approaches to problem-solving and ideal-typical referents to 'problem-free' situations have lost their universal predictive power.

Thus, the concept of social forestry did not bring about any changes in the role-orientation of forestry scientists. Rather it brought with it a diversification in the rule-orientation of forestry scientists, with forestry science no longer being normatively restricted to the organizational setting in which forestry practice historically evolved, but becoming grounded in an empirical setting in which attention is paid to all possible forest-people interactions. This resulted in a progressive development of auxiliary theories, and a gradual amendment of some disciplinary perspectives. However, the newly emerging perspectives cannot be considered as scientifically progressive in the sense that they supersede the old ones. Rather, they are mostly additive to the conventional perspectives. Thus, it is not the basic premise of forestry science that is in a state of crisis, but rather the perspectives how to operationalize these in rational forest management practices.

10.4.3 **Institutional differentiation between forestry scientists and professional forestry practitioners**

The recognition of the need to differentiate between 'professional' and 'non-professional' forestry practice, as well as to deal with the empirical diversity in forest management conditions, has brought with it important repercussions on the relationship between forestry scientists and professional forestry practitioners. Traditionally these two groups of practitioners held close institutional links (Chapter 1.2). The development of social forestry has brought to light the fact that a third category of nonprofessionally-trained forestry practitioners need to be considered. Between professional foresters and such community-level forestry practitioners important differences in perspectives concerning managing forest resources and its institutional setting exist. Consequently, from a scientific point of view professional foresters can no longer be considered as ideal-typical forest managers, but only as one of the potential groups of forest managers. The aim of

forestry science should be to focus on all existing forest management conditions rather than to focus on one specific institutional setting. Thus, the recognition of the specific features of community forestry systems has resulted in the understanding that forest science can no longer be exclusively devoted towards designing rational practices for professional foresters being in charge of specialized forest enterprises. Attention should also be given to obtaining an understanding of the features and development options of indigenous forest management practices within the framework of integrated community land-use systems. This development has resulted in a loosening of the intimate relations between forestry as a science and forestry as institutionalized practice. As a consequence, instead of the conventional disciplinary matrix of forestry as both a science and a practice, gradually two more specific disciplinary matrices of forestry as a science and forestry as a professional institution are emerging (Table 10.1 - 10.3).

10.5 Conclusion

The original identification of the concept of social forestry was fully consistent with several of the conventional perspectives on the nature of forestry. This new approach to forestry was based on a problem identification at policy level concerning the ineffectiveness of prevailing practices for conserving and properly regulating the use of forest resources. Thus it did not significantly impact on the prevailing perspectives of problem situations and political legitimacy. The newly identified approach did not challenge the basic world-view underlying forestry. This still can be characterized as a vision of enlightenment with scientifically developed forest conservation and management being considered as an essential tool for rational management of forest resources in order to contribute to human welfare and wellbeing.

Also during the subsequent operationalization of the new concept of social forestry, a number of major group commitments did not undergo a 'revolutionary' change either. Three main conceptual generalizations of forestry were hardly affected, i.e.

- * Forestry is a science and a practice regarding the effective and efficient management of forest resources in order to fulfil human needs and aspirations,
- * Forestry focuses on optimizing forest - people relations in order to conserve the multiple functions of forests and to ensure a rational combination of resource use,
- * Forestry science and professional practice is characterized by an interdisciplinary approach involving systematized knowledge regarding natural processes, technical practices and social coordination of actions.

Moreover, the concepts of multiple use and sustainability remained essential perspectives as regards principles for problem solving.

Table 10.1 The conventional disciplinary matrix of forestry as a science and practice

Basic world-view	A vision of enlightenment with scientifically developed forest conservation and management being considered the basis of rational professional forest resource management in order to contribute to human welfare and well-being.
Group commitments	
* Shared perspectives on problem situations	The ineffectiveness or inefficiency of prevailing practices to conserve and properly regulate the use of forest resources.
* Conceptual generalization	<ul style="list-style-type: none"> - Forestry is the science and practice of effective and efficient management of forest resources in order to fulfil human needs and aspirations. - Forestry focuses on optimizing forest - people relations. It aims at the conservation of the multiple functions of forests and at a rational combination of resource use. - Forestry science is a strategic science of composite interdisciplinary nature involving systematized knowledge regarding natural processes, technical practices and social coordination of actions.
* Shared perspectives on problem solving	<ul style="list-style-type: none"> - Multiple-use - Sustained yield - Political legitimacy and state custody - Professional foresters as guardians of the forest
Ideal-typical exemplars	<ul style="list-style-type: none"> - State regulation with additional market regulation as means to resolve resource conflicts - Public forest management as organisational and technical standards - Dominant use with timber primacy under the rubric of multiple use - Biological and technical management standards

Table 10.2 Emerging new disciplinary matrix of forestry science

Basic world-view	A vision of enlightenment with scientifically developed forest conservation and management being considered a major tool to assist in the improvement of a diversity of forest management systems so as to contribute to human welfare and well-being.
Group commitments	
* Shared perspectives on problem situations	- The ineffectiveness or inefficiency of prevailing practices of both local communities and professionals to conserve and properly regulate the use of forest resources.
* Conceptual generalization	<ul style="list-style-type: none"> - Forestry is a practical science concerning the effective and efficient management of forest resources in order to fulfil human needs and aspirations. - Forestry focuses on optimizing forest - people relations. It aims at the conservation of the multiple functions of forests and at a harmonious combination of resource use by different categories of forest users. - Forestry science is of composite interdisciplinary nature, it involves systematized knowledge regarding natural processes, technical practices and social coordination of actions. - Forestry science should be rooted in the empirical diversity in systems for using and managing forests, each of them being characterized by a specific relation in biological, technical and organizational features. - Forestry is characterized by a normative pluriformity concerning forest resource management. When developing management systems both professional and community perspectives to forest management need to be considered.
* Shared perspectives on problem solving	<ul style="list-style-type: none"> - Multiple-use involves multiple categories of forest users and multiple forest types - Multiple approaches to sustainable management - Diversity in management organization with forestry being practiced either in specialized enterprises or as a component of integrated land-use system - Diverse platforms for decision-making on forest management under different normative conditions
Ideal-typical exemplars	<ul style="list-style-type: none"> - Empirical variety in wood and non-wood forest products as well as environmental and cultural values - Diversity of management situations depending on status of forests as public, common property or private resource - Solving of resource conflicts through state regulation, market regulation and/or social negotiation - Basing biological and technical management standards on both professional and indigenous knowledge - Standards for social negotiation and facilitation of forest management by non-professionally trained people

Table 10.3 Emerging new disciplinary matrix of forestry as a professional institution

Basic world-view	A vision of enlightenment with scientifically developed forest conservation and management schemes being considered a major tool to assist in the improvement of the multiple types of forest management so as to contribute to human welfare and well-being.
Group commitments	
* Shared perspectives on problem situations	- The ineffectiveness or inefficiency of prevailing practices to conserve and properly regulate the use of forest resources.
* Conceptual generalization	<ul style="list-style-type: none"> - Forestry concerns the professional practice regarding the effective and efficient management of forest resources in order to fulfil human needs and aspirations. - Forestry focuses on optimizing forest - people relations. It aims at the conservation of the multiple functions of forests and at a harmonious combination of resource use with a minimization of conflicts between various user groups and different forms of utilization. - Systems for using and managing forests are characterized by diverse relations between biological, technical and organizational features. - Development of effective forest management requires the blending of professional knowledge and skills with, where appropriate, indigenous knowledge and management skills.
* Shared perspectives on problem solving	<ul style="list-style-type: none"> - Multiple-use involves multiple categories of forest users and multiple forest types - Multiple approaches to sustainable management - Diversity in management organization with forestry being practiced either in specialized enterprises or as a component of integrated land-use system - Involvement of all relevant stakeholder groups (with attention to people who are directly dependent on forest resources) - Professional foresters should act as resource managers or as facilitators assisting community groups or private entities in implementing effective forest management.
Ideal-typical exemplars for professional action	<ul style="list-style-type: none"> - Empirical variety in wood and non-wood forest products as well as environmental and cultural values - Diversity of management situations in forests which can be state, communally or privately owned. - Combined use of social negotiation, market regulation and state regulation for controlling resource conflicts - Basing biological and technical management standards on both professional and indigenous knowledge - Standards for social negotiation and facilitation of forest management by non-professionally trained people

Nonetheless, the development of social forestry gradually brought about modifications in several normative perspectives in conventional forestry. As a result of the recognition of the need to involve local communities and not to depend solely on professional action, the traditional ideal-typical exemplar of forest being managed under state custody was abolished. It was recognized that efforts to develop more sustainable forest management should concern themselves with empirical diversity rather than focus solely on professional forest management systems. In other words, forest management should be empirically grounded rather than normatively grounded as in the past. Furthermore, if political legitimacy is interpreted in a democratic rather than technocratic manner, and if state custody is not considered as the only rational form of forest ownership, increased attention needs to be given to the dimension of social coordination in forestry. As a result several new conceptual generalizations and new perspectives on problem solving emerged, such as normative pluriformity and conflict negotiation.

As a consequence of these new perspective a major diversification in the institutional setting of forestry has occurred. This diversification involved two changes. In the first place, the development of social forestry has had important impacts on forestry as a professional activity. Foresters are not any longer considered omnipotent guardians of the forests. Rather they are considered professionals, who either manage forests on the basis of objectives of the forest owners, or who facilitate forest management systems of forest owners who are not professionally trained in scientific forestry. In both cases, they should focus attention not only on the ecological and technical dimensions of forestry, but also give much attention to the social coordination of the multiple requirements of different user groups. This has resulted in a profound change in both the role and rule-orientation of professional practitioners.

In the second place, the close institutional links between forestry science and professional forestry have been loosened. In forestry science increased attention is now being given to identifying and assessing the empirical diversity in forest management systems under different social and cultural conditions. And to understanding the advantages and disadvantages of various approaches to forest management under different socio-economic and political conditions. It is now recognized that scientifically developed forestry practices should not be considered as a norm implying professional forest management, but rather as a tool to be used in improving professional or community forest management.

It might well be argued that these changed perspectives on the role of professional foresters and the relations between forestry scientists and professional foresters are so profound, that it may be construed as a revolutionary (or paradigmatic) change in forestry as a professional institution.

However, that does not necessarily imply that a paradigmatic change in forestry science has also taken place. Some of the most important elements of the disciplinary matrix of forestry, notably those regarding the basic world-views and perspectives on problem situation and conceptual generalizations, did not radically change; rather some became further diversified. Thus, it can be argued that the development of social forestry does not involve a paradigmatic change, characterized by a revolutionary change in disciplinary

commitments, but rather a further differentiation in forestry science. This differentiation involves the modification of the historical premises of forestry on the basis of a new empiricism. As a result of the new political legitimization of local participation in forest management, this differentiation involves increased attention to the full range of social and institutional settings of forestry rather than towards professional and state managed forestry only. This brings with it many important new questions with respect to the kinds of management systems that can best operate under different conditions, and how to handle the social negotiation processes needed for deciding upon the required control measures. However, similar to conventional forestry, the effectiveness of all such practices will still be judged on the basis of whether they are effective in diminishing the scarcity in forest resources and whether they ensure sustainable use by various categories of forest users. Thus, the development of social forestry can be characterized as a change in context rather than in content of forestry science, it involves amendments and additions to the conventional disciplinary matrix of forestry rather than its radical replacement. The new approach to forestry does not replace conventional forestry theories as a means to explain anomalies and solving of problems in sustaining forest resources, but rather complement them.

Thus, although the concept of social forestry can be considered as having resulted in a 'revolutionary' change in the institutional characteristics of forestry, it cannot be considered as heralding a paradigmatic change in forestry science.

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Chapter 11

REFLECTION AND CONCLUSION: CHANGING PERSPECTIVES IN FORESTRY

11.1 Reflection 1: changing perspectives in global forestry

In this study attention has mainly been given to the analysis of the reasons behind the call for a 'people-centred' paradigm, a call which emerged in response to the development of social forestry in tropical regions. As was indicated in Chapter 1, in temperate regions a call for a paradigm change in forestry has also been voiced. In this case, the call was for a change from the conventional forestry paradigm to a 'multi-resource' or 'ecosystem management' paradigm (Behan, 1990; Bengston, 1994; Gordon, 1994; Kennedy et al., 1998). At first sight, these two trends seem to be in opposition to each other, each stressing a different node of the forests - society axis which forms the focal point of forestry. Looked at more closely, this impression can be proved to be wrong. Rather than being considered as two antithetical calls for change in forestry, both calls can be considered as contextual variations of a similar call for adjustment of forestry to newly arising forest resource scarcities. Due to the prevailing socio-economic differences between the 'developing' tropical nations and the industrially-developed nations in Western Europe and Northern America, these scarcities take on different shapes.

In the tropical countries the scarcities largely concern various forest-related needs of those categories of the rural population, for whom forests still provide basic livelihood needs. Consequently, forest resources are here to a large extent still being considered for their utilitarian value. In addition these forests may have an important value in the maintenance of the cultural integrity of various tribal groups. In the industrialized countries, many of the utilitarian forest products have either been substituted by industrial products or can be imported from other regions. As a result of urbanization processes, society-at-large does not perceive a scarcity in the utilitarian values of forests, but rather in the value of forest as an environment for recreation and as an eminent representation of nature. Consequently, in these countries forest resources are increasingly valued as cultural assets, with these values being expressed in ecological terms. Thus, in both cases the call for a new paradigm, even if differently expressed, can be considered as a call to adjust forestry to the newly emerging scarcities of forest resources.

As a result of the new public concerns in industrialized countries with the need to preserve ecosystem health and nature values, the call for a change in forest management is often expressed as the need for 'ecosystem management'. A basic premise of this approach is the need to maintain biological diversity and natural ecological processes rather than to maximise resource production (Behan, 1990; Bengston, 1994). However, as already noted in Chapter 1, some advocates of these new approaches to forest management also stress the need to change the tasks of professional foresters from one of scientifically-trained, rational guardians of forest resources to engaged customer facilitators and negotiators (Brown, 1995; Kennedy et al., 1998). Due to the general trend in democratization, interest groups increasingly advocate specific values of forests. These new social values require new approaches to forest management. Consequently, forestry is undergoing a rapid and deep-seated change (Gordon, 1994), which will essentially affect professional forestry activities. The increased emancipation of various stakeholders means that it is no longer possible for forest managers to base their activities on standardized technical measures, derived from the objectives of the forest owner. Rather,

they now have to conceive of forest management as providing for social values (Koch & Kennedy, 1991), and to pay attention to how the output qualities and other outcomes of management are perceived by the various groups of forest users. In some cases they also have to act as a conflict-negotiator in forest-related conflicts (Hellström, 1996; Solberg & Miina, 1997).

Thus, predicated on social and political change, analogous changes in the tasks of professional foresters are taking place in both temperate and tropical countries. In many respects these involve a revolutionary change in the institutional perspectives of forestry. They bring with them major new questions to be studied by forestry science. This requires the incorporation of new concepts for problem-solving in forestry, and brings with it a major diversification in forestry science.

This development is not unique to forestry. In related fields of natural resource management such as land and water management similar developments are also taking place. In such cases too, two common issues may be discerned in the search for novel approaches to natural resource management, i.e. evolving concepts of ecosystem management and evolving concepts on collaborative decision making (Cortner & Moote, 1994).

11.2 Reflection 2: looking back at the study

At the end of the 1970s the idea was introduced that a new approach to forestry in tropical countries was needed, which should focus specifically on the optimal contribution of forestry to rural development. This idea was quickly accepted and since the early 1980s an increasing number of so-called social forestry projects have been implemented. In the middle of the 1980 the idea was voiced that the emergence of social forestry could be considered as a paradigmatic change in forestry. However, as discussed in Chapter 1, opinions on whether this was indeed the case, and about the exact nature of the proposed change remained unclear. As a result of a more general ongoing discussion on the nature of forestry at the Forestry Department WAU, the first ideas to study whether the emergence of social forestry could indeed be considered as a paradigmatic change in forestry were formulated in 1992. These ideas evolved from the studies I was then involved in to assess the characteristics of social forestry and how it could be operationalized. It gradually appeared that the study proved to be more complex than originally anticipated.

In the first place, the concept of paradigm and the related concept of a disciplinary matrix were originally formulated with respect to academic sciences. However, forestry science is not an academic but rather a practical science. As indicated in Chapter 1 the question therefore arose, how the concepts of paradigm and disciplinary matrix could be applied to assess changes taking place in practical sciences such as forestry. In considering this question, an additional question arose. In practical sciences there often exist a close institutional relation between scientists and professional practitioners. It appeared that it was not clear, whether the opinion of a paradigmatic change taking place in forestry

referred to forestry as a science or forestry as a professional institution.

In the second place, as discussed in Chapter 1, the concept of paradigm refers to a set of non-testable domain assumptions. It can therefore not be used as a predictive but only as a retrospective device for analysis. During this study, this retrospective device was only gradually developed in a reiterative process of conceptualization of major issues and identification of normative assumptions underlying these concepts. This process of progressive clarification included two analytical steps:

- * In the first place the notion of social forestry was conceptualized by assessing its operational significance from an actor perspective. A differentiation was made between social forestry as policy intervention and community forestry as management activity. This conceptual differentiation enabled to assess the different normative perspectives of various actor categories involved in this new approach to forestry as well as their relations.
- * In the second place the emergence of social forestry was placed within the broader historical context of forestry. Special attention was given to the question of how the emergence of social forestry and the new insights gained during its implementation compare with developments which took place during the development of what now is considered as conventional forestry. This information was used to identify the various elements of the disciplinary matrix of the conventional and new approach to forestry.

The various papers incorporated in this book attest to the reiterative nature of the study and to its gradual evolvement. For instance, Chapter 9 consist of an invited paper prepared for the IUFRO Centennial conference in 1992. It reflects an early effort at exploring the question of paradigmatic change in forestry brought about by the emergence of social forestry. In contrast, Chapter 3 consists of an article which was originally written as a contribution to the general academic discussion about the meaning of the concept of sustainability. Although it was prepared without explicit consideration of the present study, gradually its relevance became clear, especially with respect to the issue of forestry adaptation to changing social values, and the need to analytically differentiate between conceptual and operational issues.

As indicated in Chapter 1, during the analytical process a multi-theoretical approach was used, which involved concepts and theories from both philosophy of science and social science. The notion of social forestry involving a paradigmatic change in forestry has been expressed in the form of forestry changing from a 'forest-centred' to a 'people-centred' paradigm. This idea was used as a starting point of analysis. In order to test this claim, an assessment was made of the various categories of actors which are considered to be involved in conventional forestry and social forestry. This was done by using an actor-oriented research approach. It resulted in the conclusion that social forestry brought with it that attention is no longer focused on professionally-defined forest management systems only, but also on indigenously developed community forest management systems.

It may be questioned, however, whether such a change in perspective is of such importance, that it could be considered as a paradigmatic change. From an analytical

point of view, forestry involves a process dimension, a technical dimension and a dimension of social coordination. As indicated by the concepts from philosophy of science a paradigmatic change involves a change in the total disciplinary matrix rather than a change in perspective on a specific conceptual generalization only. Therefore, it seems questionable whether a change in perspectives on one of the three analytical dimensions of forestry is of sufficient significance to be construed as a paradigmatic change. Rather, it seems that for answering the question whether a paradigmatic change in forestry occurred the disciplinary perspectives concerning all three dimensions should be considered. Consequently, in the second step of analysis attention was not only focused on the disciplinary perspectives concerning the dimension of social coordination in forestry, but also on the disciplinary perspectives concerning the other dimensions.

In the second step of analysis the concept of disciplinary matrix was used as the major analytical tool. On the basis of various critical assessments of the predominant perspectives in forestry first the disciplinary matrix of conventional forestry was constructed. Subsequently, an evaluation was made of whether the emergence of social forestry had brought with it changes in any of the constituent elements of this matrix. The basic world-view and several group commitments were found not to have changed as a result of the emergence of social forestry. However, two major changes in conceptual generalizations were identified, i.e. a change from an normatively-defined to an empirically-defined perspective on forest management and the recognition of normative pluriformity in forest management. These conclusions were used for the construction of the newly emerging disciplinary matrix of forestry science and forestry as a professional institution. These matrices were compared with the disciplinary matrix of conventional forestry. This resulted in the conclusion that social forestry can be regarded as a 'revolution' for forestry as a professional institution, but that from a scientific point-of-view it can best be considered as a progressive development in response to changing social values.

Thus, the use of the multi-theoretical approach allowed a more diversified answer to the main research question than would have been the case if only a mono-theoretical framework for research had been employed, e.g. by using the concept of a 'people-centred' approach evolving in forestry as the sole analytical device. By focusing on the main research question from various angles and by using a reiterative process of analysis, the contours of the newly emerging disciplinary matrix gradually became clearly outlined.

11.3 Final conclusions

On the basis of the information presented in this book, the following conclusions are drawn regarding the central question in this study, i.e. whether the emergence of social forestry has brought about a paradigmatic change in either forestry science and/or forestry as a professional institution.

* As a result of the development of social forestry, forestry science is no longer concerned mostly with the development of rational solutions to problems faced by professional foresters. Instead, it focuses on any problem of forest conservation and management whether professional foresters are involved or not. It aims to explain location-specific problems in conservation and utilisation of forests and to provide location-specific options for human interventions for solving these. This means that increased attention is being given to truthful explanation of empirical reality of forest - people relations and to prediction of options for human interventions under location-specific conditions, instead of focusing mainly on the design of normative-based practices for rational problem solving under professionally-controlled management situations. Moreover, as a result of the increased attention for the dimension of social coordination in forestry, a progressive scientific development involving the incorporation of auxiliary concepts and theories from social science has taken place. Consequently, one can conclude that forestry has become more applied science oriented. Concomitantly, the practical science dimension of forestry is becoming focused on a much wider variety of forest - people interactions than was the case in conventional forestry. Thus, as a result of the development of social forestry, forestry science has become more 'mature': it is stronger grounded in empirical reality and the focus on the three dimensions of forestry science has become better balanced. These developments were brought about as a result of changing political values becoming incorporated in forestry. They are consistent with the basic world-view of enlightened resource management and the basic perspectives of forestry contributing to human welfare and well-being. They can best be characterized as an evolutionary change rather than a paradigmatic one.

* The development of social forestry has brought about important repercussions for forestry as a professional activity. Professional forestry practitioners are not any longer considered as omnipotent guardians of the forests, but as professionals who either manage forests on the basis of objectives of the forest owners, or who facilitate forest management by nonprofessionally-trained people. In both cases, they should focus attention not only on the ecological and technical dimensions of forestry, but also on the social coordination of the multiple requirements of different user groups. This has resulted in a major change in both the role- and rule-orientation of professional foresters. Moreover, the relations between forestry scientists and professional foresters have changed considerably. Forestry scientists are not focusing any longer only on forest management systems under control of professional foresters, but on any forest management systems whether under professional or community control. Considering the history of conventional forestry with its close institutional links between forestry scientists and professional forestry practitioners, these changes can be considered as being so revolutionary, that they may be construed as a 'paradigmatic' change in forestry as a professional institution.

In addition the following two conclusions were reached concerning the nature of the changes taking place in forestry:

* It has been suggested that the changed sets of disciplinary commitments in forestry, which resulted from the emergence of social forestry, could be characterized as

a change from a 'forest-centred' paradigm to a 'people-centred' paradigm. However, forestry is in essence not related to either forests or human population as separate objects, but to the relation between forests and mankind. It is therefore a false proposition to advocate either a forest-centred or people-centred paradigm for forestry. Nonetheless, the proposition that there is a need for a 'people-centred' paradigm in forestry in contrast to the conventional 'forest-centred' one, has been useful for focusing attention on the need to incorporate new approaches in forestry. The new approaches should address concerns related to the increasing democratization of society, and to the specific development needs of local communities in tropical countries. The identification of two polar constructions of forestry in the form of a forest-centred one and a people-centred one assisted in focusing the discussion and facilitated comparison (cf. Beus & Dunlap, 1990). The proposition for a 'people-centred' paradigm can be considered as a strong plea to give more attention to the 'society' node of the forest - society relation. A plea which was articulated in the form of an anti-thesis to the conventional approach of forestry, which became characterized as being forest-centred. This claim can best be understood as representing a stage in the process from thesis to anti-thesis, and finally to new synthesis in forestry science.

* At the same time as the call in tropical countries for a 'people-centred' forestry paradigm, in some of the industrialized countries a call for a more 'ecosystem-based' paradigm has been voiced. At first hand these calls seem to be contradictory to each other as they relate to the opposite nodes of the forest - society relation. However, after closer examination it can be concluded that both calls illustrate the need for further diversification in forestry science and change in forestry practice in response to newly arising forest-related scarcities.

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SUMMARY

Forestry has been defined as a profession embracing the science, business and art of creating, conserving, and managing forests and forest lands for the sustained use of these resources. The continuous use of forest resources is considered essential, as forests provide many important products and environmental services to mankind, and the rational management of these resources forms a vital contribution to the welfare and well-being of mankind. Notwithstanding the fact that the basic norms of forestry were already established over a century ago, since the end of the 1970's the role of forestry in rural development in tropical countries has received increasing criticism. In these regions it was found that forestry had in many cases not in fact contributed to improving the welfare and well-being of the large segments of the rural population. Consequently, it was found necessary to develop a new approach towards forestry, which aims at increased rates of community participation in the sustainable management of forest resources. This approach has been termed social forestry.

The concept of social forestry has gained general acceptance. It has been suggested that its development implies not only an important change in forestry practice, but also a major change in disciplinary commitments in forestry. Several people have even voiced the opinion that the emergence of this concept should be considered as a paradigmatic change in forestry. According to this view, the development of social forestry indicates that many of the present forestry problems cannot be solved on basis of the prevailing normative commitments underlying forestry, and that a new normative grounding of forestry is needed. This new normative grounding has been indicated as being 'people-centred' in contrast to the conventional 'tree-centred' approach in forestry. However, other people oppose this view. Notwithstanding these opposite opinions, there is still lack of critical assessment of whether the emergence of social forestry should indeed be considered as involving a paradigmatic change.

The concept of paradigm was originally proposed by Kuhn as referring to the disciplinary matrix of academic scientists. This matrix covers the entire constellation of beliefs, values and research techniques. It involves shared symbolic generalizations, shared beliefs in specific models, shared values to judge scientific endeavours and shared exemplars. Within this paradigmatic setting normally science progresses in a regulated way. However, at certain times anomalies may be perceived which cannot be reconciled within the paradigm. This results to the emergence of a scientific 'crisis', in which an increasing number of scientists start to question the paradigm itself. During such a crisis the accepted propositions and theories are in question. Consequently a paradigmatic change cannot be proven through empirical testing hypotheses against facts on the basis of such propositions and theories. The concept of a paradigm can therefore not be used as a predictive but only as a retrospective device for analysis.

Forestry is characterized by being a practical rather than academic science. Whereas academic sciences aim at truthful explanation and/or prediction of problems related to idealized objects, practical sciences aim at rational problem solving related to real world/practical objects. Consequently, whereas the criteria for judging academic science are

essentially science based, in practical science they are to an important extent society based. In analogy to the disciplinary matrix of academic sciences, the disciplinary matrix of practical sciences may be characterized as involving a world-view, a constellation of group commitments in the form of theoretical and normative perspectives, and ideal-typical referents to problem-free situations as well as ideal-typical exemplars for problem solving.

Forestry embraces not only science, but also professional practice. Forestry can therefore also be considered as a professional institution in which members share a stable, valued, recurring pattern of behaviour. The role-orientation of such professional institutions is focused on the application of scientific insights for practical problem solving. In view of the dual nature of forestry as a practical science and professional practice, in assessing the normative commitments of forestry it is important to distinguish clearly between scientific and institutional commitments. Thus, in considering whether a paradigmatic change has occurred in forestry due to the emergence of social forestry, an important question to consider is whether such a change in normative commitments should be attributed to forestry as a science, or forestry as a professional institution.

The general objective of this study is to contribute towards the elucidation of the question whether the emergence of the concept of social forestry has brought about a paradigmatic change in either forestry science or forestry as a professional institution. The question of whether social forestry involves a paradigmatic change was elaborated into four main research questions:

1. What are the major characteristics of the disciplinary matrix of conventional forestry?
2. What events resulted in the emergence of social forestry? How did this emergence compare to the 'normal' development of conventional forestry, and did it involve a major change in world-view?
3. Did any changes in the constellation of group commitments of conventional forestry emerge as a result of the development of social forestry, and if yes, what was their nature?
4. Do any changes in the disciplinary matrix relate to forestry as a science or forestry as a professional institution?

These questions are addressed in a series of, partly independently prepared, review articles and one article describing the results of a field study.

As a starting point for analysis, in Chapter 2 the nature of forestry as a practical science as well as professional activity is assessed. On the basis of a review of various recent critical assessments of the predominant perspectives in forestry the disciplinary matrix of conventional forestry is constructed. This matrix incorporates the following major features:

- * Forestry is basically perceived as a type of resource management guided by the enlightenment philosophy with its content being based on standards of welfare and well-being of mankind.

- * Forestry is conceptualized as a science and a practice of composite interdisciplinary nature involving three dimensions, i.e. (i) a process dimension involving the manipulation of natural processes in forests in such a way that biological resources are transferred to the required end-products, (ii) the dimension of technical operations by human actors, and (iii) the dimension of social coordination between the activities of various actors.
- * The basic problems to be solved by forestry is the lack of balance between social demands on forests and the actual state of forests. The identification of the nature of time and location specific problems should be politically legitimated.
- * For solving the problems professional activities are needed; these activities have to be guided by scientific knowledge. The basic characteristics of the sought-for solutions are multiple-use and sustainability.
- * Due to the multi-resource character of forests and the fact that many forest functions cannot be regulated through market mechanisms forests should preferably be managed under state control.

In concord with these perspectives, the ideal-typical exemplars for forestry activities were developed on the basis of forestry problems as identified at national level by politically powerful groups. Professional foresters were represented as a technically trained elite in charge of rational management of forests which were either under custodial or legal state control. Within this organizational setting foresters' activities could mainly focus on forestry as a biological and technical undertaking, with timber production having primacy.

In order to assess how conventional forestry proceeded as 'normal' science and practice, in Chapter 3 a review is presented about the development of one of the major normative concepts for problem-solving, i.e. sustainability. The history of the interpretation and operationalization of this concept can be considered as a representative example of the developments which took place in conventional forestry. The concept has been an accepted principle since the 18th century. The Chapter describes the history of sustainability in forestry, including the various social values on which its interpretation has been based. The original principle of sustained yield has gradually been broadened to a more inclusive principle of sustainable forest management. The dynamics in social valuation of forest resources resulted in various attempts at practical operationalization of the principle. Notwithstanding 200 years of efforts to operationalize the concept of sustainability, its exact application in forestry remains troublesome. Three conclusions are drawn: (i) the need to recognize the different nature of ecological limits and social dynamics, (ii) the role of dynamic social values with respect to forest resources, and (iii) the significance of operational experiences in trying to attain sustainability within a concrete context.

Next, in Chapter 4 a review is presented about the historic context of the development of social forestry by looking at the history of forestry policy in tropical countries. When in the 19th century colonial powers enunciated the first forestry policies, these focused on safeguarding commercial timber production and maintaining protection forests. Predicated by these commercial and environmental concerns, the colonial state reserved extensive areas of forest land, and foresters were given the task to manage these forests by scientific practices. Forest utilization by local communities was allowed to continue as

long as it was not detrimental to the colonial interests. After the tropical countries gained independence, initially this approach to forestry did not change much. National interests were considered paramount and took precedence over those of local communities. Under influence of the modernization theory of economic development, it was considered that forests should contribute in an optimal way to economic development by providing industrial resources. This was to be accomplished by improving productivity and establishing forest plantations with related wood industries. In the second half the 1970s it became recognized that this approach did not contribute as expected to rural development. A combination of new theories about how to achieve rural development and increasing concerns about the ongoing process of deforestation and land degradation resulted in the identification of new approaches to forestry development. Since the early 1980s much experience has been gained with such social forestry programmes, which focus on addressing the forest-related needs of local communities and on stimulating active community involvement in forest management. As a result of these experiences, various distinctive features of social forestry in comparison with conventional forestry have become recognized regarding both their technical and their organizational features.

Although social forestry has become a generally accepted approach in forestry, confusion still exists about its precise meaning. This is reflected by various terms which are used for this development approach, notably 'social forestry' and 'community forestry'. Some authors consider these terms to be synonymous, but others interpret them in a specific way. This lack of general understanding of the precise meaning of the terms indicates a need for their better conceptualization. Therefore in Chapter 5 the concept of social forestry is systematically assessed by considering the most appropriate interpretation of the term social forestry and community forestry respectively. Both the meanings of the adjectives 'social' and 'community' and the kinds of actors and practices which are involved in social forestry are evaluated. Two main categories of actors are distinguished: professional foresters and members of local communities. Also two categories of practices are indicated: forestry policy measures and forest management activities. The terms of social forestry and community forestry are defined as referring to forestry development strategies and forest management practices respectively. This allows the conceptualization of the terms by a specific set of logically related objectives, practices and institutional arrangements. The main characteristic of social forestry policies and community forest management are discussed with respect to each of these factors.

A major question in developing social forestry strategies, is how the activities identified by professional foresters are conceived by local communities. This question is taken up in Chapter 6, 7 and 8. First in Chapter 6 a case-study is presented to assess the initial impact of a social forestry project which introduced hedgerow intercropping on the Indonesian islands of Lombok and Sumbawa. The study focused on the question which local farmers adopted this technique and why, and what the initial effect of its introduction were. The results of detailed case studies in four villages indicated that the process of adoption is heterogeneous. Land-use conditions in the four villages were much more diverse and dynamic than the project anticipated. Rather than being an 'off the shelf' technique as assumed by the project, hedgerow cropping proved to be a 'prototype' technique. The farmers' ability to adapt the practice to their specific farming conditions

such as subsistence food production or cash crop cultivation was an important factor effecting its adoption. In some cases the introduction competed with the extension of other promising land-use practices. Several farmers adopted the technique not because of its productive benefits, but as a means to gain access to land or credit, or to demonstrate their allegiance to social networks. The results indicate that there were significant discontinuities between what the project intended to achieve by introducing the technique and the farmers' motives for adopting it.

In Chapter 7 these discontinuities between forestry development strategies and community forestry practices are further explored. This is done on the basis of an assessment of the position of forestry agents in the Sahel as operators at the interface of the local management systems and the supra-local policy level. Such interface situations are critical points at which state development efforts are applied and reshaped into new social meanings. Interface analyses explore the discontinuities resulting from the interactions of different actor groups rather than assuming a linear translation of policy to implementation. The Chapter describes the various conflicting values of the pluriform social environment in which the Sahelian forestry agent has to work, and explores how the agents tend to operate under these conditions. From these observations the following conclusions are drawn about neglected issues in studying the complex of local and external factors which influence the success of social forestry projects: (i) social forestry projects must be considered as being essentially social constructions, and the intervention process is normally characterized by social contestation and negotiation; (ii) the state bureaucracy should be restructured in such a way, that field officers are no longer considered as the 'end-of-the-line', but as front-line workers; (iii) rather than upgrading the ability of field staff to 'sensitize' local people to 'scientific' practices, which may not meet local needs and priorities, their technical competence should be upgraded in order that they are better able to assist villagers with the improvement of still viable indigenous resource utilization systems.

As demonstrated by the analyses in Chapter 6 and 7, during the implementation of social forestry projects, it became recognized that the management of forest resources by local communities is often based on a set of values that differ from the values on which the social forestry programmes are based. In addition recognition has increased that many local communities are already actively managing their forest resources, and that such indigenous forest management systems offer good prospects for further stimulation. Chapter 8 further explores the characteristics of such indigenous management systems, including their diversity and dynamics. The analysis consists of three parts. First an overview of the various types of indigenous forest management and their dynamics is presented. Subsequently, their management is characterized as involving a set of both technical activities and social arrangements for the protection and utilization of forest resources and the distribution of forest products. Three major categories of forest management practices are identified, e.g. controlled utilization of forest products, protection and maintenance of forest stands, and purposeful regeneration. These categories are then used to develop a classification model of the various evolutionary phases in forest management. Along the lines of a similar model developed for exploitation of agricultural crops, various stages of forest management are distinguished along a gradient

of increasing input of human energy per unit of exploited forest. This gradient represents a continuum of forest-people interactions; it illustrates how the various manifestations of indigenous forest management may be arranged along a nature - culture continuum.

From the information presented in Chapter 6, 7 and 8 it can be concluded that major differences in values and organizational settings exist between professional forestry and community forestry. To reconcile such differences in social forestry much attention needs to be given to the dimension of social coordination in forestry. However, as indicated already in Chapter 7, also new technical skills are needed to assess whether the indigenous management practices are sustainable and/or might be improved. This aspect is further elaborated in Chapter 9. A review of the history of silvicultural research in Indonesia is presented in which four phases are distinguished: (i) the teak era (1850-1920) devoted to teak production for the colonial powers; (ii) the forest plantations era (1920-1970) which focused on forest plantations for wood production and watershed management; (iii) the era of natural rainforest management (from 1970) where attention turned to silviculture for sustained timber production from natural rainforests; and (iv) the era of social forestry development, which started at the end of the 1970s and involved rural people in the management of local forest resources. These phases of silvicultural research are described in respect to (i) the assumptions on which they were based and the responsibility for silvicultural management, (ii) the issues in respect of forest resources and silvicultural practices, and (iii) the methods and principles used to examine these issues. During the first phases, the research attention only focused on assessing new silvicultural practices, but during the recent social forestry era, also the applicability of new practices by local forest managers was evaluated. This brought with it important changes in research methodology, with research being carried out in cooperation with local people rather than by forest researchers in isolation.

On the basis of the information presented in Chapter 2 to 9, in Chapter 10 is assessed whether the emergence of social forestry involved significant changes in the disciplinary matrix of conventional forestry. It is argued that the information presented in Chapter 4 and 5 indicates, that the original identification of the concept of social forestry was fully consistent with several of the conventional perspectives on the nature of forestry. This new approach to forestry was based on a problem identification at policy level about the ineffectiveness of prevailing practices to conserve and properly regulate the use of forest resources. Thus it did not significantly impact on the prevailing perspectives of problem situations and political legitimacy. The newly identified approach did also not challenge the basic world-view underlying forestry. This still can be characterized as a vision of enlightenment with scientifically developed forest conservation and management being considered as an essential tool for rational management of forest resources in order to contribute to human welfare and wellbeing.

Also during the subsequent operationalization of the new concept of social forestry several major group commitments did not undergo a 'revolutionary' change. The three main conceptual generalization of forestry were hardly affected, i.e.

- * Forestry being a science and a practice regarding the effective and efficient management of forest resources in order to fulfil human needs and aspirations,

- * Forestry focusing on optimizing forest - people relations in order to conserve the multiple functions of forests and to ensure a rational combination of resource use,
- * Forestry science and professional practice being characterized by an interdisciplinary approach involving systematized knowledge regarding natural processes, technical practices and social coordination of actions.

Moreover, the concepts of multiple use and sustainability remain essential perspectives on principles for problem solving.

Nonetheless, as illustrated in Chapter 6 to 9, the development of social forestry gradually brought about modifications in some of the normative perspectives in conventional forestry. Its development resulted in three interrelated changes in conceptual perspectives in forestry:

- * A change from a normatively-defined to an empirically-defined focus on forest management. This includes the abolishment of the ideal-typical exemplar of forest under state custody being managed by professional foresters, and the recognition of a larger variety of forest - people interactions than conventionally considered.
- * A differentiation between 'professional' and 'non-professional' forestry practice as well as within professional forestry practice. Scientifically developed forest practices are not any longer considered as the norm for forest management but rather as a tool. And the task of the professional forester is not longer conceived as acting as a resource manager, but also as a facilitator assisting local communities in attaining effective forest management.
- * Increased attention to the dimension of social coordination in forestry. The conventional perspective of state regulation added with market regulation as a means to resolve forestry conflicts was augmented by an approach of social negotiation and consensus building.

On the basis of these observations, in Chapter 11 the following conclusions are drawn regarding the question whether the emergence of social forestry has brought about a paradigmatic change in forestry science and/or forestry as professional practice:

1. As a result of the development of social forestry, forestry science is no longer concerned mostly with the development of rational solutions to problems faced by professional foresters. Instead it focuses on any problem of forest conservation and management whether professional foresters are involved or not. It aims to explain location-specific problems in conservation and utilisation of forests and to provide location-specific options for human interventions for solving these. This means that increased attention is being given to truthful explanation of empirical reality of forest - people relations and to prediction of options for human interventions under location-specific conditions, instead of focusing mainly on the design of normative-based practices for rational problem solving under professionally-controlled management situations. Moreover, as a result of the increased attention for the dimension of social coordination in forestry, a progressive scientific development involving the incorporation of auxiliary concepts and theories from social science has taken place. Consequently, one can conclude that forestry has become more applied science oriented. Concomitantly, the practical science dimension of forestry is becoming focused on a much wider variety of

forest - people interactions than was the case in conventional forestry. Thus, as a result of the development of social forestry, forestry science has become more 'mature': it is stronger grounded in empirical reality and the focus on the three dimensions of forestry science has become better balanced. These developments were brought about as a result of changing political values becoming incorporated in forestry. They are consistent with the basic world-view of enlightened resource management and the basic perspectives of forestry contributing to human welfare and well-being. They can best be characterized as an evolutionary change rather than a paradigmatic one.

2. The development of social forestry has brought about important repercussions for forestry as a professional activity. Professional forestry practitioners are not any longer considered as omnipotent guardians of the forests, but as professionals who either manage forests on the basis of objectives of the forest owners, or who facilitate forest management by nonprofessionally-trained people. In both cases, they should focus attention not only on the ecological and technical dimensions of forestry, but also on the social coordination of the multiple requirements of different user groups. This has resulted in a major change in both the role- and rule-orientation of professional foresters. Moreover, the relations between forestry scientists and professional foresters have changed considerably. Forestry scientists are not focusing any longer only on forest management systems under control of professional foresters, but on any forest management systems whether under professional or community control. Considering the history of conventional forestry with its close institutional links between forestry scientists and professional forestry practitioners, these changes can be considered as being so revolutionary, that they may be construed as a 'paradigmatic' change in forestry as a professional institution.

3. It has been suggested that the changed sets of disciplinary commitments in forestry, which resulted from the emergence of social forestry, could be characterized as a change from a 'forest-centred' paradigm to a 'people-centred' paradigm. However, forestry is in essence not related to either forests or human population as separate objects, but to the relation between forests and mankind. It is therefore a false proposition to advocate either a forest-centred or people-centred paradigm for forestry. Nonetheless, the proposition that there is a need for a 'people-centred' paradigm in forestry in contrast to the conventional 'forest-centred' one, has been useful for focusing attention on the need to incorporate new approaches in forestry. The new approaches should address concerns related to the increasing democratization of society, and to the specific development needs of local communities in tropical countries. The identification of two polar constructions of forestry in the form of a forest-centred one and a people-centred one assisted in focusing the discussion and facilitated comparison. The proposition for a 'people-centred' paradigm can be considered as a strong plea to give more attention to the 'society' node of the forest - society relation. A plea which was articulated in the form of an anti-thesis to the conventional approach of forestry, which became characterized as being forest-centred. This claim can best be understood as representing a stage in the process from thesis to anti-thesis, and finally to new synthesis in forestry science.

4. At the same time as the call in tropical countries for a 'people-centred' forestry paradigm, in some of the industrialized countries a call for a more 'ecosystem-based' paradigm has been voiced. At first hand these calls seem to be contradictory to each other, as they relate to the two opposite nodes of the forest - society relation. However, after closer examination it can be concluded that both calls illustrate the need for further diversification in forestry science and change in forestry practice in response to newly arising forest-related scarcities.

SAMENVATTING

Bosbouw is gedefinieerd als de wetenschap en praktische vaardigheid ten aanzien van aanleg, bescherming en beheer van bossen en bosgronden teneinde deze duurzaam te kunnen gebruiken. Dit duurzame gebruik is van vitaal belang, want bossen leveren een veelheid aan maatschappelijke produkten en diensten; derhalve vormt rationeel bosbeheer een essentiële bijdrage aan welvaart en welzijn. Deze bosbouwkundige uitgangspunten werden reeds meer dan een eeuw geleden geformuleerd. Echter sinds de tweede helft van de 70er jaren wordt de rol van bosbouw ten behoeve van plattelandsontwikkeling in tropische landen in toenemende mate bekritiseerd. In deze gebieden werd geconstateerd dat bosbouw niet had bijgedragen aan de verbetering van de welvaart en welzijn van grote delen van de plattelandsbevolking. In reactie op deze constatering werd er een nieuwe bosbouw-benadering ontwikkeld, waarbij gestreefd wordt naar een grotere participatie van lokale gemeenschappen in duurzaam bosbeheer. Deze benadering wordt sociale bosbouw genoemd.

Het begrip sociale bosbouw heeft algemene ingang gevonden. Verschillende onderzoekers hebben gesuggereerd dat de ontwikkeling van sociale bosbouw niet alleen een belangrijke verandering in de bosbouwpraktijk betekent, maar tevens een belangrijke verandering in de disciplinaire uitgangspunten van bosbouw. Sommige onderzoekers zijn zelfs van mening dat de opkomst van sociale bosbouw een paradigmatische verandering in de bosbouw betekent. Volgens deze opvatting kunnen veel van de huidige bosbouwproblemen niet worden opgelost op basis van de bestaande normatieve waarden die aan bosbouw ten grondslag liggen. Derhalve dient er een nieuw normatief kader gevormd te worden. Dat kader is gekarakteriseerd als 'mens-gericht' in tegenstelling tot de traditionele 'boomgerichtheid' in bosbouw. Deze mening wordt echter niet algemeen gedeeld. Ondanks deze tegengestelde meningen zijn er tot nog toe echter weinig systematische evaluaties uitgevoerd of de opkomst van het begrip sociale bosbouw inderdaad als een paradigmatische verandering beschouwd zou moeten worden.

Het begrip paradigma is oorspronkelijk door de wetenschapsfilosoof Kuhn omschreven als een set van disciplinaire uitgangspunten van academische wetenschappers. Een paradigma omvat het geheel van theoretische en filosofische uitgangspunten in de vorm van filosofische voorveronderstellingen, waarden, vakwetenschappelijke theorieën en exemplarische voorbeelden. Het paradigma legt het normale wetenschappelijke werkterrein vast. Soms treden er echter anomalieën op die niet kunnen worden opgelost binnen het heersende paradigma. Dit kan tot een wetenschappelijke 'crisis' aanleiding geven, waardoor het paradigma ter discussie wordt gesteld en er gezocht wordt naar een nieuw stelsel van disciplinaire uitgangspunten. Omdat een paradigmatische verandering betrekking heeft op wetenschappelijke uitgangspunten, kan een dergelijke verandering niet empirisch worden vastgesteld door toetsing van empirische gegevens aan wetenschappelijke stellingen en hypothesen. Het paradigma-begrip kan derhalve niet gebruikt worden in het kader van voorspellend onderzoek, maar alleen in het kader van verklarende onderzoek.

Bosbouw is geen academische wetenschap, maar een praktische wetenschap. Academische wetenschappen hebben tot doel om ware verklaringen en/of voorspellingen te maken over

denkbeeldige objecten; praktische wetenschappen hebben tot doel om rationele oplossingen te zoeken voor praktische problemen. De beoordelingscriteria in academische wetenschappen zijn gebaseerd op wetenschappelijke uitgangspunten, maar in praktische wetenschappen zijn deze criteria in belangrijke mate gebaseerd op maatschappelijke uitgangspunten. Analoot aan de set van disciplinaire uitgangspunten voor academische wetenschappen kunnen de disciplinaire uitgangspunten voor praktische wetenschappen worden gekarakteriseerd als omvattende een grondhouding, een stelsel van theoretische en normatieve uitgangspunten en ideaal-typische voorbeelden voor probleemloze situaties en voor probleem-oplossing.

Bosbouw omvat niet alleen wetenschappelijke maar ook beroepsmatige activiteiten. Bosbouw kan derhalve ook worden beschouwd als een professionele institutie, waarbinnen de leden een vast gedragspatroon vertonen. Dergelijke professionele instituties zijn gericht op de toepassing van wetenschappelijke inzichten bij het oplossen van praktische vraagstukken. Vanwege het tweezijdige karakter van bosbouw als een praktische wetenschap en een professionele activiteit is het belangrijk om bij een analyse van normatieve uitgangspunten in de bosbouw een duidelijk onderscheid te maken tussen wetenschappelijke en institutionele uitgangspunten. Bij het beschouwen van de vraag of er een paradigmatische verandering in de bosbouw is opgetreden als gevolg van de ontwikkeling van sociale bosbouw, is het derhalve van belang om na te gaan of een dergelijke normatieve verandering betrekking heeft op bosbouw als een wetenschap of bosbouw als een professionele institutie.

De doelstelling van deze studie is een bijdrage te leveren aan de opheldering van de vraag of de opkomst van sociale bosbouw een paradigmatische verandering in de bosbouw-wetenschap of in bosbouw als een professionele institutie beschouwd kan worden. De vraag of sociale bosbouw een paradigmatische verandering betekent werd uitgewerkt in vier onderzoeksvragen:

1. Wat zijn de belangrijkste karakteristieken van de disciplinaire matrix van conventionele bosbouw?
2. Welke gebeurtenissen veroorzaakten de identificatie van de sociale bosbouw benadering? Hoe verhielden deze gebeurtenissen zich tot 'normale' ontwikkelingen in de conventionele bosbouw en behelsden ze een verandering in grondhouding?
3. Traden er als gevolg van de ontwikkeling van sociale bosbouw veranderingen op in de theoretische en normatieve uitgangspunten die aan de conventionele bosbouw ten grondslag lagen. Zo ja, wat was het karakter van deze veranderingen?
4. Betreffen de veranderingen in disciplinaire matrix voornamelijk bosbouw als een wetenschap of bosbouw als een professionele institutie?

Deze onderzoeksvragen worden behandeld aan de hand van een serie overzichtsartikelen, die oorspronkelijk onafhankelijk van elkaar werden geschreven, en een artikel dat resultaten van een veldonderzoek beschrijft.

In hoofdstuk 2 wordt als uitgangspunt voor de studie een analyse gemaakt van de belangrijkste karakteristieken van bosbouw als wetenschap en als professionele activiteit. Aan de hand van diverse recente beschouwingen over de uitgangspunten van bosbouw wordt een disciplinaire matrix van bosbouw samengesteld met de volgende kenmerken:

- * Bosbouw is in principe een vorm van beheer van natuurlijke bestaansbronnen; dit beheer is gebaseerd op de uitgangspunten van de Verlichtings-filosofie en richt zich op menselijke welzijn en welvaart.
- * De bosbouwwetenschap en -praktijk zijn gekenmerkt door een samengestelde interdisciplinariteit en omvat een procesdimensie, een technische handelingsdimensie en een sociale handelingsdimensie.
- * Het basis-probleem in de bosbouw betreft het gebrek aan afstemming tussen maatschappelijke aanspraken op het bos en de actuele bosgesteldheid. De identificatie van dergelijke plaats- en tijdgebonden problemen dient politiek gelegitimeerd te zijn.
- * Het oplossen van bosbouw-problemen dient gebaseerd te zijn op professionele activiteiten en wetenschappelijke kennis. De basis-kenmerken van ideaal-typische oplossingen zijn multifunctionaliteit en duurzaamheid.
- * Bossen hebben een multifunctioneel karakter. Diverse functies kunnen niet via het marktmechanisme gereguleerd worden; derhalve dienen bossen bij voorkeur onder staats-controle beheerd te worden.

Uitgaande van deze theoretische en normatieve uitgangspunten werden de ideaal-typische voorbeelden voor bosbouwpraktijken gebaseerd op problemen die door politieke machthebbers op nationaal niveau werden geïdentificeerd. Professionele bosbouwers werden beschouwd als behorende tot een technisch-opgeleid elitecorps, dat tot taak had om een rationeel beheer te verzekeren van bossen die in eigendom waren of onder controle stonden van de staat. Als gevolg van deze organisatorische constructie konden de activiteiten van bosbouwers zich voornamelijk richten op de biologische procesdimensie en de technische handelingsdimensie; hierbij speelde houtproductie een belangrijkste rol.

In hoofdstuk 3 wordt vervolgens een analyse gemaakt van de 'normale' ontwikkeling van de conventionele bosbouwwetenschap en -praktijk. Dit gebeurt aan de hand van het duurzaamheidsbegrip, dat beschouwd kan worden als een van de belangrijkste normatieve uitgangspunten in de bosbouw. Derhalve kan de geschiedenis van de interpretatie en operationalisering van dit begrip als een representatief voorbeeld van bosbouwontwikkeling beschouwd worden. Het begrip werd reeds geïntroduceerd in de 18e eeuw. Sindsdien is de interpretatie van het begrip onder invloed van veranderende maatschappelijke waarden geleidelijk verruimd van duurzame houtopbrengst naar duurzaam bosbeheer. Onder invloed van de veranderende maatschappelijke waarden is steeds weer getracht om de praktische uitwerking van het begrip nader te precisiëren. Toch blijft deze uitwerking ook na 200 jaar nog steeds lastig. Uit de opgedane ervaringen kunnen drie belangrijke lessen getrokken worden: (i) de noodzaak om een duidelijk onderscheid in duurzaamheid te maken ten aanzien van ecologische begrenzing en sociale dynamiek, (ii) de grote dynamiek in maatschappelijke waardering van bossen, en (iii) het belang van operationele ervaringen bij de invulling van het duurzaamheidsbegrip onder concrete omstandigheden.

Vervolgens wordt in hoofdstuk 4 een overzicht gegeven van de ontwikkeling van het bosbeleid in tropische landen. Het oorspronkelijke 19e eeuwse koloniale bosbeleid was gericht op de handhaving van commerciële houtproductie en van essentiële schermbossen. Op basis van deze commerciële en milieukundige overwegingen werden uitgebreide oppervlakten bos tot bosreservaat verklaard; bosbouwers kregen de taak om deze bossen

op wetenschappelijke basis te beheren. Het bosgebruik van de lokale bevolking mocht in de meeste gevallen voortgezet worden mits het niet concurreerde met de koloniale belangen. Deze bosbouwbenadering veranderde niet wezenlijk na de politieke onafhankelijkheid van de betreffende landen. Ten aanzien van bosbeheer werden de staatsbelangen als overheersend beschouwd; deze hadden voorrang boven lokale belangen. Onder invloed van de moderniserings-theorie uit de ontwikkelingseconomie was men van mening dat bossen via het leveren van industriële grondstoffen een optimale bijdrage aan economische ontwikkeling konden verschaffen. Bosbouwontwikkelingsprogramma's waren daarom in hoofdzaak gericht op het verhogen van houtproductie, het aanleggen van bosplantages en het opzetten van een houtverwerkende industrie. In de eindjaren 1970 werd onderkend dat deze benadering niet aan de verwachtingen voldeed en weinig bijdroeg aan plattelandsontwikkeling. Onder invloed van nieuwe theoretische ideeën over plattelandsontwikkeling en een toenemende bezorgdheid over de voortgaande ontbossing en bosdegradatie werd een nieuwe benadering voor bosbouwontwikkeling geformuleerd. Sinds het begin van de 80er jaren is er veel ervaring opgebouwd met deze zgn. sociale bosbouw benadering, die er op gericht is specifieke aandacht te geven aan de bosnoden van de lokale bevolking en om een actieve participatie van lokale gemeenschappen bij het bosbeheer te stimuleren. Er zijn sindsdien verschillende kenmerkende verschillen tussen conventionele en sociale bosbouw duidelijk geworden; deze liggen zowel op het gebied van de technische en de sociale handelingsdimensie.

Hoewel de sociale bosbouw thans een geaccepteerde benadering in de bosbouw is, bestaat er nog steeds onduidelijkheid over de precieze betekenis van dit begrip. Dit komt o.a. tot uiting in een veelheid van termen die ervoor gebruikt wordt, zoals 'social forestry' en 'community forestry'. Sommige deskundigen beschouwen deze termen als synoniemen, maar andere geven er een specifieke interpretatie aan. Dit gebrek aan een eenduidige betekenis van de termen maakt een nadere begripsvorming noodzakelijk. Daarom wordt in hoofdstuk 5 het begrip sociale bosbouw nader geanalyseerd. Hiertoe wordt de betekenis van de kernwoorden 'social forestry' en 'community forestry' nader beschouwd. Ook wordt nagegaan welke actoren en specifieke activiteiten betrokken zijn bij sociale bosbouw-programma's. Er worden twee hoofdcategorieën actoren onderscheiden: professionele bosbouwers en lokale dorpsbewoners. Ook worden twee categorieën van activiteiten onderscheiden: bosbouw-beleidsmaatregelen en bosbeheersmaatregelen. Op basis van hiervan wordt 'social forestry' gedefinieerd als een bosbouw-ontwikkelingstrategie en 'community forestry' als een specifieke vorm van bosbeheer. Op deze wijze zijn de twee begrippen systematisch gekarakteriseerd op basis van een stelsel van logisch-gerelateerde doelstellingen, handelingen en institutioneel kader.

Een belangrijke vraag bij de ontwikkeling van sociale bosbouw strategieën is, wat de mening is van de lokale gemeenschap over de maatregelen die door de professionele bosbouwers als wenselijk worden voorgesteld. Deze vraag wordt uitgewerkt in de hoofdstukken 6, 7 en 8. Hoofdstuk 6 presenteert een analyse over de gevolgen van een sociaal bosbouwproject dat op de Indonesische eilanden Lombok en Sumbawa werd uitgevoerd. Dit project stimuleerde de aanleg van heggen als middel voor erosiebestrijding in gebieden waar zwerfandbouw plaatsvindt. De analyse richt zich op de vraag welke boeren deze techniek adopteerden, waarom ze dat deden en wat de gevolgen ervan waren.

Uit gegevens van vier dorpen blijkt dat de mate van adoptie van de nieuwe techniek nogal variabel was. Dit kwam omdat de landgebruikssituatie veel diverser en dynamischer was dan werd verondersteld door het project. De geïntroduceerde techniek betrof geen 'kant-en-klare' techniek die overal toepasbaar was, maar een 'prototype' techniek. De mate waarin boeren deze techniek konden aanpassen aan hun specifieke landbouwpraktijken zoals verbouw van eenjarige voedselgewassen of van meerjarige commerciële gewassen was een belangrijke factor voor het al dan niet toepassen ervan. In sommige gevallen concurreerde de techniek met meer lucratieve vormen van landgebruik. Soms namen boeren niet uit technische maar uit andere overwegingen deel aan het programma. Bijvoorbeeld omdat het hen toegang verschafte tot nieuwe grond en/of krediet, of omdat het sociaal-wenselijk werd gevonden. Er bestonden derhalve duidelijke verschillen in doelstellingen van het project en de redenen van lokale boeren om aan het project deel te nemen.

In hoofdstuk 7 worden zulke verschillen in doelstellingen van bosbouw-ontwikkelingsprogramma's en bosbeheerspraktijken van lokale dorpsgemeenschappen nader beschouwd. Dit gebeurt aan de hand van een analyse over de werkpositie van lokale boswachters in de Sahel; deze positie wordt gekarakteriseerd het ontmoetingspunt ('interface') van lokale bosbeheerspraktijken en supra-lokale ontwikkelingsstrategieën. Vaak wordt verondersteld dat de doelstellingen van ontwikkelingsprogramma's via een lineair proces worden doorgegeven van beleidsniveau naar uitvoeringsniveau. Een nadere analyse van 'interface' situaties leert echter, dat er vaak een vertaling en aanpassing van de ontwikkelingsdoelstellingen plaats vindt. Dit wordt geïllustreerd aan de hand van een beschrijving van de diverse conflicterende waarden waaraan de boswachter is blootgesteld in zijn sociaal-pluriforme werkomgeving. Ook wordt beschreven hoe een boswachter met dergelijke conflicterende waarden omgaat. Op basis van deze analyse worden de volgende, vaak onvoldoende erkende, factoren die de mate van succes van bosbouw-ontwikkelingsprogramma's bepalen geïdentificeerd: (i) sociale bosbouwprojecten dienen beschouwd te worden als sociale constructies, die bij concrete uitwerking veelal gekenmerkt worden door het optreden van sociale meningsverschillen en onderhandeling, (ii) de overheidsbureaucratie dient zodanig geherstructureerd te worden dat het veld personeel niet meer als de laatsten-in-de-rij maar als front-werkers beschouwd worden, (iii) veldpersoneel heeft niet zozeer meer kennis nodig om de lokale bevolking ontvankelijk te maken voor zgn. wetenschappelijke beheerspraktijken, maar veeleer dient hun technische kennis verbeterd te worden opdat zij in staat zijn om dorpelingen behulpzaam te zijn bij de verdere aanpassing en verbetering van de aanwezige waardevolle inheemse beheerspraktijken.

Uit de in hoofdstuk 6 en 7 gepresenteerde analyses blijkt, dat tijdens de uitvoering van sociale bosbouwprogramma's het geleidelijk duidelijk is geworden, dat de bosbeheerspraktijken van de lokale bevolking vaak gebaseerd zijn op een waardenstelsel dat andersoortig is dan dat waarop de ontwikkelingsprogramma's zijn gebaseerd. Bovendien is het duidelijk geworden dat veel lokale gemeenschappen reeds hun eigen specifieke bosbeheersactiviteiten uitvoeren; deze activiteiten verdienen verdere ondersteuning. Hoofdstuk 8 beschrijft de kenmerken van dergelijke inheemse beheersactiviteiten. Eerst wordt een algemeen overzicht gegeven van hun diversiteit en dynamiek. Vervolgens worden de

technische en sociale handelingsdimensies voor het behoud en gebruik van de waardevolle boscomponenten en de verdeling van bosproducten nader gepreciseerd. Hierbij worden drie categorieën van handelingen onderscheiden: (i) maatregelen ten aanzien van gecontroleerd gebruik van bosproducten op basis van sociale regels, (ii) technische maatregelen gericht op de bescherming en onderhoud van waardevolle boscomponenten, en (iii) maatregelen gericht op stimuleren van verjonging. Op basis van deze categorieën wordt vervolgens een beschrijvend model van de verschillende evolutionaire fasen in bosbeheer in afhankelijkheid van de mate van intensiteit van beheersactiviteiten opgesteld. Dit model is gebaseerd op een soortgelijk model voor de landbouw-ontwikkeling. Het model geeft een inzicht in de diverse stadia van de relaties tussen mensen en bossen. Het illustreert dat inheemse beheerssystemen tot een diversiteit aan bostypen hebben geleid; deze bostypen vertegenwoordigen een continuüm tussen natuur en cultuur.

Uit de informatie in hoofdstukken 6, 7 en 8 kan geconcludeerd worden dat er belangrijke verschillen in waarden en organisatiestructuur bestaan tussen het bosbeheer van professionele bosbouwers en lokale gemeenschappen. Tijdens de ontwikkeling van sociale bosbouwprogramma's dienen deze verschillen met elkaar verzoend te worden; dit vereist expliciete aandacht voor de maatregelen ten aanzien van de sociale handelingsdimensie. Daarnaast dient er echter ook aandacht besteed te worden aan nieuwe technische kennis ter beoordeling van de mate van duurzaamheid van de inheemse beheerspraktijken. Dit laatste aspect wordt nader uitgewerkt in hoofdstuk 9 aan de hand van een beschrijving van de geschiedenis van het bosteeltkundige onderzoek in Indonesië. In deze geschiedenis worden vier fases onderscheiden: (i) het tijdperk (1850-1920) van het beheer van teakbossen ten behoeve van de koloniale machthebbers, (ii) het tijdperk (1920-1970) van de aanleg en het beheer van bosplantages ten behoeve van houtproductie en stroomgebiedsbeheer, (iii) het tijdperk (na 1970) van beheer van de tropische regenbossen ten behoeve van duurzame houtproductie, en (iv) het tijdperk van sociale bosbouw ontwikkeling, dat aan het eind van de 70er jaren begon. Voor elke fase wordt aangegeven wat de uitgangspunten van het bosteeltkundige onderzoek waren: (i) op welke voorveronderstellingen was het gebaseerd en wie werd verantwoordelijk geacht voor het beheer, (ii) welke bostypen en welke teelttechnische maatregelen kregen aandacht, (iii) welke principes en methoden van onderzoek werden toegepast? Oorspronkelijk richtte de aandacht zich uitsluitend op de ontwikkeling van nieuwe teelttechnische maatregelen, maar tijdens de periode van onderzoek in het kader van sociale bosbouw werd tevens expliciete aandacht besteed aan de mogelijkheid van toepassing van de nieuwe methoden door lokale bosbeheerders. Dit had tot gevolg dat er nieuwe onderzoeksmethoden werden ontwikkeld waarbij het onderzoek niet meer uitsluitend door onderzoekers werd uitgevoerd, maar door onderzoekers en lokale bevolking gezamenlijk.

In hoofdstuk 10 wordt op basis van de informatie uit hoofdstuk 2 t/m 9 nagegaan of de ontwikkeling van sociale bosbouw belangrijke veranderingen heeft gebracht in de disciplinaire matrix, die ten grondslag lag aan de conventionele bosbouw. Zoals aangegeven in hoofdstuk 4 en 5 was de oorspronkelijke ontwikkeling van deze nieuwe benaderingswijze in overeenstemming met verschillende van de uitgangspunten van conventionele bosbouw. De nieuwe benadering was gebaseerd op de identificatie op beleidsniveau dat de bestaande bosbouwmaatregelen ineffectief waren om bossen goed te beschermen en

bosgebruik eerlijk te reguleren. Er was derhalve geen sprake van een nieuw uitgangspunt ten aanzien van wat als een probleem gezien wordt of het uitgangspunt van noodzaak tot politieke legitimering. Noch was er sprake van een nieuwe grondhouding.

Ook tijdens het proces van nadere uitwerking van het nieuwe begrip traden er ten aanzien van diverse normatieve en theoretische uitgangspunten geen 'revolutionaire' veranderingen op. Met name de volgende drie uitgangspunten bleven gehandhaafd:

- * Bosbouw betreft de wetenschap en de praktijk ten aanzien van het effectieve en efficiënte beheer van bossen ten behoeve van wenselijk welzijn en welvaart;
- * Bosbouw richt zich op de optimalisering van de relaties tussen mensen en bossen met aandacht voor de duurzame handhaving van bosfuncties en rationele combinatie van diverse vormen van bosgebruik;
- * De bosbouwwetenschap en -praktijk wordt gekarakteriseerd door zijn samengestelde interdisciplinariteit met aandacht voor de procesdimensie, de technische handelingsdimensie en de sociale handelingsdimensie.

Ook de kernconcepten van multifunctionaliteit en duurzaamheid bleven gehandhaafd.

Echter zoals beschreven in hoofdstuk 6 t/m 9 ondergingen sommige andere theoretische en normatieve uitgangspunten van conventionele bosbouw wel een essentiële verandering als gevolg van de ontwikkeling van sociale bosbouw. Deze veranderingen betroffen met name de volgende drie aspecten:

- * Bosbeheer werd in toenemende mate niet meer normatief maar empirisch gedefinieerd. Als gevolg hiervan verloor de ideaal-typische aanname dat bosbeheer uitgevoerd wordt door professionele bosbouwers in bossen die onder staatscontrole vallen zijn betekenis. Er werd herkend dat er een grotere diversiteit in relaties tussen bossen en mensen is dan waarvan werd uitgegaan in de conventionele bosbouw.
- * Geleidelijk werd het onderscheid duidelijk tussen 'professionele' en 'niet-professionele' bosbeheersactiviteiten en trad er een diversificatie in beroepsuitoefening van professionele bosbouwers op. Wetenschappelijk-ontwikkelde bosbeheersactiviteiten werden niet meer beschouwd als een exclusieve norm voor bosbeheer, maar als een belangrijk middel. En als taak van professionele bosbouwers werd niet alleen meer beschouwd het optreden als een beheerder, maar tevens het optreden als hulpverlener bij het verbeteren van bosbeheer door lokale gemeenschappen.
- * Er werd in toenemende mate aandacht besteed aan de sociale handelingsdimensie van bosbouw. Het oorspronkelijke uitgangspunt van overheidsregulering gecombineerd met een zekere mate van marktregulering als middelen voor het oplossen van conflicten ten aanzien van bosgebruik en -behoud werd uitgebreid met een derde type instrument, nl. sociale communicatie en onderhandeling.

In hoofdstuk 11 worden vervolgens de volgende conclusies getrokken ten aanzien van de vraag of de sociale bosbouw benadering heeft geleid tot een paradigmatische verandering in de bosbouw als wetenschap of bosbouw als een professionele institutie:

1. Ten gevolge van de ontwikkeling van sociale bosbouw is de bosbouwwetenschap niet meer exclusief gericht op het ontwikkelen van oplossingen voor problemen van

professionele bosbouwers. Inplaats daarvan richt het zich op elk probleem ten aanzien van bosbescherming en -beheer onafhankelijk van het feit of er professionele bosbouwers bij betrokken zijn. De bosbouwwetenschap richt zich derhalve op het verklaren van locatiegebonden problemen ten aanzien van de bescherming en het beheer van bossen en op het ontwikkelen van locatie-specifieke oplossingen voor dergelijke problemen. Derhalve wordt niet alleen meer aandacht besteed aan het ontwerpen van oplossingen voor bosbeheer onder omstandigheden van professioneel bosbeheer, maar aan de empirische verklaring van specifieke bos/mens relaties en aan voorspellingen ten aanzien van locatie-specifieke mogelijkheden voor menselijke ingrepen. Als gevolg van de toegenomen aandacht voor de sociale handelingsdimensie is tevens een progressieve wetenschappelijke ontwikkeling opgetreden, en worden theoretische inzichten uit de sociale wetenschappen geïncorporeerd in de bosbouwwetenschap. Als gevolg van deze ontwikkelingen heeft de bosbouwwetenschap een meer toegepast karakter gekregen. Bovendien is bosbouw op praktische niveau op een grotere verscheidenheid aan bos/mens interacties gericht dan het geval was in de conventionele bosbouw. Dientengevolge is de bosbouwwetenschap als gevolg van de ontwikkeling van sociale bosbouw 'rijper' geworden: het is sterker gericht op de empirische verscheidenheid en er is een beter evenwicht in aandacht voor de drie dimensies van bosbouw. Deze veranderingen zijn het gevolg van het feit dat in de bosbouw nieuwe politieke en beleidsmatige waarden werden geïncorporeerd. Zij pasten binnen de grondhouding van een verlicht beheer van natuurlijke hulpbronnen en van het uitgangspunt dat bosbouw dient bij te dragen aan de maatschappelijke welvaart en welzijn. Daarom kunnen de opgetreden veranderingen beter als een evolutionaire dan een paradigmatische verandering gekarakteriseerd worden.

2. De ontwikkeling van de sociale bosbouw heeft een belangrijke verandering in de bosbouw als een professionele praktijk teweeggebracht. Professionele bosbouwers worden niet meer beschouwd als de 'behoeders van het bos', maar als personen die of werkzaam zijn op het gebied van bosbeheer, of assistentie verlenen aan het bosbeheer dat uitgevoerd wordt door niet-professioneel opgeleide personen. In beide gevallen dienen zij hun aandacht niet alleen te richten op de ecologische en technische aspecten van bosbouw, maar ook aan de juiste afstemming tussen de veelheid aan maatschappelijke aanspraken van diverse groepen bosgebruikers. Dit heeft belangrijke gevolgen voor zowel de taakgerichtheid en de inhoudelijke oriëntatie van professionele bosbouwers. Bovendien zijn de relaties tussen bosbouwwetenschappers en professionele bosbouwers veranderd. Bosbouwwetenschappers richten hun aandacht niet meer uitsluitend op bosbeheersystemen onder de controle van professionele bosbouwers, maar op alle mogelijke bosbeheersystemen. Tegen de achtergrond van de sterke institutionele banden die er in de conventionele bosbouw bestond tussen bosbouwwetenschappers en professionele bosbouwers kunnen deze veranderingen zo revolutionair worden gevonden, dat zij gekarakteriseerd kunnen worden als een paradigmatische verandering in de bosbouw als een professionele institutie.

3. Er is wel gesuggereerd dat de veranderingen in de bosbouw die zijn opgetreden als gevolg van de ontwikkeling van sociale bosbouw, gekenmerkt kunnen worden als een overgang van een 'bos-gerichte' naar een 'mens-gerichte' paradigma. Echter, de essentie van bosbouw is dat het gericht is op het optimaliseren van bos/mens relaties. Het is

derhalve een verkeerde voorstelling van zaken om een 'bos-gerichte' of een 'mens-gerichte' benadering te suggereren. Niettemin heeft de suggestie dat het nodig is om in tegenstelling tot de conventionele 'bos-gerichte' benadering een 'mens-gerichte' benadering te ontwikkelen, een nuttig effect gehad. Deze suggestie heeft de aandacht gevestigd op de noodzaak voor een nieuwe bosbouwbenadering, die beter aansluit bij de huidige politieke tendens tot een verdere democratisering en vergrote aandacht voor de bosgebonden noden van lokale gemeenschappen. De identificatie van de twee tegengestelde bosbouwbenaderingen was nuttig als een middel voor vergelijkende analyse en discussie. De stelling dat het noodzakelijk was om een 'mens-gerichte' benadering te ontwikkelen vestigde de aandacht op de noodzaak om meer aandacht te geven aan de maatschappelijke handelingsdimensie van bosbouw. Dit pleidooi werd verwoord als een antithesis tot de conventionele benadering in de bosbouw. Zij leidde uiteindelijk in een proces van thesis via anti-thesis naar een nieuwe synthese in de bosbouwwetenschap.

4. Terwijl er in de tropische landen een discussie plaats vindt over de noodzaak tot een 'mens-gerichte' benadering in de bosbouw, vindt er in de geïndustrialiseerde landen een soortgelijke discussie plaats over de noodzaak tot een meer 'ecosysteem-gerichte' benadering. Op het eerste gezicht lijken deze twee ontwikkelingen in tegenspraak met elkaar te zijn, omdat zij zich richten op de twee verschillende objecten van de bos/mens relatie. Bij nader inzicht blijkt echter dat beide ontwikkelingen beschouwd kunnen worden als een pleidooi voor verdere diversificatie in de bosbouw teneinde beter in te kunnen spelen op het huidige gebrek aan functievervulling door bossen.

CURRICULUM VITAE

Kornelis Freerk Wiersum was born on March 4, 1947 in Groningen, the Netherlands; afterwards he grew up in Bogor, Indonesia, and Groningen, the Netherlands. After obtaining the diploma "HBS-B" at the Dalton HBS in Groningen, he spent one year in Detroit, USA, where he visited Redford Highschool. In 1965 he went to the Wageningen Agricultural University, where he obtained his "Ingenieurs" degree in Tropical Forestry (with distinction) in 1973, with majors in Tropical silviculture, Nature conservation and management, Forest influences, and Applied animal ecology. During his study he spent time for practical training and field research in Surinam, Costa Rica and the USA. He also worked as a student assistant at the Department of Nature Conservation preparing a course on 'Development cooperation and environmental management'. After graduation he was employed as an associate expert forestry in the FAO Upper Solo Watershed Management and Upland Development project, Indonesia. From 1976-1980 he was involved in a joint research and education project on 'Tropical forest ecology - Vegetation and erosion in the Jatiluhur region', which was carried out in the framework of a cooperative project between the Department of Silviculture of Wageningen Agricultural University and the Institute of Ecology, Padjadjaran University, Bandung, Indonesia. From 1980-1985 he was engaged in a variety of teaching, research and consultancy activities. These included the organisation of the 'International symposium on strategies and designs for afforestation, reforestation and tree planting' on occasion of 100 years of forestry education in the Netherlands, a FAO consultancy on 'Fuelwood as a traditional and modern energy source in the Philippines', and the preparation of agroforestry courses at the Department of Silviculture, Wageningen Agricultural University and the Faculty of Forestry of Gadjah Mada University, Yogyakarta, Indonesia. In 1984 he was a research fellow at the Environment and Policy Institute of the East-West Center, Hawaii, USA. In 1986 he was engaged at the Institute for Research in Forest and Landscape Planning 'De Dorschkamp' as head of the section on Development Cooperation. This task was combined with an assignment at the Department of Forest Management and Economics of Wageningen Agricultural University to carry out research and educational activities in the field of forestry and rural development. In 1988 this last task developed into a full-time employment at the Department of Forestry WAU. Since that time he has been engaged in three research projects dealing with social forestry policies and community forest management. He (co-)supervised over 60 M.Sc. and 6 Ph.D. students in the field of social forestry. He visited 14 different tropical countries, mainly in Asia and Africa. In 1994 he was admitted as a staff researcher at the Interuniversity Research School for Resource Studies for Development (CERES). Since 1995 he has also become involved in studies concerning the role of forestry for rural development in Europe. At present he is the coordinator of a joint European research project on 'Multifunctional forestry as a means to rural development, establishing criteria for region-specific strategies for balancing public demands and forest owners' objectives' funded by EU/FAIR. Within the Department of Forestry he has been engaged in various organisational tasks, amongst others as the secretary of the Commission Forestry Science and as the coordinator of the research group on 'The role of forestry in rural transformations'. He is a member of the editorial board of two scientific journals, and has published over 100 scientific articles, reports and working papers.