

Natural forest management by local groups in the humid tropics

Forests, Forestry and Biological Diversity Support Group.



Theme study

2

NATURAL FOREST MANAGEMENT BY LOCAL GROUPS IN THE HUMID TROPICS

**Arend Jan van Bodegom
International Agricultural Centre**

June 2000

**Theme Studies Series 2
Forests, Forestry and Biodiversity Support Group**

National Reference Centre for Nature Management (EC-LNV)
International Agricultural Centre (IAC)
Wageningen, The Netherlands

This document has been prepared at the request of the Directorate General for International Co-operation (DGIS) of the Ministry of Foreign Affairs. The views expressed in this report are those of the author and do not imply the expression of any opinion whatsoever on the part of the government of the Netherlands.

Copies can be downloaded from Internet, or ordered by telephone, e-mail or by writing to the National Reference Centre for Nature Management mentioning the code "national forest programmes" and the number of copies required.

Sections of the text may be quoted and otherwise made use of on condition that the source is cited.

Author: Arend Jan van Bodegom

Translation: Paul Gretton, Maastricht

Final editing: Herman Savenije

Cover photo: Herman Savenije

Printing: JB&A Grafische Communicatie, Wateringen

Production: National Reference Centre for Nature Management
Visitors' address: Marijkeweg 24, Wageningen
P.O. Box 30, NL 6700 AA Wageningen, the Netherlands
Telephone: (+31) 317-474 801
Fax: (+31) 317-427 561

E-mail: balie@ikcn.agro.nl
Website: www.minlnv.nl

CONTENTS

| | |
|---|-----------|
| PREFACE | 5 |
| Acknowledgements | 5 |
| 1. INTRODUCTION | 7 |
| 1.1 Background | 7 |
| 1.2 Framework of this document | 7 |
| 2. CONCEPTS OF SUSTAINABLE FOREST MANAGEMENT | 9 |
| 3. POLICY ON SUSTAINABLE FOREST MANAGEMENT | 11 |
| 3.1 International policy | 11 |
| 3.1.1 Convention on Biological Diversity (CBD) | 11 |
| 3.1.2 International Forum on Forests (IFF) | 11 |
| 3.1.3 International Tropical Timber Organisation (ITTO) | 11 |
| 3.1.4 Remarks | 12 |
| 3.2 National policy in development co-operation countries | 12 |
| 3.2.1 Papua New Guinea (PNG) | 12 |
| 3.2.2 Ghana | 13 |
| 3.2.3 Costa Rica | 14 |
| 3.2.4 Remarks | 15 |
| 3.3 The policy of the Netherlands | 15 |
| 3.3.1 The policy of the Netherlands on sustainable forest management | 15 |
| 3.3.2 Dutch development co-operation policy on sustainable forest management | 16 |
| 4. SOME EXPERIENCE IN THE FIELD WITH SUSTAINABLE LOCAL MANAGEMENT OF NATURAL FORESTS | 19 |
| 4.1 Introduction | 19 |
| 4.2 Swift Solomons | 19 |
| 4.3 CICOL/APCOB, Bolivia | 20 |
| 4.4 Nepal-Swiss Community Forestry Project | 21 |
| 4.5 Chinantec Shifting Cultivation, Mexico | 22 |
| 4.6 FOMACOP, Laos | 23 |
| 4.7 Proyecto Forestal Chorotega, Costa Rica | 24 |
| 5. SYNTHESIS AND APPLICATION OF EXPERIENCE AT NATIONAL LEVEL | 27 |
| 5.1 General | 27 |
| 5.2 Participatory policy-making | 27 |
| 5.3 Drawing up criteria and indicators for sustainable forest management | 28 |
| 5.4 Training and educating institutions in the forest sector | 29 |
| 5.5 Professional training and forestry training programmes | 30 |
| 5.6 Research on sustainable forest management | 31 |
| 5.7 Institutional reform | 32 |
| 6. SYNTHESIS AND APPLICATION OF EXPERIENCE AT LOCAL LEVEL | 35 |
| 6.1 General | 35 |
| 6.2 Organising the actors | 35 |
| 6.2.1 Raising awareness | 35 |
| 6.2.2 Local participation | 36 |
| 6.2.3 Promoting land rights | 37 |
| 6.2.4 Women and sustainable forest management | 37 |
| 6.2.5 Training | 38 |

| | | |
|-----------|--|-----------|
| 6.3 | Managing the forest as a natural resource | 38 |
| 6.3.1 | Management for plant-based production | 39 |
| 6.3.1.1 | Choice of species | 39 |
| 6.3.1.2 | Forest surveys | 39 |
| 6.3.1.3 | Studies of production | 40 |
| 6.3.1.4 | Surveys to determine regeneration | 40 |
| 6.3.1.5 | Harvesting methods and evaluation of situation | 40 |
| 6.3.1.6 | Adapting the harvest | 41 |
| 6.3.1.7 | Forest cultivation measures | 41 |
| 6.3.2 | Management of animal-based production (game and fish) | 42 |
| 6.3.3 | Management to maintain natural values (biodiversity) | 43 |
| 6.3.4 | Management for tourism | 43 |
| 6.4 | Organisation | 44 |
| 6.4.1 | Various organisations | 44 |
| 6.4.2 | Degree of mechanisation | 45 |
| 6.4.3 | Product choice and diversification | 45 |
| 6.4.4 | Storage, processing and transport of forest products | 46 |
| 6.4.5 | Marketing | 47 |
| 6.4.6 | Financial aspects and loans | 48 |
| 6.4.7 | Certification | 49 |
| 6.5 | Results of local sustainable forest management | 50 |
| 6.5.1 | Effects of forest management on local population | 50 |
| 6.5.2 | Distribution of the income | 51 |
| 6.5.3 | Economic yield | 51 |
| 6.5.4 | Ecological sustainability | 52 |
| 7. | INCORPORATING SUSTAINABLE FOREST MANAGEMENT INTO RURAL PROJECTS | 53 |
| | CHECKLIST | 55 |
| | BIBLIOGRAPHY | 63 |

PREFACE

In recent years the concept of sustainable forest management implemented by local groups has emerged as a new, integrated approach to reconciling economic, social and ecological concerns. Several small-scale projects have been started up in developing countries. The present publication attempts to deal with all the main aspects involved in implementing sustainable forest management at the local level.

This report explains the concept of sustainable forest management and reviews its significance for developing countries. The author believes that sustainable forest management for local communities can serve both as a means of alleviating poverty and as a strategy to combat deforestation and forest degradation. Working on the basis of experience gained so far, the author discusses some “do’s and don’ts” and suggests concerns and guidelines for improving sustainable forest management.

The report focuses on the local level, dividing important aspects for consideration into four groups: organisation of the actors involved, management of the natural resources, organisation of forest management and processing and marketing of products, and the results of local sustainable forest management. The point the author wishes to stress is that most projects fail to devote balanced attention to all these aspects. This weakness is also reflected in the relevant literature. Many publications, for instance, highlight the importance of participatory approaches in order to organise local populations, but do not reflect on problems regarding commercial management or marketing aspects. Other projects have developed ecologically sustainable forest management and/or a marketing system, but disregard the organisation of the local population. An unbalanced approach to local sustainable forest management will necessarily lead to disappointment. Sustainable forest management at the local level is an inter-disciplinary and highly complex issue.

Although this publication focuses on the local level, it also deals with national and international policies. These are important in the local context, and local experience should also provide feedback regarding sustainable forest management at the national and international policy levels. In the author’s experience, communication between policymakers at the national and international level and the people actually implementing sustainable forest management in the field is still in need of improvement.

Proper implementation of sustainable forest management requires people who can take a broad view of the aspects involved, without necessarily possessing a deep knowledge of all of them. The author has therefore tried to deal with most of the important issues, but has not dealt with all of them in detail. He reviews matters from his own perspective and discipline –namely forest management and nature conservation– and this imposes some limitations.

This document has been prepared at the request of the Directorate General for International Cooperation (DGIS) of the Ministry of Foreign Affairs. The target audience for this material will in the first place be Dutch government officials dealing with nature conservation and development programmes and professionals involved in sustainable forest management at community level.

In conclusion, it should be noted that the views expressed in this report are those of the author and do not imply the expression of any opinion whatsoever on the part of the government of the Netherlands.

Acknowledgements

The author is grateful for the constructive criticism offered by his colleagues (who also commented on previous versions of this document) in the Support Group for Forests, Forestry and Biodiversity at the IAC and the National Reference Centre for Nature Management (*IKC Natuurbeheer*): Herman Savenije, Kees van Dijk, Gertjan Renes, Henk Lette, Cathrien de Pater, Arthur Ebregt, Reinout de Hoogh and Severin ten Houte de Lange. He is also grateful for comments made by Wim Dijkman (Utrecht University), Franke Toornstra (Embassy in Cotonou), Gerhard van den Top (WWF College) and Jochem Schneemann (ICCO).

1. INTRODUCTION

1.1 Background

Drastic deforestation and forest degradation on a world-wide scale are having serious consequences for mankind and for the environment. The effects are to be found at local, national and global level and will continue far into the future. In many places, the size of forests and their ability to recover have decreased to such an extent that they are no longer able to fulfil their functions. The consequences include climate change, erosion, impoverishment of the soil, uncontrolled water flow, a reduction in biodiversity, erosion of the basic requirements for survival of the local population, loss of productivity, risks to local and indigenous peoples, and social conflicts.

Promoting sustainable forest management in developing countries is valuable because of three basic considerations:

1. The consequences of deforestation and forest degradation already mentioned affect the basic requirements for survival of vulnerable rural groups. Promoting sustainable forest management can therefore contribute effectively to combating poverty, an important basic principle of development co-operation policy.
2. A policy of reasonable self-interest: like other countries, the Netherlands is dependent on a healthy global environment. The country also imports a large part of its own timber requirement. It is important to ensure the sustainable supply of raw materials by promoting sustainable forest management.
3. The fact that the Netherlands imports a large part of its own timber requirement means that it has a certain responsibility with respect to how that raw material is extracted.

The Sector Policy Document on Forests and Forestry [*Sectorbeleidsdocument Bossen en Bosbouw*] (1997) devotes a great deal of attention to sustainable forest management and emphasises the local implementation of such management. However, it offers no practical indications of how sustainable forest management can be promoted in actual practice.

Within the framework of international co-operation, there has been a great deal of interest in community forestry for some decades now. The activities involved have focused on planting forests and trees in areas which are primarily used for agricultural purposes. It was only in the 90s that the focus began to shift towards managing existing natural forests. Since then, a number of pilot projects have been launched in that field and a certain amount of experience has been gained. This study will attempt to systematise that experience, to indicate the strong and weak points, and to make suggestions for improvement.

The aim of this document is to provide Dutch embassies with answers to the following central question:

What concrete measures can embassies take to promote local sustainable forest management?

Information is drawn from the sources cited in the bibliography and from the concrete experience gained in the field by the members of the Support Group for Forests, Forestry and Biodiversity working on development co-operation projects.

1.2 Framework of this document

Sustainable forest management is a concept which involves a large number of elements and which can be applied in different ways in a great variety of situations. In the interest of conciseness and clarity, the following restrictions have been observed in the present document:

1. The emphasis is on **local** sustainable forest management. The national and international aspects will be dealt with briefly if there is a clear and fairly direct relationship to the local level.
2. The emphasis in this document is on experience gained in the humid tropics.
3. The document deals with situations in which **local** parties have a great deal of **responsibility** for forest management. For that reason, concessions –often on a large scale– granted to companies located outside the region will not be dealt with.
4. The management of trees and small areas of woodland in regions used primarily for agriculture (**agroforestry**) fall **outside** the remit of this document.
5. The **management of protected areas** will **not** be dealt with. This does not mean, however, that nature conservation and biodiversity do not play a role in the document.

2. CONCEPTS OF SUSTAINABLE FOREST MANAGEMENT

The concept of “sustainable forest management” is constantly evolving. Until the end of the 60s, sustainability referred primarily to the harvesting of timber and to the maintenance of certain hydrological functions. Sustainable forest management therefore refers to maintaining the productivity of forests and managing watersheds. Even if we apply this restricted interpretation, it will be clear that there are many forests –definitely not only in tropical countries– which are not managed sustainably because the harvest is so extensive that it damages the production capacity of the forest.

Quite apart from this, there are many groups and individuals whose concept of sustainable forest management also includes social and biological aspects, and the production of non-timber forest products (NTFPs) is also the focus of increasing attention. The concept of sustainable forest management is still evolving and every group emphasises particular aspects.

The Sector Policy Document on Forests and Forestry (1997) defines sustainable forest management (in accordance with ITTO) as:

“The process of managing forests in order to achieve one or more clearly specified management goals, with the desired functions (forest products and services) being obtained without restricting the potential fulfilment of those functions and without unwanted effects on the physical and social environment.”

It is also stated that sustainable forest management involves a number of sectors. The authorities and users concerned are generally responsible for determining the functions and the aim of management and for translating this into management preconditions. In this context, Dutch development co-operation policy emphasises the socio-economic situation of the local population and biodiversity. Sustainable forest management covers such aspects as land use planning, nature conservation, community forestry (participatory forestry), management responsibility and property rights.

If we examine these ideas in greater detail, we can identify the following six major features of sustainable forest management (adapted from Abramovitz (1998)):

1. Forests must be managed in ways which meet the social, economic and ecological needs of present and future generations. These needs are related to the following functions of the forest:
 - a. Regulatory functions: protection of soil and water, watersheds, micro-climate and macro-climate, atmosphere.
 - b. Production functions: timber, non-timber forest products, trees as an ecological “nest egg”, genetic material, tourism (including ecotourism).
 - c. Support functions: living environment for humans, animals and plants.
 - d. Information and reservoir functions: the forest as the stage for ecological processes and the source of species and genetic material, source of socio-cultural and spiritual values, intrinsic natural value.In any given forest area, the forest will need to fulfil several functions simultaneously. That can be done by ascribing several functions to the same area of forest (multi-functional forest) and/or by dividing the forest into separate zones in which different aims are primary.
2. Management should maintain and improve the quality of the forest and should focus on a much wider landscape so as to maintain biodiversity and ecological processes. It is at this point that land use planning becomes involved, as does the design of a main ecological network of protected areas linked by corridors to facilitate the exchange of plants and animals.
3. The conditions prevailing in natural forest should be imitated as much as possible (ecosystem approach). The composition of the forest should be heterogeneous, with a large number of species of different ages and sizes. Natural disturbances should be permitted and imitated. Dead wood, fungi and insects which used to be seen as pests are now maintained because they are important to the functioning of the ecosystem.
4. Sustainable forest management also means the active and significant participation of all interest groups, particularly local communities. Every interest group has its own interests and rights, meaning that there may well be conflicts. Conflict management may therefore be an

important aspect of sustainable forest management. Within local communities there are also various different interest groups. Special attention needs to be paid to gender aspects.

5. Sustainable forest management has a number of dimensions: technical-ecological, social, economic and institutional. Sufficient attention needs to be paid to these dimensions in advance. This makes sustainable forest management a complicated matter.
6. Sustainable forest management must be approached at three levels: the international, the national and the local. At each level there are certain preconditions which must be met in order to achieve sustainable forest management. There must also be an exchange of information and views between the various levels.

3. POLICY ON SUSTAINABLE FOREST MANAGEMENT

3.1 International policy

3.1.1 Convention on Biological Diversity (CBD)

The Convention on Biological Diversity resulted from the UNCED conference in Rio de Janeiro and has been signed by a large number of countries. It is well known that much global biodiversity is to be found in natural forests in the humid tropics. The Convention is therefore of great importance to the management of natural forests in such areas, although not only there. Meetings are still taking place to discuss the implementation of the Convention. Countries are being requested to carry out case studies on important topics, for example the relationship between indigenous peoples and the protection of biological diversity. The Netherlands is represented by delegates from the Ministries of Foreign Affairs (OS) and Agriculture, Nature Management and Fisheries (LNV).

3.1.2 International Forum on Forests (IFF)

The International Forum on Forests (IFF) is the successor to the Ad Hoc Intergovernmental Panel on Forests (IPF), which was set up by the Commission on Sustainable Development (CSD). The CSD was in turn set up as a result of the UNCED conference in Rio de Janeiro in 1992. The IFF focuses on forests and attempts to implement the recommendations made by the IPF during its fourth and final session in February 1997. Some of the main topics dealt with in the framework of the IFF are: national forest programmes, the underlying causes of deforestation, traditional forest-related knowledge, assessment of forest functions, criteria and indicators for sustainable forest management, trade and the environment in relation to forest products and services. Various countries report at meetings of the IFF on progress with respect to these and other topics. Here too, the Netherlands is represented by delegates from the Ministries of Foreign Affairs (OS) and Agriculture, Nature Management and Fisheries (LNV).

3.1.3 International Tropical Timber Organisation (ITTO)

ITTO was already set up in 1983 and aims to promote both international trade in tropical hardwood and the maintenance and sustainable management of tropical forests. The agreement on which the ITTO is based is one governing international trade in a product (commodity), comparable with the agreements on coffee, rubber, etc. It is therefore often the trade ministries of the various production and consumer countries that are primarily responsible for contributing to meetings of ITTO. For the Netherlands, it is the Ministry of Economic Affairs which takes the lead, and there are also representatives from the ministries of Housing, Spatial Planning and the Environment (VROM), Foreign Affairs/Development Co-operation and Agriculture, Nature Management and Fisheries (LNV).

ITTO commenced its work in the late 80s. In 1990, it agreed on the target that by the year 2000 only timber from sustainably managed forests would be permitted to be traded. The international trade in all timber has for a number of years been subject to the treaty provisions, including therefore timber from boreal and temperate regions. ITTO has formulated a number of principles for sustainable forest management which are recognised by both the consumer and the producer countries. These principles have been formulated at a high aggregation level and are therefore not directly applicable in actual practice. They can nevertheless form the basis for setting up a system of criteria and indicators for sustainable forest management in a country. In principle, two meetings are held each year at which various matters are discussed, including projects for financing. Projects cover the fields of forest management, timber processing, marketing and the provision of information.

3.1.4 Remarks

In the field, international conventions and agreements often seem very distant and irrelevant. Nevertheless, a large number of countries have bound themselves to the agreements mentioned above and can therefore be called to account. These countries, including the Netherlands, are making constant attempts to actually implement international agreements and are required to report on these efforts within the various international forums. In many cases, not much is known at local level about the contents of international agreements. Moreover, the input of a country at international level is often not based on experience in the field. It is important to improve communication between the international level and the national and local levels. This can be done, for example, by financing workshops on the agreements or by financing the participation of representatives of governments or NGOs at meetings of international forums. Input originating at local level is particularly important, for example that resulting from projects financed by embassies.

3.2 National policy in development co-operation countries

National policy on sustainable forest management naturally differs enormously between countries, and it is impossible to give a full survey within the confines of this document. The IIED in London has carried out studies in India, Pakistan, Zimbabwe, Costa Rica, Papua New Guinea and Ghana to investigate which factors are important in developing sustainable forest management. The following sections deal first with the example of Papua New Guinea, where the road to sustainable forest management still seems to be a difficult one, and then Ghana, where great progress has been made in sustainable forest management in recent years. The situation in Costa Rica will also be reviewed briefly because it illustrates the highly specific features of the Latin American situation. In section 3.2.4, an attempt will be made to describe common features of the problems.

3.2.1 Papua New Guinea (PNG)

Papua New Guinea is an example of a country where forest management at national level and the implementation thereof leave a great deal to be desired. Uncontrolled logging takes place on a major scale. Nevertheless, PNG is in fact the scene of a number of initiatives targeting sustainable forest management and implemented at local level by groups of landowners with the assistance of NGOs (supported by donors) because the private landowners (and groups of landowners) have almost complete control over the forests. NGOs collaborate with the government at local and provincial level, and play a role in monitoring and implementing government policy. Pressure from NGOs sometimes leads to the reversal of certain measures damaging to forests.

Filer and Sekhran (1998) describe the problems associated with managing forests in PNG as a kind of stage play with six actors/stakeholders, each of them with their own interests and power. The play features the following groups: landowners, the private sector, donors, politicians, government personnel and NGOs. The donors and the private sector are the groups with the greatest financial power and these two attempt via the other players to ensure that as much forest as possible is managed and exploited in the way they approve. One feature of the situation is that the parties have not the slightest confidence in one another. In recent years, forestry legislation has been drastically amended, but implementing that legislation has by no means always been a success. There is very little confidence in the government.

One salient point is that the power of the donors is so great primarily because the government finds itself in a state of financial crisis and needs outside help. This gives the World Bank leverage to push through certain legislative reforms. However, as soon as the programme of economic restructuring succeeds, the power of the donors may well be at an end.

Where the management of protected areas is concerned, the problem is that *customary landownership* rules out virtually all government spatial planning. Amongst other things, customary landownership –based on tradition and laid down by law– means that landowners have virtually complete say over their land and that the land is in fact not for sale but that negotiations can only take place about its usufruct. It is possible to come to an arrangement with one group of landowners to protect part of their property and to have another part used for generating income. However, if one wishes to work on a larger scale, major problems arise. If the property of a number

of groups is entirely protected, for example, and those groups are then required to make use of the land belonging to other groups, the latter will offer fierce opposition. As yet, no construction of this kind has been put into practice.

Some of their report's recommendations include:

- Bridging the gap between interests at village level and the general interest.
- Developing platforms for negotiation and negotiating skills.
- Developing mechanisms to verify whether action agreed on is in fact carried out (perhaps by means of certification).
- Developing a dialogue in a highly polarised situation.

The preface to the study emphasises that a shift in focus needs to take place towards small-scale and medium-scale forestry.

3.2.2 Ghana

The forestry policy followed in Ghana in recent years is viewed by many as a success, and will probably produce a situation in which sustainable forest management becomes the rule rather than the exception. In fact a type of collaborative forest management (co-management) is under development in Ghana which gives a large number of interest groups an influence on what is actually done with forests in practice. The IIED has analysed the situation in Ghana and has identified a number of *positive* lessons (Kotey et al., 1998):

1. *Negotiations in national forums and working groups* in which chiefs and local representatives are present.
2. The possibility of arriving at a joint approach to imbalances in power, the readiness to share power.
3. *High-quality information and information flow*, particularly on forest ownership, the value of services and products and the demand for them. On the basis of this information, interest groups can argue their case effectively.
4. *A mix of complementary instruments* (financial incentives and regulations). If information, incentives from institutions, and market incentives become the driving force for improving forest management, the law will become the final recourse instead of the first. Enforcing the law will then be less important.
5. *Local knowledge and institutions*. Policy must be linked to actual practice, for example that of local forest action groups, with local knowledge being emphasised.
6. *Mechanisms for dealing with conflicts*. The existence of conflicting attitudes can create a healthy tension. However, tension can sometimes have a destructive effect and such a situation needs to be dealt with using mechanisms trusted by the interest groups involved. Solutions imposed from outside generally do not work.
7. *Key persons* who devote themselves entirely to bringing about changes in forestry policy.
8. To these positive factors, one can add the following strengths (Toornstra, pers. com.):
9. *Proper co-ordination of policy*. This has to do with the political importance of the Ministry of Land and Forestry. In Ghana, especially in the south, forests are economically important. In addition, the Ministry has authority with respect to "lands" (land rights and land policy). Because of this political importance, the Ministry can play a leading role in processes of change. An important role is also played by the World Bank as the Ghanaian government's main negotiating partner and as the main donor in the forestry sector. This can allow donor interventions to be channelled via sector programmes in which donors and various departments co-ordinate the interventions.
10. Sustainable forest management has become a *political issue*. In Ghana, the threat of introducing a certification system for sustainable production for the European market was very effective. Donors joined forces to put on the pressure, especially in cases where sustainable forest management is a requirement to qualify for macro-funding (bilateral donors), credits for Structural Adjustment Programs (World Bank), IMF loans and indicative programs (EU), and debt swaps. A number of serious companies in the timber sector are in favour of a long-term perspective and the sustainable production necessary to ensure it. Their arguments have raised awareness considerably.

Kotey et al. (1998) also specify which aspects do *not* work effectively (weaknesses):

- a. Interest groups which are passive observers when decisions are being made will not make their skills and resources available.

- b. Where matters are complex and uncertain, monopolising the information (often by the authorities) will cause the policy to fail.
- c. When the information provided is inadequate, policy will do more harm than good (both with respect to the organisations implementing it and the groups which are affected).

In *future*, the following preconditions need to be met:

1. Those involved have to be prepared to sacrifice something to achieve the common goal (this includes a balance between landowners and tenants where rights to trees are concerned).
2. Mechanisms are necessary to facilitate genuine negotiations between large numbers of interested parties.
3. Economic equality and environmental quality need to be reconciled.
4. There needs to be greater collaboration between the authorities, local communities and *business and industry*.
5. Confidence in *local institutions* needs to be restored.
6. Use needs to be made of opportunities to *socialise* forest policy. Recent developments in forest policy have been possible because of growing recognition of the political importance of the rural population and their crucial role in the process of national development.

3.2.3 Costa Rica

In Costa Rica, attempts are being made to establish a balance between socio-economic and ecological priorities. However, according to Watson et al. (1998), there are a number of major obstacles:

1. A macro-economy which determines forest policy (in particular the structural adaptation programmes imposed internationally).
2. The excessive influence of some of the parties, in particular the timber industry, businesses, and to a certain extent “academic” environmental interests.
3. The ability to analyse proposed policy effectively is restricted, meaning that policy involving negative consequences is still approved.
4. Policy favours large-scale industry to small-scale forestry producers.
5. Incentives which do not focus on social aims but merely on technical and economic forestry aims.
6. Integration of forest management and the timber industry is not seen as profitable.
7. State institutions are incommunicative and unfriendly.
8. Regionalisation is a problem because regions are not always sufficiently homogeneous to justify a regional approach.
9. The local authorities lack the necessary know-how and ability.

A number of *positive* lessons can be drawn from the Costa Rica situation:

1. Policy analyses which cover multiple sectors have a positive effect (for example TFAP, Environmental Profile of Costa Rica etc.).
2. Economic incentive funds are effective, assuming that the government provides sufficient financing for them.
3. Small-scale producers can defend their interests by forming representative organisations at local, regional and national level.
4. Collaboration between the government, the universities, NGOs and research institutes for technical assistance and for disseminating the relevant knowledge.
5. From the point of view of protecting biodiversity and ecosystems, the system of protected areas is a success, but there are a number of groups which have not benefited sufficiently.
6. A progressive tax on land can lead to a more balanced system of land ownership.
7. New “green” policy can produce international financing.
8. Environmental guarantees anchored in the constitution have opened up more pathways towards public participation in matters affecting forests and the environment.
9. Bilateral assistance between the Netherlands and Costa Rica in the framework of the sustainability treaty has produced a framework within which various sectors engage in dialogue and negotiations.

It is important for the future that increased participation and democratisation of forestry policy is reconciled with increased liberalisation and globalisation of the economy, the effects of which in Costa Rica are expected to lead to a concentration of land.

3.2.4 Remarks

Many developing countries are still dominated by the “classic” approach to forestry based on centralised, production-oriented government management of national forests (with the exception of a number of countries in the Pacific where owners’ rights to land have traditionally been extremely strong). Experiments are, however, taking place with social forestry and types of co-management. Many governments attempt to improve and restructure their institutional forestry set-up, often with foreign aid. However, this often leads to tension with the World Bank’s structural adjustment programmes and the retrenchment and privatisation processes promoted by the IMF. This means that support is only provided to a restricted extent for processes aimed at bringing about sustainable forest management at local level.

Opportunities for promoting effective forestry policy in a country are highly dependent on the specific situation. Political will and the presence of energetic, dedicated people who promote sustainable forest management are preconditions which cannot always be met. If they are not met, a lengthy impasse may arise which cannot easily be broken.

One aspect common to many countries is that there is increasing pressure on the restricted natural resources available. One of the most intriguing aspects is that increasing human use of a restricted natural resource leads to social dependence, resulting in conflicts and the need for a negotiated settlement. The government or certain powerful groups cannot get their own way. Negotiation is an absolute necessity. Only a negotiated arrangement can produce genuine solutions.

One important aspect of promoting sustainable forest management is therefore the creation of social platforms for managing natural resources. The aims of the various interest groups are often incompatible. The perspectives differ, as do the level of access to power, skills, and the need for information. It is of crucial importance that processes for solving conflicts, negotiation, and adaptation should be brought into line (Röling, 1998). This involves sacrifices, which will not be made if people are afraid that a single group can benefit from the sacrifices of others without itself having to contribute (“free rider”). There also needs to be a minimum basis of trust. If the negotiation process and the information required for negotiation are not transparent and beyond dispute, the consequence is likely to be a lengthy dispute and the results of the negotiations are likely to be sabotaged.

3.3 The policy of the Netherlands

3.3.1 The policy of the Netherlands on sustainable forest management

In 1997, the government set out the minimum requirements to be met by quality marks for timber from sustainably managed forests on the Dutch market (Ministry of LNV, 1997). The underlying aim of the minimum requirements is on the one hand to promote sustainable forest management and on the other to enable consumers to be confident that the timber they are buying actually comes from a sustainably managed forest. The latter guarantee is given by means of a process of certification and product labelling.

Box 1: Minimum requirements for sustainable forest management (Source: Min. of LNV, 1997)

1. The forest management system applied must demonstrably and to the full extent focus on guaranteeing the integrity of the ecological functions and the continuity of the socio-economic and socio-cultural functions, applying the associated criteria and indicators.
2. Forest management must be based on a proper management system.
3. The certifying institute is independent, demonstrably meets all international guidelines with respect to organisation and procedures followed, and possesses the necessary specific forest management expertise.
4. The procedures followed with respect to keeping the different types of timber separate during transport must be both watertight and transparent.

Besides these minimum requirements, a checklist has been made of principles, criteria and indicators for sustainable forest management at the level of the management unit. Box 2 gives the principles and criteria which are stated in this list.

Box 2: Checklist of principles and criteria for sustainable forest management at the level of management unit (source: Min. of LNV, 1997).

The integrity of the ecological functions is guaranteed, as is demonstrated by:

- Maintenance of the regulatory functions of the forest
- Maintenance of the biodiversity which is important in the type of forest concerned
- Prevention and reversal of unwanted side-effects of forest exploitation.

The continuity of the socio-economic functions is guaranteed, as is demonstrated by:

- Maintenance of the timber production capacity of the forest
- Maintenance of the production capacity for non-timber forest products
- Participation on the part of the local population.

The continuity of the socio-cultural functions is guaranteed, as is demonstrated by:

- Maintenance of the functions of the forest and types of use for people in and around the forest
- Protection of the socio-cultural functions and the traditional rights of people living in and around the forest
- Restriction of the negative effects of forest exploitation.

Where their actual contents are concerned, the above criteria for sustainable forest management meet those developed by the Forest Stewardship Council (FSC) and those formulated in the framework of ITTO and the (European-oriented) Helsinki procedure.

3.3.2 Dutch development co-operation policy on sustainable forest management

Besides certifying timber, the Dutch government also considers the use of other instruments to be of great importance in combating deforestation and promoting sustainable forest management. These include international co-operation and international consultations.

In 1991, the government's Position Paper on the Tropical Rainforest was approved. This contains nine policy guidelines, including in the area of the maintenance and management of primary forest, promoting forest as part of land use, the planting of forests, the timber trade and research. This position is still supported by four ministries, namely the Ministry of VROM, LNV, Foreign Affairs/Development Co-operation and Economic Affairs. The major portfolio of programmes and projects – a major one by international standards as well – for the maintenance and sustainable management of tropical forests finds its interdepartmental policy basis in this government position.

The Sector Policy Document on Forests and Forestry (1997) elaborates on development co-operation policy on forests and forestry. It devotes a great deal of attention to sustainable forest management as part of development co-operation. The **central aim of development co-operation forestry policy** is stated to be:

“Bringing about and promoting sustainable maintenance, recovery, and –where possible and necessary– the extension of forests and trees. In this way, and within the boundaries of their ecological resilience within the natural context of ecosystems, they can fulfil important functions for the population, especially for those groups within the population who are dependent for their livelihood on forests and trees.”

In order to implement this policy, activities are proposed at three levels:

- **Dutch international policy** (including participation in relevant international forums, support for institutes which contribute to international policy-making, reinforcement support for strategic forest research).
- **Reinforcement of national forest policy in development co-operation countries:** including by means of co-ordinating various different planning levels (local, regional, national), improving co-ordination between various different sectors (forestry department and other departments), formulating integrated energy policy, supporting forest surveys relevant to forestry policy, supporting the setting up of a system of protected areas, providing training for forestry services,

transforming experience gained during practice into policy, providing support for national forest programmes, co-ordinating research and practice, providing support for formal specialist training, providing support for research.

- **Reinforcement of forest management and forestry at local level.** The activities will focus on achieving forest conservation and sustainable forest management. Local activities may involve not only economic aspects but also social and ecological ones:
 - **Social** aspects involve such things as participation by the local population, support for the settlement of claims to land and usage rights, women's rights, environmental education, information activities.
 - **Ecological** aspects involve such things as protecting primary forest, maintaining biodiversity, including representative ecosystems in a system of protected areas, developing buffer zones, maintaining genetic diversity and restoring secondary and degraded forests.
 - **Economic** aspects involve such things as certifying concessions, the provision of firewood, tree plantations, multi-functional trees, small-scale processing of forest products (timber and non-timber products).

4. SOME EXPERIENCE IN THE FIELD WITH SUSTAINABLE LOCAL MANAGEMENT OF NATURAL FORESTS

4.1 Introduction

It was in fact only in the 90s that international policy came to focus on managing natural forest. The number of projects actually being carried out in the field is restricted and the time spent building up experience has in general been brief.

Managing forests can be carried out under many different circumstances and using many different methods and intensities. Wiersum (pers. com.) has produced the following extremely broad categorisation of types of management:

1. Collection of products in natural forest
2. Enrichment of natural forest with useful species
3. Reconstruction of natural forest
4. Mixed tree cultivation
5. Trees in agricultural areas
6. Tree plantations (often commercial).

The first three categories form part of “tolerant” forest management, the latter three are classed as “intrusive” forest management. The terms “tolerant” and “intrusive” refer to the pressure which management places on the ecosystem. Within a tolerant system, there is far more scope for leaving natural processes to take their course.

It is clear that various transitional types are possible between the different types of management. This document emphasises the management of natural forests, “tolerant” management in the terminology used here. Apart from this categorisation, other categorisations are possible, for example the distinction between an implementation project and a research project or according to the types of products extracted from the forest.

The following sections will deal with various examples of sustainable forest management. No attempt will be made to be exhaustive, but an attempt will be made to illustrate the rich variety of different possibilities. Each example will conclude with a number of remarks. These involve only a few salient points. Some of the experience gained during these projects will be looked at again in section 6.

4.2. Swift Solomons

Like Papua New Guinea, the Solomon Islands have a system of *customary landownership*. In practice, this means that landowners (families or clans) have virtually complete say over their land. The authority of the government is minimal. The SWIFT project was set up to provide landowners with an alternative to prevent their having to make their land available for large-scale logging. The project operates in two provinces, covering an area of about 800,000 ha with a population of 90,000-100,000. Of these, 25,000 constitute the target group. Since 1994, Solomon Western Islands Fair Trade (SWIFT) has marketed the timber felled and sawn by the landowners. The project was set up by a church organisation and is supported by ICCO and the EU. It has developed a number of forms and rules to regulate management of the land covered by the programme. The system is kept transparent by maintaining an archive for each landowner’s property so that the project can receive so-called umbrella certification from SGS, an organisation qualified by FSC to certify forest management. Umbrella certification means that the project itself certifies the participating landowners and that the project itself is then certified by SGS.

One of the forms sets out the rights and duties of the two parties involved (the project and the landowner). It also states which parts of the land are intended for agriculture, housing, productive forestry and for conservation. So-called hectare blocks are laid out within that part of the property intended for productive forestry. A number of 100 x 100 m² blocks are then marked out in the forest, which in general is in a fairly natural state. The position of every tree with a trunk diameter greater than 30 centimetres is then marked on graph paper, with a separate ground plan for each hectare block. The diameter of each tree is also measured at chest height and its species determined. Trees with a trunk diameter of between 30 and 60 centimetres constitute the new growth and may not be felled. Larger trees are basically open to felling. The first survey is carried

out by a forester who lives in the area (an island) and is employed by the project, together with members of the landowners' group. The intention is that later blocks will be surveyed by the landowners themselves and that the forester will then merely have to check the results.

The results of the survey are used to determine how many trees can be felled. The greater the number of large trees per ha, the more that can be felled. The precise number is set out in a felling table. After felling, no cultivation measures are carried out because research elsewhere in the Solomon Islands has shown that the forest continues to grow sufficiently for further harvesting to be possible. An inspection is carried out at the point where the tree has been sawn. After the quota of trees has been felled in each hectare block, the block is left for five years and no harvesting may take place there, including harvesting of NTFPs. This makes it possible for sufficient growth of timber to take place to allow for further harvesting.

The trees are sawn into planks at the point where they have been felled and then taken to a collection site where SWIFT inspects and purchases the timber. The trees are sawn using a power saw mounted on a frame. Initial experiments are taking place with a portable sawmill, but for many landowners the investment involved is considerable and it remains to be seen whether the return on their investment will be satisfactory.

The re-growth of the trees is monitored at a single felling location and at an undisturbed location. At the felling location, three trees per species are measured (maximum of five marketable species) with a diameter of at least 10 centimetres. In addition, four seedlings from a maximum of five species are also measured (height and diameter). In an undisturbed part of the same hectare block, five trees with a diameter of more than 30 centimetres are measured. If a landowner wishes to fell more timber, more hectare blocks have to be laid out and marked. These are then subject to the same rules.

SWIFT purchases the sawn timber from the landowners, stores it at its own yard in the Solomons, dries it and sees to transportation to the Netherlands in containers. Until 1998, there was a special yard in the Netherlands which sawed the timber and sold it to wood-working factories etc. The wood is now sold directly without the intervention of the yard.

Some remarks:

- A number of positive features of the SWIFT projects are its market-oriented nature and the use of a forest management system certified by the FSC. This system can be implemented by local landowners without advanced training being necessary.
- The forest management system is not simple but is accepted, partly because a good price is paid for the certified timber.
- By scientific standards, the re-growth is monitored in far too restricted a manner to be able to say anything useful about the extent to which re-growth has taken place (Dijkman, pers. com.). This is a serious flaw in the management system as currently practised.
- Focusing particularly on two points has been at the cost of other aspects such as project organisation, target group organisation and environmental education. This may well endanger the institutional and social sustainability of the project.
- Marketing has gone somewhat too far. The project set up a yard of its own in the Netherlands, but this did not generate enough turnover to be profitable. Moreover, there was not sufficient knowledge of the specific features of the Dutch timber market. In the Netherlands that expertise is concentrated in family businesses.
- SWIFT has at all times kept open the possibility of dealing in more than one product. At the moment, marketing the timber requires so much effort that it is not possible to produce and market the other products.

4.3 CICOL/APCOB, Bolivia

The CICOL/APCOB project operates in Lomerio, in the lowlands of Bolivia. The target group for the project consists of indigenous Indian communities totalling 17,000 people. The work involves ecological and economic consolidation of their territory. One economic activity involves the sustainable felling of timber.

The groups of Indians work in compartments of between 384 and 400 ha, which are subdivided into 24 blocks, each of 16 ha (400 x 400 m²). The blocks are marked out in the field by means of

paths and posts. The intention is that one of the 24 blocks should be dealt with each year, so that in 24 years time it will be possible to return to it to fell the next generation of trees which by then will be ready for logging.

- Before the timber is harvested, a diagnostic inventory is first made. Compartments measuring 10x10 m² and situated in line are surveyed to identify the best tree and the tree which is most suitable to be left standing. Data is taken about the crown.
- In the 16 ha compartments, trees with a diameter greater than 40 centimetres are mapped, and their volume and quality are estimated. The mapping takes place on a scale of 1:2000. The surveying is carried out by a group of five villagers with one clerk, the “promotor forestal”. The group walk along strips of forest 50 metres wide, with the individual villagers 12 metres apart. They measure the trees and note the diameter, calling out the details to the clerk.
- Felling is planned at the office. In each unit, 25% of the trees are allowed to remain to provide seeds. The result is recorded on maps for the loggers (who use power saws).
- The maps also indicate the seed trees and regeneration and the direction in which the trees are to be felled (directional felling).

The loggers are sent out into the forest with a power saw and a map indicating the location of the trees to be felled and the direction in which that must be done. The branches are then removed from the trees, which are sawn into standard dimensions for round timber. Roads are laid on the basis of the density of the trees to be felled and the map. The work is done by the communities, which are then paid by the project. Collection areas measuring 35 x 35 m² are also created and the trees are dragged out using agricultural tractors. The activities are registered. After felling has taken place, a diagnosis is made of the vegetation. Permanent blocks are also laid out. Four 100 x 100 m² blocks are laid out in each 384 ha block, with a protective strip 50 metres wide. Two of the four blocks are laid out in felled forest and two in unfelled forest (for reference). An evaluation is then given of the damage caused by felling and dragging out the timber. Refinement and liberation then take place. The trunks of desirable species are freed, the number of unwanted individual trees is reduced by ringing and by cutting lianas and strangling figs.

A sawmill was built early on in the project, but this had too great a capacity and was therefore not economical. Managing the sawmill also proved to be a problem. The project was recently awarded an FSC certificate.

Some remarks:

- A decision was taken early on in the project to buy a sawmill. This major investment has never been recovered.
- Management of the sawmill was a problem. Within the local context, it was especially difficult to distinguish between the use made of vehicles for the company and for all kinds of community requirements.
- The emphasis is primarily on a single product, mainly timber (although on various species). It is unclear whether this decision means that opportunities are being lost (NTFPs).
- The project is still confronting the problem of how to make sustainable forest management economically viable. This is no easy matter, definitely not in the Bolivian context, where there is species-rich forest but only a restricted number of species can be used commercially.
- Road construction, the exploitation of only a limited number of species, and limited economical viability all put a strain on the ecological sustainability of the project (Van den Top, pers. com.).

4.4 Nepal-Swiss Community Forestry Project

Besides being a source of firewood, forests in Nepal are primarily important as a source of grazing and organic material which is used as bedding in accommodation for animals and then as compost. Forest is therefore an essential component of the agricultural system. The Swiss Community Forestry Project considers it important to take account of the present and future value of a number of products resulting from various different types of forest conservation. The project therefore produces separate participatory surveys of timber, firewood, fodder for animals, NTFPs, growth location and specific diversity for the following:

- *Timber.* Timber is surveyed on the basis of circles with a radius of 5.64 metres (100 m²), or a wooden *relascope* is used. This is a simple piece of equipment allowing one to determine – from any particular point in the forest– which trees are of a girth that falls within a predetermined geometrical angle. The relascope method uses between 0.8 and 4 survey points per ha, depending on the area of the site and the relascope used. Economies of scale mean that

when the area is 64 ha or larger, only 0.8 and 2 points per ha are necessary. The diameter, species and height of the trees within the survey plot are also recorded. The measurement plots are basically permanent. The project technician assists in carrying out the survey, but it is perfectly possible for this to be done by villagers.

- *Firewood*. For firewood, the circle used has a radius of 5.64 metres. The users –men and women from various different castes– are positioned at the edge of the circle and asked to estimate the total amount of firewood within the circle, excluding the timber trees present. The users are also asked how much firewood could be extracted on a sustainable basis and how long it would take before harvesting could be carried out once more.
- *Foliage for animal fodder, grasses and organic material*. Within the same circle used for firewood (see above), users are asked to estimate the quantity of harvestable fodder, grasses and organic material. They are also asked how much time is required between harvests.
- *NTFPs*. Users hand in a list of all the NTFPs which they have observed in the forest. If the intention is to market a product, an estimate must be made of the available quantity, and a sustainable harvesting level must be determined.
- *Growth location*. The quality of the growth location is an indication of the regenerational ability of the forest after harvesting. Local farmers therefore use simple methods to determine the slope, depth of weathered soil, organic material, drainage etc. of the growth location.
- *Biodiversity*. In some management plans drawn up by Forest User Groups, maintaining dead trees and small streams are stated to be minor but important contributions to the biodiversity of the forest.

Information on the production potential for various different products can help Forest User Groups to manage their forest in the best possible manner. A great deal of effort goes into ensuring that poorer groups are involved in discussions on forest management.

Some remarks:

- The strength of this project lies in the fact that the sustainable forest management it involves focuses not only on the production of timber but also on the production of NTFPs. Simple and apparently effective methods have been discovered to carry out surveys of the various products.
- The focus is on the subsistence level and probably on the market (most likely timber). The source of the information given above (Aus der Beek, 1998) does not, however, give any further information about how products are processed and marketed. This raises the question of whether sufficient attention is being paid to these aspects.
- Carrying out surveys based on circles might well be difficult in hilly areas.

4.5 Chinantec Shifting Cultivation, Mexico

Shifting cultivation means fallow land agriculture: between periods of cultivation there are periods when the land is left fallow. Often, burning first takes place, followed by sowing or planting and then weeding and harvesting. There are many different systems of shifting cultivation in which include these activities. The Chinantla Indians still live in relative isolation in the mountains of the Sierra Madre Oriental in Mexico. They distinguish between various categories of vegetation/forest: 3 types of fields:

- logged and burned fields
- cultivated fields
- fields with bushes

6 types of secondary forest:

- sparse secondary forest
- secondary forest with trees, bushes, lianas and herbs
- grown secondary forest
- secondary forest which has been allowed to “rest” properly
- mature secondary forest
- recovered secondary forest.

They also distinguish between three different types of primary (“undisturbed”) forest. The names of these types do not have specific translations.

Every category of forest has its own features and it is these which determine whether and when logging and burning can be used to get the land ready again for planting a crop. In the above list,

the fallow period increases the further down the list one goes. If the fallow period is too short, insufficient fertility is built up. There are also areas which have been logged and burned a number of times, thus changing the composition of the recovering vegetation. The local population know broadly how the species composition changes under the influence of constant felling and burning. Most of the species in secondary forest have an indigenous name and a Spanish name, but many species which are restricted to primary forests have no name. This indicates that secondary forests are more important for extracting everyday products and services than primary forest is.

A study of the situation in Mexico allows one to draw the following conclusions:

- The way the forest has been used in the past is an important factor in its management.
- Both indigenous and scientific knowledge can be used to estimate and monitor the influence of agriculture on the development of secondary forest;
- Indigenous shifting cultivation systems are highly specific. If one wishes to introduce changes, a new design for the particular situation is required and not a blueprint.
- Indigenous shifting cultivation is a sequential type of land use within which the development of secondary vegetation may follow a number of paths. Management may lead to an extremely varied mosaic of vegetation and fields.
- Indigenous farmers know how vegetation may develop and the factors which influence it. Their knowledge and views must therefore form the basis of new plans for local types of shifting cultivation which are better suited to meeting the changing social situation. (Van der Wal, 1998).

Some remarks:

- We are dealing here with a research project (a small-scale and temporarily completed one) which receives support from the Netherlands.
- It is striking that for this group of Indians, secondary forest is more important than primary forest.
- This is an example of a situation in which the local actors may have a good knowledge of the vegetation and of how they can manipulate it. Plans for new management systems can build on this knowledge.
- It may be that the sustainability of the system can only be guaranteed as long as the pressure on the forest remains low.

4.6 FOMACOP, Laos

In Laos, the Forest Management and Conservation Program (FOMACOP) operates in two provinces. With help from the project, villagers set up an organisation and mobilise their resources and capacity to sustainably manage an allocated area of forest in partnership with the staff of the forest service. The villagers take management decisions, prepare plans, and collect the information needed for planning and decision-making. This is in contrast to the system in the past, when the local population supplied only the labour within the context of management activities undertaken by the authorities.

Management plans and annual plans are being developed for village forests as part of a system based on low-intensity logging. This is something new in Laos. The village forests have in many cases already been logged.

The forest area is divided up into the same number of management compartments as the number of years in the product cycle. The cycle differs for every product to be harvested (timber, NTFPs). This means that the layout of the compartments is different for each product, although the forest area involved is the same. In the case of timber, the cycle is short (five years) and the area is thus divided into five sections. More than 400 permanent measurement plots have been laid out in the two provinces where the project operates. This has made it possible to gain an understanding of the way the trees in various types of forest grow and die off. Two types of forest are distinguished, with three classes within them, subdivided according to the volume of standing timber: up to 75 m³, between 75 m³ and 152 m³ and above 150 m³ per ha. The allowable harvest per ha is known for each class. The following criteria are applied to select trees for felling:

- Trees to be felled must be separated by a distance of at least 25 metres.
- Trees are preferred which are represented by a large number of individuals located close to one another. Solitary trees are not felled if no other example is present in the surrounding ha.

- No felling is permitted within 30 metres of a stream.
- There must be at least 10 acceptable seed trees in the ha surrounding the tree.

No proper growth data are available on the NTFPs, so that it is no simple matter to determine maximum harvesting levels. The project monitors the quantity of material collected. If this decreases in the course of time, the Village Forestry Adviser can set limits or prohibit collecting entirely.

Directional felling is used (felling in a specific direction so as to restrict the damage caused). The trees are dragged out using 6-wheel self-loading trucks. To gain access, the small-scale vegetation is removed to produce 3-metre wide paths. Logging and removal of the timber take place in the dry season. Compared to commercial forestry in concessions, this type of forestry is labour-intensive, allows better protection of the forest and biodiversity, and causes less soil erosion (Bonita and Sophathilath, 1998).

Some remarks:

- It is clear that this situation involves collaboration with the local population, but the authorities still have a great deal of influence on what takes place.
- It would appear that in this situation the local population only has an influence on forest management and has nothing to do with processing or marketing.
- Forest management also focuses on maintaining other valuable features of the forest, for example protecting biodiversity, water and the soil. It is noticeable, however, that the productive function of the forest focuses only on timber, whereas forests in Indo-China are known to contain a large number of NTFPs, whose use –and often also marketing potential– are known.
- Although this type of forestry is stated to be more labour-intensive than commercial forestry in concessions, the high level of modernisation (6-wheel trucks) is notable. The publication does not make clear who owns the trucks, nor does it give any data on processing or marketing.
- One of the authors of the publication on which this section is based is Dr. Bonita, one of the ‘godfathers’ of the selective logging theory. In his native country –The Philippines– this has resulted in considerable deforestation because of ineffective government supervision and optimistic assumptions about conservation and re-growth (Van den Top, pers. com.).

4.7 Proyecto Forestal Chorotega, Costa Rica

The forests of Guancastre are located in various different ecological zones, ranging from extremely humid premontane forest to dry tropical forests. The Proyecto Forestal Chorotega has developed a methodology which makes it possible to subdivide the activities which are to be carried out into various different phases. A number of steps are then distinguished within these phases:

Phase 1: Motivation and organisational reinforcement of the community

- Step 1 involves forming the forest reserve committee.

Phase 2: Collection of information

- Step 2 is to carry out an overall survey (reconnaissance) of the available natural resources and to produce a vegetation map.
- Step 3 is a Rapid Rural Appraisal.
- Step 4 is to identify and formulate a number of alternatives to the use of the resource.
- Step 5 is to survey the resource with a view to the use which has been identified. Surveys are carried out of timber products (firewood, timber and timber for use in craftwork), of NTFPs (honey, wax, medicinal plants, fruit and ornamental plants) and surveys of services (production of drinking water, small game for recreational hunting, protection of biodiversity and development of ecological paths for tourism).

Phase 3: Production of the management plan

- Step 6 involves formulating management alternatives.
- Step 7 involves presentation of options to the forest reserve committee, followed by discussion.
- Step 8 involves presentation of the management plan to the general assembly of the community for discussion, amendment and approval.
- Step 9 involves motivating those involved to ensure active participation in the activities by the majority of the target group.
- Step 10 is to transfer the resource (in usufruct or property) into the hands of the community or association.

Phase 4: Implementation of management

- Step 11 is to mark out the management object
- Step 12 is to identify specialised institutions which can provide support. Organisation and co-ordination of the assistance.
- Step 13 involves implementation.
- Step 14 involves processing products according to market requirements.
- Step 15 involves marketing and product promotion.
- Step 16 involves the equitable distribution of income between the participants.

Phase 5: Monitoring

- Step 17 involves monitoring and evaluation (including economic evaluation).

Phase 6: Becoming independent

- Step 18 involves consolidation of management and the gradual pull-out of external help.

The time needed to complete each phase varies. For phases 1 and 2, between two and three months are broadly necessary; for phase 3, between one and two months, so that after about six months it is possible to start on phases 4 to 6.

Some remarks:

1. A plan presented in phases and separate steps, as here, creates transparency. Those involved even realise that the various phases can overlap.
2. The ecological and social side of forest management has been properly worked out. Processing and marketing of products have been worked out in less detail. Marketing should already play a role in the product identification phase. It should not be a question of first managing a forest and producing products and then looking for a market.
3. It would seem that formulating management alternatives (step 6) is carried out by the project and that the result is only later submitted to members of the forest reserve committee. In this respect, participation may well be open to improvement.
4. One interesting element is step 12, which involves attempting to identify institutions which can provide specific forms of expertise which the project lacks (for example related to ecotourism, crafts, wood carving, bee-keeping). Within certain limits, this may be a way of focusing attention on all aspects without building up a very large project organisation.
5. Phase 18 is interesting because here the project indicates that at a certain point it wishes to leave the community and allow the established organisation to continue the work independently. Unfortunately, no indication is given of the total number of years necessary to reach this point.

5. SYNTHESIS AND APPLICATION OF EXPERIENCE AT NATIONAL LEVEL

5.1 General

This chapter will attempt to synthesise and make use of experience relating to the national level. The lessons learned come from the cases described in section 4 and from other projects and programmes. The topics involved are important at national level so as to arrive at sustainable forest management at local level. These topics are: participatory policy-making, the development of criteria and indicators for sustainable forest management, training for government services, professional training and forestry training programmes, and research on sustainable forest management.

The emphasis in this study is on the local level, meaning that an attempt will primarily be made to establish links between the national and the local level. The topics will be briefly discussed. A number of studies are to be published in the series produced by the Support Group for Forests, Forestry and Biodiversity. These will deal, for example, with an important element of participatory policy-making in more detail, namely the drawing up of national plans for forests.

5.2 Participatory policy-making

The situation in each country is unique and it is risky to propose solutions for a given country without having fully analysed the specific situation there. There is, nevertheless, a common denominator, namely the fact that sustainable management cannot get off the ground properly if the relevant interest groups do not have sufficient influence on policy and management. This does not mean that sustainable forest management at local level is impossible in countries with weak forest policy and weak implementation of that policy. Pilot projects in Papua New Guinea and the Solomon Islands show that if property rights are favourably arranged, interesting initiatives at local level (alongside a great deal of mismanagement) can be developed. However, these are exceptions (no matter how interesting) and without effective policy it is extremely difficult to introduce sustainable practices on a larger scale.

Participatory policy-making is therefore an extremely important aspect of promoting sustainable forest management. Some of the main aspects of participatory policy-making are the following (after Filer and Sekhran (1998), Kotey et al. (1998) and Watson et al. (1998) etc.):

- a. The interests of the rural population must be recognised and the population must be recognised as an important factor in national development.
- b. Platforms must be created within which all the interest groups concerned, including representatives of local groups, can genuinely negotiate about the future of the forest.
- c. Efforts should be made to ensure mutual trust between the various interest groups.
- d. Checkable mechanisms need to be developed to deal with conflicts.
- e. The importance of local knowledge and institutions needs to be recognised and made use of.
- f. The information and information flow must be of excellent quality, particularly where they concern forest ownership, and the value of and demand for services and products from the forest. This information will allow interest groups to argue their case effectively.
- g. Many groups, including the authorities at various levels, must be able to influence the way in which the forest is to be managed (types of co-management).
- h. Sustainable forest management means that many groups of stakeholders are involved in management. This principle must also be anchored in forestry legislation. The government needs to monitor the way the legislation is enforced in a reliable manner.

Participatory policy-making should not focus merely on the sustainable management of forests for timber production (and checks on this) but also on wider areas. One example of this is Suriname (Markie et al., 1999):

“...there is a need to achieve greater national consensus on the weight attached to diverse and to some extent conflicting goals and to clarify a range of issues such as: the place of different forest uses (e.g. tourism, mining and village agriculture); relative importance attached to wealth and employment generation in local industry and roundwood export; approaches to taxation; concession and tenure policy; financing of local people and entrepreneurs for forest development; and meeting the legitimate expectations of tribal people in relation to forested land.”

One important point is that there are only a few projects in the field which have an active policy of passing on the experience gained to national or international forums, or which actively keep abreast of what is taking place at national and international level.

5.3 Drawing up criteria and indicators for sustainable forest management

One problem associated with sustainable forest management is that it needs to be established, in an honest and independent manner, just what sustainable forest management actually is in a concrete situation. If this is not done, anyone can claim that his timber or another forest product is produced in a sustainable manner. A well-structured set of criteria and indicators, supported by the various interest groups, can provide a practical means of arriving at a consensus definition of what is meant by sustainable forest management at the level of the management unit. Because the situation can differ greatly from country to country, a set of such criteria needs to be drawn up for each particular country.

In 1992, the International Tropical Timber Organisation (ITTO) was the first body to draw up a set of criteria and indicators for sustainable forest management. Since then, several processes have begun at both regional and national level to develop sets of criteria and indicators with which to measure the social, economic and ecological sustainability of forest management.

The following comments can be made:

- National governments are not always genuinely behind national processes intended to produce criteria and indicators. They have their doubts about their usefulness.
- In some countries, working groups have been set up to produce joint criteria and indicators, but in actual practice the process is making hardly any headway. The interests of the various parties involved are seemingly too far apart (still), or the groups do not appreciate sufficiently that it is in everybody's interest for joint criteria to be drawn up.
- Certification is often seen as something imposed by the North on countries in the South.
- National criteria and indicators (for example, those drawn up by the FSC) are most highly developed for the technical aspects of forest exploitation. Greater understanding still needs to be developed in the case of other aspects, such as social equality, other social aspects, the incorporation of NTFPs, and biodiversity.
- National initiatives often have insufficient links to international initiatives, such as the CIFOR tests for various criteria, whereas these can in fact ensure that the gaps mentioned are filled.
- Ecological and forest conservation research often provides insufficient data to determine valid criteria and indicators for use in actual practice.

It should be noted that various initiatives for certification are in fact underway. The only operational system at the moment is that drawn up by the FSC (Forest Stewardship Council). This is applicable both in the tropics and in temperate and boreal regions. The FSC applies ten principles, involving criteria which can be tested in the field by a number of accredited certification organisations, after which a quality mark (label) can be awarded. As of December 1999, a total forest area of 16.65 million ha had been certified within the FSC system in 30 countries. Developing countries are lagging behind (in relative terms).

Drawing up criteria and indicators cannot be viewed separately from promoting a market for sustainably produced timber and other sustainably produced forest products. The term “sustainably produced” is virtually unknown to the general public, whether in developing countries or in the North, and it can hardly be used –if at all– for marketing products. It makes little sense to promote the process of drawing up criteria and indicators without also considering these marketing aspects. Promoting the marketing of sustainable products can silence critics who say that drawing up criteria and indicators for sustainable forest management is something imposed by the North.

Once a set of criteria and indicators has once been drawn up, it is important that national certification organisations should be created, because these can operate more cheaply than international organisations which have to fly in their experts. This does not mean, however, that the additional costs involved in certification do not form a significant stumbling block, particularly for small-scale enterprises.

Certification organisations need to operate more proactively, for example by carrying out the first assessment free of charge. Extra funds are needed for producers who wish to have their enterprise certified. Some ways of achieving this are:

- The certification organisation can have commercial enterprises pay an extra sum (for example 5%) into a fund to cover the cost of certifying small-scale initiatives. However, this solution will probably not produce enough funds.
- Donor assistance for the national certification system.

Besides the situation in a particular management unit, national legislation and the institutional environment are also of major importance in sustainable forest management. Here too, criteria and indicators can be drawn up at national level. This component receives little attention, probably because it rapidly tends to become politically sensitive. An initial attempt was recently made in the Netherlands to produce a set of principles, criteria and indicators to test enterprises at national level (Stortenbeker et al., 1999). This set may be very valuable as the basis for developing a national set in a given country.

Box 3: Drawing up national criteria and indicators in Ghana

The process of drawing up national criteria and indicators for sustainable forest management is still ongoing. Some important aspects are (Toornstra, pers. com.):

- The use of the right expertise (IIED in Ghana) to produce the first drafts.
- The purchase of the right equipment (log tracking system).
- The involvement of stakeholders in all phases of the discussion (NGOs, companies, civil organisations). Consensus should be the aim when decisions are being taken. Adequate information (high-quality research) is important here.
- Constantly keeping in touch with the market for certified timber.
- Drafts should be presented to international certification organisations at an early stage.

5.4 Training and educating institutions in the forest sector

In order to get sustainable forest management going at local level, it is important to be able to reckon on the involvement of government services which can support and perhaps check the local process. One can attempt to set up a project without involving the Forest Service or regional authorities, but doing so does involve a greater risk of the project becoming a kind of island. Moreover, it is virtually impossible in a number of countries to set up local sustainable forest management projects without involving the authorities.

The personnel of these services have often been trained without being taught interpersonal skills or how to facilitate participatory processes. They are often also unfamiliar with other aspects now considered to be of great importance to promoting sustainable forest management (for example the production of NTFPs, business management (small-scale) and marketing).

The importance of proper training is made clear by the situation in Ghana. The Planning Division of the Ghana Forestry Department is highly skilled and is an enthusiastic proponent of sustainable forest management, partly as a result of years of intensive training in sustainable forest management and social forestry (financed by DFID). Training government personnel is more effective if a flexible personnel policy is also possible: those who are high achievers and those with better training need to be paid better and to be promoted more rapidly (Toornstra, pers. com.). We are here entering the area of institutional reform (see 5.7).

However, it is not only governments which are struggling with all sorts of weaknesses with respect to knowledge of sustainable forest management. Businesses, NGOs, trades unions and universities are also insufficiently familiar with this area. Providing courses for all the interest groups in the

forest sector can help fill in these gaps in knowledge. Courses arranged for several interest groups at a time have the advantage of encouraging communication between the various interest groups. Moreover, they make it possible to become acquainted with the way other interest groups think about a particular matter and thus to broaden one's understanding of it.

This type of course is different to the normal training given in forest and nature management. Those who undertake this kind of course already have the relevant background and it is important to make use of it. Some types of experience can provide an effective basis for gaining new insights. Analysing one's own experience should be combined with the provision of new theoretical knowledge. It is important to link the subjects covered in the course to the actual situation of the participants.

Box 4: Checklist of potential topics for training at national level (not exhaustive)

- Formulation of policy and legislation (concepts of community forest and co-management, parties and interests, process analysis etc.).
- Assessment of forest functions and biodiversity (concepts and methods).
- Important topics in local planning (problem analysis, access and control of resources, gender etc.).
- Methodology for local planning (actor analysis, Participatory Rural Appraisal, Participatory Resource Inventory, participatory provision of information, conflict management and negotiation etc.).
- More technical aspects, including agroforestry, community and large-scale forest exploitation, NTFPs, buffer zone management, hunting management, sustainable harvesting methods, marketing of products of community forest management.
- Organisational/institutional changes in the party's own organisation, national/local relationship.
- Knowledge of the socio-economic environment: farming systems, perceptions of forest dwellers etc.
- Management and organisation (monitoring and evaluation of local programmes and projects, evaluation of impact), business management.
- Alteration of party's own attitude: switch from a policing function, which keeps people out of the forest, to the function of facilitator, working together with people towards sustainable forest management.
- Development of communicative skills such as listening, speaking, organising and running group activities.

Complications which may arise when setting up effective training at national level may include:

1. Training (for example taking a course abroad) is sometimes used as a kind of sweetener, not as a means of meeting a specific need.
2. There is a tendency for the top echelons in the organisation to receive too much training, and the lower echelons to receive too little. In other situations, however, it may be the case that the higher echelons have insufficient time to undertake training.

Effective planning of training and transparent implementation can provide part of the solution to this kind of problem, but in some situations compromises will be necessary.

5.5 Professional training and forestry training programmes

Many training programmes in forest management and nature management deal mainly with the technical aspects of forestry, for example timber cultivation, harvesting, and the use of timber. They are often aimed at forest management carried out by the government or by a commercial company and not at management by local communities. The planning aspects, legislation and policy receive little attention. Students do not learn how to deal with people. The programme often involves little field work and/or practical training and there is also often a lack of useful teaching materials, for example books, learning aids etc. The training institute itself often lacks personnel who can teach such subjects as participation, community forestry, NTFPs, appraisal of forest functions and biodiversity etc. Moreover, the teaching method is often authoritarian and not aimed at sharing experience and insights. If there is to be a proper supply of personnel with suitable training both within government service and projects in the fields, changes are required.

Besides the traditional technical aspects, training programmes in forestry and nature management need to focus on all the aspects referred to in Box 4. However, changes in forestry training require a basis of support within the community. Basically, all the interest groups involved should consult together to decide what kind of training is needed.

The institutional problem is also important. In some countries, universities are highly politicised, while in others corruption or extreme inefficiency within government institutions may play an important role. Consideration should be given to having some or all of the programme carried out by an NGO. One then needs to consider the extent to which this option is institutionally sustainable.

5.6 Research on sustainable forest management

Research on sustainable forest management can be divided into two categories:

- Research with a practical orientation which aids a field project or field activity and which is intended to provide an answer to a concrete question or a concrete problem.
- Research with a strategic orientation which aims to benefit the forestry sector as a whole.

Research within the first category should preferably be identified when the project is being formulated. When a project is being implemented, a need may arise for small-scale research. Funding needs to be available for this. Research of this kind does have its limits: can the research results be reproduced in other areas, for example? For more generic recommendations, more –and more thorough– research is therefore necessary. This section deals with that category of research.

Support for research can basically fulfil the following functions:

1. Gain certain insights which can then be applied to policy or in practical forest management.
2. Design of certain instruments or methods (“tools”).
3. The educational and training function. Students who do their MSc. or BSc. programme become acquainted with new ideas, which they can later put into practice in their own work. Research can therefore provide a long-term basis for change.
4. Institutional reinforcement and skills development.
5. A not unimportant side-effect is the activation function: the fact that some matters are examined scientifically already leads to changes in practice.

For an example of how a research project can determine its own scope, see the box dealing with PROMAB, Bolivia.

Box 5: PROMAB Bolivia

The PROMAB project is a partnership between a Bolivian NGO (IPHAE), the Technical University of Beni, and Utrecht University. CIFOR and the University of Freiburg are also involved in the project. The project focuses on research in the Bolivian Amazon. It has received funding from DGIS since 1995. The mid-term evaluation carried out in September 1998 brought to light the fact that recent changes in forest legislation had created an enormous need for expertise in the field of forest management, specifically with respect to management planning and certain investigations prescribed by law. The project took advantage of this, although this was not the original intention. National and international institutes say that the project has made significant contributions to:

- Systematic knowledge of the reality in the forest sector at local level;
- Implementation of forest legislation;
- Production of management plans;
- Production of technical standards for managing palm heart and brazil nut extraction;
- Workshops and seminars for strategic discussions, as a source of information on technical aspects;
- Interpretation of technical standards.

(Source: Enriquez et al., 1998)

Some important points when setting up and promoting research include the following:

- The same applies to research as to forestry training programmes: the research priorities must be determined *in a participatory manner* by consulting all the relevant interest groups. In many countries, this process is still seriously inadequate. The most important problems and research topics need to be determined jointly, something which is a process in itself. During the initial

phase, a number of workshops may well be necessary. Moreover, implementing the research requires regular adjustment, during which there needs to be consultation between researchers and interest groups. See Box 5 for a checklist.

- Production of an *institutional analysis*: is sufficient capacity actually available to meet the demand for researchers? If not, how can the situation be improved? How can one ensure that the proposed research contributes to improving the research infrastructure? Here too, the simplest thing in the short term may be to make the research part of a separate NGO. However, is that the most sustainable solution from an institutional perspective?
- Is all available *national capacity* being used, or are we too rapidly switching over to foreign consultants or Dutch researchers? It is important to draw up a human resource management plan.
- It may be necessary to achieve *regional co-ordination* of the research. This may also mean that Dutch embassies in various countries in the same region consult on co-ordinating forest research. It may also be useful to arrange to collaborate with global organisations (for example CIFOR, Tropenbos).
- *Dissemination of the research results* needs to be properly arranged. The results of research often go no further than the researchers themselves and are not made sufficiently available to their colleagues, either in the country concerned or in the region.
- Putting research results into *practice* and incorporating them into *policy* often turn out to be a problem. It may be necessary to set up a type of intermediary institute or group to do so. After all, a good researcher does not need to possess the qualities required to make research findings accessible to workers providing information in the field.
- A clear distinction needs to be made between research and education (at universities) on the one hand and the provision of *information* on the other. To a certain extent, research and education go hand in hand, but a different type of organisation is necessary for the provision of information.
- It is necessary to determine whether sufficient account is being taken of existing *indigenous knowledge* and knowledge systems and whether use is being made of them.

Box 6: Checklist for potential topics for strategic research (not exhaustive):

- Productive sustainability of forest ecosystems for the production of timber and NTFPs.
- Social, economic, organisational and marketing aspects of participatory sustainable forest management.
- Biodiversity and ecological services provided by the forest.
- Cultural diversity of people living in and near the forest.
- Development of harvesting techniques which cause less damage to forest ecosystems.
- Legal aspects of sustainable forest management.
- Testing of criteria and indicators for sustainable forest management at national level and management unit level.
- Research on forest policy-making and its consequences.
- Design of databases containing data on the national forest reserves.
- Role of local credit and trade capital.
- Collaborative management.
- The role of local authorities (e.g. municipalities).
- The economic potential of integrated multiple use forest management.

This list is not exhaustive and is intended to illustrate the fact that research on sustainable forest management is a highly multi-disciplinary (and interdisciplinary) matter.

5.7 Institutional reform

Many of the topics dealt with so far (training, professional training, research, participatory policy-making) will have a much greater effect if the institutional situation within the authorities is such that changes can be implemented. Training government officials is most effective if a flexible personnel policy is also possible. Staff who have better training and who are high achievers should be given priority where promotion and pay are concerned. Low achievers should ultimately be released from the service. In many African countries, but also in a country like Suriname, this is hardly possible because of the very strong legal status of civil servants at the central ministries.

For this reason, the Ghana Forest Department has been changed into a semi-governmental organisation, the Forest Service, which is in a position to pursue a much more flexible personnel policy. Personnel carrying out checks on activities by companies in the field can be paid better so as to reduce the potential for fraud. A similar government is taking place in Suriname, where the Suriname Foundation for Forest Management (SBB) has been set up as a quasi-governmental organisation to take over the tasks of the National Forest Management Service (LBB). The FAO is running a project in Suriname, with Dutch funding, to get the new SBB off the ground. A mission sent out to evaluate this project made the following remarks (Markie et al., 1999):

“The move for establishment of a quasi-governmental organization outside of the civil service structure with greater flexibility, improved conditions of service and a more performance oriented culture is the only immediate solution to the improvement of forest management and control. However, it may be noted that for the longer-term there will be a need for more comprehensive civil service reform to ensure competent coordination and policy direction for line agencies...”

These remarks emphasise the fact that privatising government institutions is not a simple panacea for complicated problems.

The support project mentioned here also involves preparing the rules and guidelines needed to implement a new forest act, one which provides merely the framework for rules and guidelines. It is obvious that providing support for institutional reform and the drafting of legislation in the form of guidelines are activities requiring a long-term effort on the part of the donor and the country concerned.

6. SYNTHESIS AND APPLICATION OF EXPERIENCE AT LOCAL LEVEL

6.1 General

Experience at local level can be categorised as follows:

- Organisation of local actors. What is involved here is a number of social requirements which must be complied with in order to develop sustainable forest management.
- Forest management in a way that makes the most of various functions of the forest: not only the various productive functions but also others, including the support function (in particular the protection of biodiversity).
- Organisation of the production side (business aspects, including processing and marketing).
- Results of sustainable forest management at local level. This will involve discussion of the effects of local forest management on the population and ecological and economic sustainability, etc.

The first remark which needs to be made is that there are no descriptions of projects in which all these aspects are dealt with sufficiently and in a balanced manner. Our own experience in the field so far leads to the same conclusion. Some field projects are well on the way to ecologically sustainable production but devote hardly any attention to marketing aspects. This means that the economic yield of their activities is much less than it might be (or that the economic yield is negative). Other projects are primarily aimed at marketing or at doing business (for example ecotourism), although there is no economic basis for testing whether or not the methods applied in the field are ecologically sustainable. In other cases, insufficient time is devoted to participatory processes. As was already mentioned in the previous chapter, there are also hardly any projects which focus on the exchange (in two directions) of experience of sustainability aspects at national and international level.

The lessons drawn below have been assembled from various publications and field experience to produce a more or less logical whole. However, whether a project organisation can be set up to focus sufficiently on all the important aspects is a question still open to debate. That may well be a bigger job than one can handle. Perhaps what is needed is to carry out project intervention in phases, with each successive phase focusing on a different aspect. One example of phased planning is the Proyecto Forestal Chorotega (section 4.7). Even if one were to decide on phased planning, however, the initial project set-up would already need to take account of all the aspects and plans, if they are to be tackled thoroughly.

6.2 Organising the actors

6.2.1 Raising awareness

Before sustainable forest management can be implemented, it is necessary for the target group to be convinced of the value of such management and the way in which, and under which preconditions, they can put it into practice. A special campaign can be implemented to do this, with a particular focus on the following aspects:

- An organisational distinction is necessary between campaign and information activities on the one hand and production activities on the other. The campaign and the economic aspects can easily conflict with one another.
- When providing information, efforts need to be made to link up ecological sustainability with the provision of a reasonable income, one which can be guaranteed in the long term.
- It is important to increase the ecological knowledge and understanding of the target group. Raising awareness can easily go no farther than superficial slogans.
- One component of raising awareness may be the provision of information on the actual consequences for humans and for the ecosystem when certain non-sustainable types of forest use are implemented. Other important points are to draw attention to legal rights, to how to negotiate with companies involved in commercial exploitation and to how to apply extraction regulations (after Fernside, 1995).
- There may also be insufficient public support in the villages or communities for sustainable forest management. The project should then have the courage to withdraw from the village or

community concerned. The community may also be internally divided. One can then wait until the internal divisions have been resolved or one can actively attempt to mediate in the conflict. The latter approach will not be an easy matter, given that the project is also a party, one that is in favour of sustainable forest management.

- It is useful to develop modules so that the provision of information and raising awareness can take place in a systematic manner. Suitable information material can then be developed in the context of the modules.

6.2.2 Local participation

A large number of books have already been written about on the subject of participatory forest management and on the need to involve local groups in identifying problems, in planning, organisation, implementation and monitoring. Participation is undoubtedly an extremely important precondition for effective forest management, but the present document only has space to focus on a few aspects.

Various different models of local participation are possible (after Cornwall (1995), cited in Carter et al. (1995)):

1. *Co-operation*: Tasks are assigned and payment is made for carrying them out. Outsiders determine the agenda and guide the process.
2. *Consultation*: The local population are asked for their views. Outsiders analyse the information collected and decide on the action to be taken.
3. *Collaboration*: Local people work with outsiders to determine priorities. The outsiders are responsible for guiding the process.
4. *Learning together*: Local people and outsiders pool their knowledge to create new insights and to collaborate and decide on action to be taken. Outsiders facilitate.

The first two options are no longer considered relevant to modern development co-operation. However, the most participatory option is not always the most obvious choice (4). By not relinquishing all responsibility, a government can attempt, for example, to ensure that forest remains forest or that the qualities of biodiversity are maintained. It is also possible that the forest service and/or national policy-makers are not yet in a position to relinquish all responsibility. A great deal of attention currently focuses on options for *collaborative forest management* (co-management) in which the government relinquishes some of its responsibilities, under certain preconditions, to the local population or in which the government provides support, again under certain preconditions, for local forest management.

If one wishes to work within models 3 or 4 (in other words, within a model involving extensive participation), the following conditions will need to be met when carrying out forest surveys, drawing up a management plan, implementing forest management, harvesting, processing and marketing products (after Carter et al. (1995), Molina Barrios et al. (1995), Biodiversity Conservation Network (1998) and ODA (1996)):

- Produce a social analysis of the functions, responsibilities, perceptions, aims and powers of local institutions and systems. Distinguish between stakeholders with rights (formal) and interests (not set out in writing).
- It is important to maintain a continuous pattern of consultation with all the stakeholders. This does not mean that contact with all the stakeholders needs to take place with the same frequency.
- All activities should be carried out with the participation of, or entirely by, the local population.
- The information needed for planning, implementing and monitoring sustainable forest management and for processing and marketing products should be assembled by the local population as much as possible and in such a way that it can be understood by the local population and is of use to them. The honest and accessible provision of information is crucial.
- Participation is less necessary when analysing data. However, the experts who are called in must present the results and the consequent options in a simple manner so that the local population can play a role in decision-making. If experts ultimately start deciding what is to be done, participation will have ceased.
- The methods which ensure participation by individuals or communities must constitute a social system in which techniques of participatory evaluation and planning and of participatory technological development can be applied.
- Participatory forest management costs time, so that it is necessary to be realistic as regards timing and the extent of project elements.

- Government officials should not be forgotten, even if the project is being carried out without government involvement. It is important to develop a relationship at an early stage (and maintain it) with key figures at all levels of government who can in any way influence project activities. However, certain government officials (and also other stakeholders) may have personal interests which form an obstacle to sustainable forest management and conservation. It may then be necessary to form alliances with other stakeholders.
- Take steps to ensure clarity as to the roles and responsibilities of the authorities, local groups, and perhaps other stakeholders.

6.2.3 Promoting land rights

One important precondition for sustainable forest management is that the situation concerning property rights and rights of use should be properly dealt with. There is no point, after all, in having the local population make long-term investments if it is unclear whether they will profit from those investments. In most cases, it will not be possible to agree on improved harvesting techniques if property rights or rights of usufruct are not properly arranged (Clay 1996).

On the other hand, it needs to be pointed out that the possession of land rights does not automatically lead to sustainable forest management; there are a number of other conditions which need to be complied with. In Papua New Guinea and the Solomon Islands, for example, local landowners have virtually complete say over how their forests are managed. There are other groups of owners, however, who sell the logging rights to their land to foreign companies, which then log the timber in a non-sustainable manner and in fact ruin the forest. However, there are a number of initiatives in these two countries in the area of sustainable forest management which are the subject of international attention, even though the national forestry policy of these countries leaves a great deal to be desired. These initiatives involve groups of landowners who are showing an interest in sustainable use of the forest. Because they have virtually complete say over their land, initiatives aimed at implementing sustainable forest management can be rapidly put into practice. These initiatives attempt to comply with other necessary preconditions for sustainable forest management.

In a local situation, land rights may be ensured in various ways, including the following:

- If there is no legal framework at national level to deal with the property rights of local and indigenous groups, attention will need to be given to setting one up.
- It may be necessary to start a programme for regional land use planning or for Integrated Environment Management. Such a programme may define various different zones. It may entail collecting all kinds of data and linking them via GIS. It may also be necessary to develop a programme which can aid in decision-making (for example determining the consequences of various different scenarios). It may also be possible, however, to work on a smaller scale using simpler aids (for example maps made by the villagers themselves or aerial photos).
- Assistance can often be provided for individual farmers to help them measure their land and to deal with the often lengthy procedures involved, so that the local population can ultimately – either individually or collectively – get their rights set down in black and white.
- Indigenous peoples generally find it necessary for their territory to be marked out physically.

6.2.4 Women and sustainable forest management

When felling and removing timber are mentioned, it is often stated that women are unable to carry out such heavy work. This is often recognised by both men and women, and it may easily sideline women. This is neither necessary nor desirable. Some areas in which women can play an important role include:

- Planning and decision-making on forest management and other activities;
- Collection of NTFPs;
- Carrying out surveys;
- Setting out and marking management units or blocks;
- Deciding on how the proceeds of forest management should be distributed;
- Management, administration, or other work in a company processing or marketing forest products;
- Environmental education and the provision of information to children.

It may be important to carry out a study of the actual opportunities women have to invest a great deal of time in a project for sustainable forest management and of the impact of forest management on gender relations. Consulting the women themselves is naturally vital.

6.2.5 Training

The target group often lacks knowledge in many areas. Training which is applicable in practice is therefore an important component of a project for sustainable forest management. In fact, all the matters mentioned in this chapter may be the subject of training programmes for the target group. In order to provide effective training for the target group, it is also often necessary to provide training for one's own personnel. Many projects aimed at sustainable forest management take place in marginal areas where more highly qualified personnel do not always wish to work, meaning that less highly qualified personnel require additional training. In addition, sufficiently qualified personnel are not always available for all disciplines. Separate programmes need to be set up and implemented to train personnel and to train the target group. It is important that training programmes should be carried out systematically and that models should be developed to deal with relevant themes.

Training in promoting entrepreneurship and organisational skills should be given priority. This can make producers attractive partners for banks when loans are concerned. Another important matter is learning sustainable harvesting techniques.

The overall approach to training should be as follows (ODA, 1996):

- The emphasis should not be on courses with a high input for a select group but on short, low-cost courses for a larger group.
- It is not only individual qualities which are important but also team qualities.
- Efforts should be made to promote an exchange of experience with other projects with a comparable aim.
- Attempts should also be made to set up training contracts with businesses, for example by means of secondment.
- Training is a continuous process and should emphasise the individual's responsibility for developing his own skills.
- The need to develop individual skills should be one of the aims set out in job descriptions.

The first of the ODA's recommendations is particularly subject to debate. Van der Top (pers. com.) rejects the idea of short, low-cost courses for larger groups. He would prefer quality rather than quantity: have a number of groups consisting of 20-25 local leaders from forest-relevant enterprises, government services and NGOs develop a local curriculum, with a refresher course every now and then, and in this way build up a sustainable network.

6.3 Managing the forest as a natural resource

All aspects of forest management should be integrated into the management plan. The management plan should take account of the various different functions of the forest (regulatory functions, support functions, production functions and information functions). We can distinguish between four groups of aspects within the area of practical management:

1. Management for plant-based production
2. Management for animal-based production (game and fish)
3. Management for natural values (biodiversity)
4. Management for tourism.

A management system needs to be determined for these four groups of aspects. It should be based on the specific features of the forest area concerned. Management aimed at regulating tourism will not be relevant in all situations (see 6.3.3).

The specific *management plan* will depend on the particular situation, scale and form. Some examples include:

- In the Solomon Islands, a separate management plan is made for each property (generally no larger than 1000 ha). The management plan actually consists of a restricted number of forms on which certain specific information has to be filled in. Much of the text is standardised.
- In the case of the COBOL/ABCOP project in Bolivia, the forest is the property of the communities. Management plans are made for much larger units.

The management plan should contain relevant information about such matters as the various types of forest, plants and animals, endangered species, landscape and cultural values. The aims of management should also be clearly set out, together with the strategy and measures to be used. The management plan forms the framework for management for a period of no more than 10 years. It then needs to be revised.

A management plan is naturally only worthwhile if it is drawn up in consultation with the local population groups involved and if it takes such a form that it is understandable and transparent for those groups. A management plan is also only worthwhile if it is actually used in practice as a means of achieving better management results.

It is essential to *monitor* the results of management. The ways in which monitoring takes place should be set out in the management plan. Management relates to production aims but also to aims involving the maintenance of biodiversity. Local people can play an important role in monitoring.

6.3.1 Management for plant-based production

Amongst other things, sustainable forest management involves ensuring that the production capacity of the forest does not decline and that biodiversity is maintained. From the point of view of ecological sustainability, we need to distinguish a number of basic steps within the process of exploiting forest products (after Peters, 1994). These steps are applicable to sustainable production of NTFPs but can also be applied to timber production: choice of species, forest surveys, studies of production, regeneration surveys, harvesting methods, adaptation of harvesting and cultivation measures. The following sections will go into these steps in greater detail. It should also be noted that there is indeed a significant difference between the harvesting of timber and the harvesting of NTFPs. Harvesting timber affects the structure of the forest, while harvesting NTFPs does this to only a slight degree, if at all. This fact has considerable consequences for re-growth and variation in re-growth.

6.3.1.1 Choice of species

This is primarily determined by economic and social considerations. In addition, the occurrence of a species also naturally plays an important role, as does the marketing potential. One of the first steps in setting up a sustainable production system may therefore be to carry out marketing studies (see the section on marketing). It should be noted that not every species has the same ecological potential for sustainable management. This potential depends, amongst other things, on the part of the plant which is harvested, the population dynamics, and the growing conditions for the species.

6.3.1.2 Forest surveys

Forest surveys are intended to produce an estimate of the number of harvestable individuals (trees, bushes or plants) per ha in the various types of forest and to provide information about the number of trees in each diameter class. This information is important in harvesting timber but also when harvesting other products.

Before a forest survey is carried out, it is important to determine which territory is the property of a particular group, family or community. Problems and disputes associated with land rights will need to be solved before carrying out the survey.

It also needs to be clear which part of the property is intended to be permanent forest, agricultural land, land for housing construction, etc. It is generally possible to produce a plan showing the property and the various types of land use concerned.

It is important to fully consider the type of information which is intended to be collected. There is no point in collecting information which is then either not used or used to only a very limited extent. Peters gives some general advice on carrying out surveys aimed at the exploitation of NTFPs which can also be applied to timber (after Peters, 1994):

1. First assemble all the knowledge available. Where do the species occur which are to be exploited, in what type of forest do they occur and in what density? Is the product produced by one or more species? Have forest surveys ever been done before and are aerial photos available? Has the area already been exploited? If so, for how long and at what level of

intensity?

2. The survey should provide fairly precise information about the number of harvestable trees per ha.
3. The diameter of all the trunks of the desired species should be measured, or if this is not possible, the height. Categorising the trees according to their size and determining the number of trees per size category makes it possible to determine the population structure.
4. Smaller, non-productive individuals should also be counted and measured.
5. Basically, there is no lower limit for inclusion of individuals in the survey. In order to estimate potential production, all size categories should be considered (Dijkman, pers. com.).

The following remarks can be made about surveys:

- Most surveying systems focus on timber. Little experience has been gained with surveying NTFPs in a simple, practical, participatory manner (see section 4.4 Nepal-Swiss Community Forest Project). Some NTFPs, such as palms, can be surveyed in the same way as timber.
- The intensity of the survey differs considerably from system to system. This also has to do with the number of commercially viable and harvestable trees per ha. This number may vary considerably according to the location. It is also clear that surveying is more intensive the higher the expected financial proceeds from the forest.
- Efforts must be made to have the survey carried out by the target group itself as much as possible, perhaps with assistance during the initial phase from project organisation personnel or the forest service. Projects are not averse to applying fairly intensive surveying systems which can nevertheless be carried out by ordinary villagers.
- The manner in which information is collected in the forest must be such that it can be understood by the target group. The local population often have the necessary knowledge to recognise species quickly and effectively.

6.3.1.3 Studies of production

These should be carried out on trees of differing size and should be repeated a number of times for the same trees. The harvest may, after all, depend on the size and age of the tree but may also fluctuate considerably per year. The variety present in the environment should also be included in the measuring system because a different environment (for example better soil) can produce a different rate of growth. These studies can be carried out by local product collectors.

6.3.1.4 Surveys to determine regeneration

These surveys are used to determine the original density of seedlings and young trees of species which are to be exploited. In order to carry out regeneration surveys, permanent test plots need to be laid out. Monitoring also takes place of the fluctuation in density resulting from harvesting. The results of these surveys are categorised according to height and are then added to the results of the survey of the larger trees. This produces *a complete picture of the population of the species to be exploited from seedling to old tree*. For many species, one survey every five years will be sufficient.

6.3.1.5 Harvesting methods and evaluation of situation

Harvesting techniques often have an unnecessarily large number of negative effects on the remaining ecosystems. Methods are sometimes used which are particularly destructive in the case of harvesting NTFPs. One example is the extraction of wild honey, in which the whole bees' nest is often destroyed, even though there are methods available which allow the bees to rebuild their nest after the honey has been harvested by humans.

The many negative environmental effects of the normal methods of harvesting timber are well known, if not infamous. Even so, enough methods and techniques are available which have a positive effect:

- Planning the harvest: where and when (for example, indicate on maps where the trees to be felled are located);
- Directional felling (felling in a pre-determined direction);
- Technically correct felling (with a felling notch);
- Planning roads to be used for dragging out timber;
- Use of winches with a cable, which can reduce the damage caused by skidders etc.
- Sawing the timber at the felling location using a portable sawmill: dragging out the timber is replaced by transporting planks and beams.

These measures may perhaps turn out to be more expensive than more usual methods of logging, but the latter often lead to considerable losses as a result of bad planning and the use of techniques which damage the wood after it has been felled. Studies are necessary to evaluate new harvesting techniques, focusing on the time involved, the economic costs and proceeds, and the environmental impact.

According to Peters (1994), situation assessments are visual estimates of the behaviour and condition of mature trees (for example fallen flowers and unripe fruits, diseases). They are carried out during harvesting. Such rapid assessments can identify problems of reproduction or growth before these have consequences for the number of seedlings present. However, it is not clear to what extent this can be carried out in practice because it is not clear how the data should be processed (Dijkman, pers. com.).

6.3.1.6 Adapting the harvest

If monitoring regeneration shows that the net survival rate of seedlings of the economically important species is declining when compared to the initial survey, or if assessment of the state of the mature trees is negative, changes need to be implemented in the method of harvesting. There are two possibilities:

- Regulating the number and size of the plants to be exploited
- Restricting the total area where harvesting is permitted.

If it is impossible from the socio-economic perspective to reduce the level of harvesting, cultivation measures will need to be taken in an attempt to increase the level of sustainable harvesting. It should be noted that ecological sustainability can only be achieved if a number of socio-economic preconditions are met. These will be dealt with below.

6.3.1.7 Forest cultivation measures

In a subsistence economy, extracting a large variety of forest products can be ecologically sustainable. If a monetary-economic market for products develops, production levels which are ecologically sustainable are often too low to be economically valuable. Overexploitation can then rapidly occur. From the economic and cultural point of view, there is hardly ever any way back to a subsistence economy and its associated methods, with low pressure on the ecosystem. People wish to make use of a number of modern facilities and will therefore need to generate a cash income of some kind. They will consequently need to produce profits for the market. Intensifying forest production is often necessary to achieve this. This can be achieved by means of the following cultivation methods, for example:

1. Introducing (sowing or planting; in the case of animals releasing) extra individuals of harvestable species;
2. Selective removal of species which are considered less useful (lianas, undergrowth and/or large trees). This reduces competition for the species which are considered useful.
3. Cultivating useful species outside the natural woodland in monocultures or mixed vegetation (in the case of animals, rearing in captivity).

The third of these methods is a realistic option but it goes beyond the bounds of this document.

The following remarks can be made about the cultivation measures mentioned under points 1 and 2:

- Cultivation measures are highly dependent on local ecological conditions and the productivity of the ecosystem. In the Solomons, for example, forest re-growth after harvesting is sufficient for selective logging to be possible again after five years. As yet, extra cultivation measures are unnecessary, although logging is highly market-oriented, even targeting the international market. However, ignoring cultivation measures in natural tropical forest is in most cases impossible.
- Cultivation measures are also highly dependent on the intensity of exploitation. If the pressure of exploitation is low, cultivation measures may be unnecessary, or not worth carrying out. One can also reason in the opposite direction: if cultivation methods are considered too ecologically disruptive, the pressure of exploitation will need to remain low.
- Monitoring growth and development is an important component. By monitoring growth, one can determine whether cultivation measures need to be taken. One can also determine whether cultivation measures can produce sufficient effect. In some cases, sufficient reliable growth figures are available for neighbouring forest, so that monitoring can take place within the management unit at reduced intensity.

- No simple recipe can therefore be given for what a package of cultivation measures should look like. This will need to be designed for each particular situation; monitoring the ecosystem is necessary to introduce improvements.

6.3.2 Management of animal-based production (game and fish)

Animals and fish are frequently important sources of protein for local population groups. Bushmeat is often the most important NTFP, far more important than vegetable NTFPs, but research has paid little attention to it. Overfishing and overhunting in inhabited forest areas is the rule rather than the exception. Game management and fishery regulation often play only an unjustifiably modest or insignificant role in sustainable forest management.

Hunting can have a negative effect on the regeneration of natural vegetation because animals (for example forest-dwelling rabbits and apes) play an important role in distributing seeds. It is estimated that 80% of the species of plants in tropical rainforests are dependent for pollination and seed distribution on animals (Dijkman, pers. com.)

In the Taï forest of the Ivory Coast, Caspary (1999) found that local communities apply certain restrictive rules to prevent certain animals being hunted in certain areas. This does not mean, however, that one should subscribe to the romantic idea that the local population is by definition the main protector of forests and biodiversity there. Hunting is in general non-selective and there is no such thing as local game management.

Game management is necessary, however, if one wishes to speak of sustainable forest management. Some of the points to consider are the following (from sources including Van Wieren (1999), Caspary (1999) and Dijkman (pers. com.):

- Game management and fishing must be integrated into the management plan and into land use planning.
- The population of a particular species of animal must be lower than the carrying capacity of the area; in other words, there should be no unlimited rearing and release of animals.
- When hunting takes place, it is important to know where the animal concerned stands in the food chain. Removing a top predator (for example a carnivore) may lead to the unchecked growth of the rabbit population and to their being hunted, for example. This puts conservation at odds with production.
- It may be important to identify traditional cheap and selective hunting techniques which can assist in combating non-selective hunting. In the case of fishing, this might involve preventing the use of dynamite or nets whose mesh is too small (often leading to small and immature fish being caught unnecessarily).
- It is possible to carry out research on methods of rearing forest animals in captivity as a means of increasing the protein supply for the local population. One major advantage here is that forest animals can use fodder taken from the forest (leaves, fruits), in contrast to chickens and pigs, for example, which often need to be fed (in part) with concentrates that have to be brought in from a distance and which are therefore often expensive.
- Certain species of plants provide fruits which can feed many species of animals in times of scarcity. During this period, animal populations are entirely dependent on only a few species of plants, so-called “keystone plant resources”. It is important to the forest ecosystem as a whole that these species should be identified and that the management plan should include suitable measures, for example protecting the pollinators of these species and the animals which distribute their seeds (Meiboom, 1997).
- The approach to hunting and fishing needs to combine technical and ethical aspects. Local customs and culture play an important role specifically in hunting and fishing. Attitudes cannot quickly be altered.

6.3.3 Management to maintain natural values (biodiversity)

In most countries, the size of protected areas is insufficient to ensure long-term maintenance of the total biodiversity. In many places, suitable protection of biodiversity is only possible if considerable areas of natural forest are managed using environmentally friendly production systems. The idea of natural production forests often appeals to the local population far more than that of protected areas.

IUCN has drawn up guidelines for protecting biological diversity in forests which are managed for timber production. These guidelines have been drawn up primarily for the large-scale commercial exploitation of timber and also include proposals for action to be taken at national level. However, a number of principles and proposed measures are also relevant to sustainable forest management by local communities (see box).

Box 7: Some principles and possible measures to protect biodiversity in production forests

(From: Blockhus et al. 1992).

1. Areas of special importance for biodiversity need to be identified and, if necessary, marked out. Besides restrictions on logging and forest conservation measures, special rules may apply to such areas with regard to the harvesting of NTFPs and timber.
2. It is important to regularly monitor the state of biodiversity. To that end, indicator species need to be identified and their presence regularly measured.
3. In order to maintain biodiversity, effective protection of watercourses and wetlands/morasses within the forest is of major importance.
4. Species will be able to recolonise logged areas of forest if sanctuaries are created in production forest. These should measure about 100 ha and should amount to a total of about 10% of the various forest types.
5. Small-scale disturbance by humans may increase the structural diversity in flora and fauna. Large-scale disturbance (for example large-scale logging areas) often leads to a loss of biodiversity.
6. Guidelines for sustainable forest management (as set out in ITTO guidelines or FSC principles) involving restricting the damage to the remaining trees as much as possible, minimal compaction of the soil and proper construction and maintenance of roads, will in general also benefit the maintenance of biodiversity.
7. In general, diversified production of a large number of products and services is preferable to managing the forest for the production of a restricted number of species of timber.
8. It is important not only to protect the production function of large areas but also to make the protection of biological diversity a goal.
9. It is important that the forest includes areas where rotation is longer (a long period of time between the various logging activities).
10. Both protected areas and natural production forests should preferably be large, continuous areas without a large number of enclaves used for agriculture and building. Internal zoning can ensure the optimum balance between the aims of protection and production.
11. Some species have important functions within the ecosystem because they are essential to seed distribution, for example (keystone species). These species deserve special attention.
12. The use of pesticides, herbicides, arboricides, and other chemicals should be restricted as much as possible.
13. Trees with holes in them, standing dead trees and rotting fallen trees fulfil important ecological functions and should not be removed from the forest.

6.3.4 Management for tourism

In the Netherlands, recreation is a particularly important function of forest. In the humid tropics, tourism may also be an important factor. Tourism and nature form a field of policy which is rapidly growing in importance. In the Netherlands there is now a platform made up of representatives of the tourism industry, other interest groups, the authorities, and NGOs which is attempting to coordinate action, certainly with respect to nature in an international context.

Tourism is sometimes seen as a magic potion to generate income from forest management. In many remote areas, however, the potential for tourism is likely to be very restricted. If transport connections are poor and if the hotel facilities in a country are sub-standard or extremely

expensive, ecotourism will not easily get off the ground. The national context also plays an important role. If one sets up ecotourism activities without their generating enough income, the local population will be disappointed and cease co-operating. Tourism can sometimes be an important source of income, even more so than timber (for some examples, see Biodiversity Conservation Network, 1998). In general, tourism should be seen as a complementary activity, a means of increasing the diversity of sources of income within the context of sustainable forest management.

Once tourism actually gets going, it is no easy matter to control the process. Major economic interests can suddenly become relevant. Large investors may set up hotel chains, for example, which may have disadvantages for the local population and for the forest. Before encouraging tourism, one therefore needs to determine whether one can take control of the situation. If not, it is often better –assuming that one wishes to promote sustainable forest management– to not undertake any activities to promote tourism.

Some important points include the following (after Brandon (1996) and Biodiversity Conservation Network (1998), with additions):

- The attractions which tourists are to visit must be competitive (either unique or at least interesting to visitors).
- It is important to define clear goals for management. It is essential to develop and implement management plans which control, regulate and promote tourism. One needs to determine what level of influence by tourism on the ecosystem is acceptable. The areas involved need to be monitored and zoned.
- Tourists should pay for entry to the area and a tourism tax can be levied. This should reflect the management costs for tourism and protection of the area.
- The income generated from entry charges should primarily be used by the park where it has been generated. Projects exist in which a certain percentage of the tourism tax is used to benefit the local population. This naturally increases their involvement in forest conservation. It is also possible to use any surplus for nature conservation elsewhere.
- Information needs to be collected on the impact of ecotourism on the local population, and on the options and opportunities which it provides them with. Mechanisms need to be determined to involve the local population in planning and development.
- An investigation should be carried out to determine whether the local population can gain possession of ecotourism enterprises. This might involve small-scale enterprises which manage hotel facilities, observation posts for watching game, marked paths and/or restaurants. There may be work for local people to guide scientists and tourists, for baggage porters and for food producers and preparers.
- Explore niches in the market for craftwork, artwork, and applied arts.
- It is important to consider the marketing strategy. A decision has to be taken on whether to aim at low value/high intensity or at high value/low intensity, and the consequences of this choice need to be borne in mind. Tourism is also a dynamic sector; much is dependent on fashion.
- In many areas, the local population have only little schooling. Training in all sorts of basic skills may be required.
- The opportunities for collaboration with national tour operators need to be explored. They may be able to incorporate a few days stay in the project area into certain holiday packages.
- In the case of indigenous groups which still have a culture of their own, it may be important to impose a code of conduct for visitors. Such rules must be drawn up in consultation with the local population and must be announced before the tourists arrive.

6.4 Organisation

6.4.1 Various organisations

Forest management projects involve a number of different types of organisation, namely that which implements the project on behalf of the donor, the local village organisation, and the local organisation which carries out actual forest management and the processing and marketing of forest products. A clear distinction needs to be made between these three types of organisation.

The organisation implementing the project (for example an NGO) should not itself act as if it were

an enterprise but should facilitate, create the necessary preconditions, and provide training. There is a major lack of professional entrepreneurial and marketing expertise within NGOs and project implementation organisations. When projects are being set up to produce and market forest products, people are needed who genuinely know how to transact business, who have already been involved in it themselves, and who have more than just a theoretical knowledge of the subject.

Encouraging the *village organisation* is important, as we have already seen in section 6.2. A village organisation may be the proprietor of a management and processing enterprise, but it is then important to make the business a separate organisation. An enterprise can be set up by an external body, but it is not absolutely necessary for the producers (farmers) to be the proprietors of that enterprise. Interested producers may perhaps use their product to buy shares in the processing and/or trading enterprise. If they do not wish to do so, the enterprise can simply operate on a commercial basis, for example without making a profit.

The following points need to be considered by the *management and processing enterprise*:

- *Transparency* is required; those involved (those who produce the raw material) must understand broadly what is going on.
- More attention needs to be paid to drawing up professional business plans which are capable of implementation. The business plan will provide information about such matters as the expected investment, costs and proceeds. It is necessary to indicate whether the enterprise is expected to become economically self-supporting (see also section 6.5.3).
- The business plan should also indicate how the *forest management plan* is to be carried out and how it is to be financed (see section 6.3).
- Certain requirements will need to be met with respect to safety and working conditions, for example so as to qualify for sustainable forest management certification.
- Internal environmental protection involves the requirements which must be met by the operational management and the way products are processed: internal monitoring, disposal of waste, waste oil etc.

If a production enterprise focuses on production for export, it will not always need to concern itself with marketing for export. Basically, it is quite possible for several production enterprises in one country to make use of the same exporter (of sustainably produced goods). The export company can work on behalf of several groups of producers and deal with several products, can provide the necessary knowledge of languages, create better contacts with banks, build up more knowledge of marketing, and encourage greater awareness of sustainably produced goods.

6.4.2 Degree of mechanisation

Investment in management, and in any processing unit, must be appropriate to the production forecast. The Village Development Trust in Papua New Guinea (PNG) carried out a study of the profitability of portable sawmills. These have an economic life span of about seven years. The study showed that to reach the break-even point for this investment in equipment, it was necessary to saw at least 10 m³ per month (120 m³ per year). Doing so would still produce only a very low return (IRR) on the money invested. If production were raised to approx. 350 m³ a year, the IRR would be 15%, which is quite acceptable. If one can predict how many cubic metres each ha of forest can produce annually in a sustainable fashion, it is possible to calculate the minimum area necessary to ensure that a portable sawmill is cost-effective. If the area of forest is insufficient, you know that using a sawmill will not be a success. It will either lead to overexploitation and degradation of the forest or it will not be cost-effective. If one does not wish to make this investment, one will need to find a solution involving a lower volume of investment which is economically and ecologically sustainable. Labour costs differ considerably from country to country and also fluctuate in the course of time. The conclusion is therefore that the level of mechanisation and the volume of investment must be carefully determined in each specific situation.

6.4.3 Product choice and diversification

Forests often produce a large number of products. In a situation where forest dwellers still mainly search for products for their own consumption, many forest products can be useful to them. However, if the aim is to produce for the market, it is not so simple a matter to find a market for all

these products. Often, only a few projects are suitable.

Product diversification is essential to the long-term survival of many communities. If products harvested in the wild become extremely popular, attempts will be made to produce such products synthetically or to plant them in the form of mono-cultures. Producers therefore have to have more than one string to their bow. They can also decide to change over to mono-culture themselves (or preferably to a mixed agroforestry system). This can be an effective option if the aim is to reduce the pressure of exploitation on the forest and to combat poverty.

Product diversification can also involve selling second-grade products on the local or national market (at a lower price) while earmarking the best quality examples for export. This sometimes makes it possible to cover part of the cost of production by selling a product which would otherwise –in a sense– be wasted.

Product development should always be carried out for one product at a time and should focus on two variables: the products which are easiest to produce and those which produce the most per hour of labour invested. Once a community is producing a single product, part of the profits generated can be invested in product diversification. However, it is necessary to determine whether the new product suits the community as far as the season is concerned. The best approach is to focus on products which require the same skills, materials, and infrastructure, or which make more efficient use of the available resources. Diversification is more worthwhile if it takes place on a regional basis and not only for a single producer or community (Clay, 1996).

6.4.4 Storage, processing and transport of forest products

During peak production periods, most producers can only sell at low prices. *Storing* a product is often a way of adding value. For the international market, storage is essential because processors want to be sure of a continuous supply (Clay, 1996).

Where *processing* is concerned, the following points should be considered:

- The market imposes various requirements on the processing of forest products. If the intention is to sell palm hearts on the Dutch market, the stringent Dutch and European requirements will need to be met. These will frequently be significantly stricter than in the country of production, meaning that investment will be necessary, for example to improve hygiene.
- Processing should focus on increasing the size of the market where the product can be sold (Clay, 1996) Producing an end product is by no means always the most obvious choice. The market for an end product may well be much more restricted than for a semi-manufacture. Processors who are more familiar with the consumer market are often in a much better position to determine what requirements and fashions a product must meet. Fashions sometimes change very rapidly.
- It is often thought that processing has to increase the value of the product. However, this is often a highly complex matter. Things should be kept simple. The best option is to systematically attempt to reduce loss and waste during the production process. In the case of timber, for example, this may involve preventing waste caused by leaving too high a stump, felling trees but forgetting to remove them, allowing timber to rot during storage or transport, and sawing timber to the wrong dimensions.
- Newly established processing companies are often less efficient than existing companies. New companies are often set up with the specific intention of providing more income for the producers in the field. If this is in fact the intention, it will be necessary to work more efficiently than other companies.
- Processing must be ecologically acceptable. An investigation is necessary to determine whether processing is not in fact so inefficient that it uses far more raw material to produce the same end result (Clay, 1996).

Many communities do not have suitable *transport facilities*. One of the biggest problems in transport is the scale of the work. It is important to collaborate, but it is not always a good idea for the community or (communities) to buy vehicles themselves. It may be cheaper to hire vehicles for a restricted part of the year (Clay 1996).

6.4.5 Marketing

Marketing is an aspect which is grossly underestimated by those carrying out projects in the field of forest management. They focus on managing the forest and on the participation of the local population. They assume that the forest can produce certain products. They aim to achieve sustainable levels of production, and then somebody has to find out how to get rid of them. A dealer or marketing expert looks at matters from precisely the opposite point of view. He or she first determines which product has a chance of being successful on the market and then checks whether it is possible to produce such a product. Sustainable forest management will always lead to a certain conflict between these two approaches. However, it is clear that the role of marketing and entrepreneurship within projects aimed at sustainable management and conservation of tropical forests needs to be greater.

One can make a large number of comments on the topic of marketing. These can be divided into two categories, “general” and “international market”.

General

- Before producing products it is essential to determine whether there really is a market for them. If a product is already produced in another country, it may be worth first importing it, re-packaging it in one's own packaging and then seeing whether it can be sold. This costs money, but it can save a lot of trouble.
- It is often better, therefore, to start with products which are already being produced and for which a market already exists. Creating a market for unknown products takes between 5 and 20 years: about 5 years for foods, 10 years for personal care products, and 20 years for pharmaceutical products (Clay, 1996).
- In all cases, quality production should be the aim. Few consumers are prepared to sacrifice quality for environmental or social correctness. Low-quality products can only be disposed of on the local or national market at a lower price.
- Products must be adapted to changing market conditions.
- The volume of sustainably produced goods is still restricted.
- Local organisations (producers) are often beginners where marketing is concerned.

International market

Focusing production entirely on exports may have the following consequences for the local population (Siwatibau et al., 1998):

- In the case of timber, there is a great deal of waste because foreign customers only require certain dimensions and grades. Producers incur a loss because they cannot sell a portion of their products.
- Little or no timber comes onto the local market any longer.
- People have to choose between the production of quality timber for export and production for constructing their own houses. There is virtually nothing in between these two extremes.

It is therefore advisable to maintain the local market for the sale of second-grade products.

Where the international market is concerned, the following remarks may be made:

- On the international market, it is possible to ask a somewhat better price for certified timber. Nevertheless, the most accessible market is generally the local market. It is therefore important to think hard before attempting to access the international market. This often applies to other forest products too.
- Tropical forests contain an extremely large number of products which are still entirely unknown on the European market. A number of Dutch businesses and dealers are prepared to make their knowledge of marketing within Europe available for products from tropical forest areas. The co-financing organisation ICCO, in particular, is doing pioneering work in this field.
- Producers in developing countries often lack professional communication skills. English is essential for the international market.
- If the aim is to produce for the international market (for example Europe), donors or projects need to be prepared to invest heavily in opening up the market for products from sustainably managed forest.

- It is essential to think hard about how the product is to be positioned: “biological”, “green”, “natural”, “from the wild” etc. The concept of “sustainability” is as yet so unfamiliar to consumers (in Europe) that it has virtually no value from the point of view of marketing. Donors can play an important role in educating the public about the concept of “sustainability” in general and “sustainable forest management” in particular.
- Where timber is concerned, there is still a problem with so-called *less well-known species*. Sustainable forest management often implies the use of species which are unfamiliar on the European market. Expensive testing is then needed to qualify for quality marks. A business which invests in this is also doing it for its competitors, because they can make use of the results without having to pay. This is actually something which should be dealt with by the government or by a donor.

6.4.6 Financial aspects and loans

A proper *overview* is necessary of all costs involved in production: the percentage of costs involved in transport, labour, interest payments etc. The overview must cover the whole chain, from the product when it is still in the forest right up to when the consumer buys it, in other words for the entire chain of production. Such an overview allows measures to be taken to restrict certain costs or to ensure that more income is channelled into the hands of the producers in the forest. This can be achieved, for example, by having a greater proportion of processing take place in the producing country or by producing a product that is of better quality so that less processing is necessary in the country where it is consumed. Clay (1996) gives a large number of tips with respect to financial aspects:

- It is easier to reduce production costs than to raise the price of the product. The table below lists some ways of reducing costs.
- The business component of a support project must be dealt with in a businesslike way. This means that the donor must provide loans at the prevailing rate of interest rather than provide gifts. It also needs to be made clear that loans must be paid back. Gifts should be used for training, product development etc. and not for the business as such.
- Transporting tropical forest products is often complicated and expensive. Bringing in supplies of necessary raw materials and packaging (for example pots or tins) is also often expensive. It may sometimes be a better idea to have processing carried out elsewhere than in the forest.
- It may be a good idea to use vehicles which return empty to transport consumer goods for the community.

Regarding credits there may be two problems of a different nature:

1. The volume of investment required to organise forest product processing may be considerable. The problem is that in many forest areas in the tropics there is a lack of formal *credit* for investment. If one wishes to carry out a project, some way of dealing with this problem will therefore need to be found. Assistance will at the very least need to be provided in arranging a loan. Institutions which provide loans need to take account of the fact that they should not accept a level of repayment which exceeds the sustainable production limits of the forest.
2. In some areas near the forest boundary, informal (‘rapacious’) credit may be available. In the Sierra Madre (The Philippines) this credit is considered to be one of the major causes of deforestation (Van der Top, 1998). Initiatives on the part of the Philippines government to provide cheaper credit to local groups or individuals failed. The most important reason was that informal credits are socially integrated and they connect production and consumption goods: people take out a loan at the same shop where they buy rice, coffee and cigarettes on credit. Loan services and defaults increase poverty, accelerate the loss of land rights and migration, and may cause a more rapid shift in the forest boundary. In this case the promotion of sustainable forest management necessarily means dealing with such informal credit systems.

| Box 8: Potential economic impact of various activities to improve the return on forest products (from Clay, 1996). | |
|---|---|
| Activity | Economic impact |
| Improve harvesting techniques | increase income by 10% or more |
| Improve harvest efficiency in the forest | increase income by 5-10% or more |
| Reduce post-harvest losses by: | |
| · improving storage and transport in the forest | reduce losses by 5% or more of product |
| · improving local storage | reduce losses by 25% or more of product |
| · improving transport to processing plant | reduce losses by up to 35% of product |
| Improve transport by: | |
| · larger volumes | reduce costs by 10% or more |
| · 'backhauling' (transporting something in a vehicle that returns empty) | reduce costs by up to 50% |
| · processing product to reduce water and waste | reduce costs by up to 70% |
| Hold product and sell in the off-season | increase gross income by up to 200% |
| Add value through local processing | increase gross income by up to 500% |
| Improve price information | increase income by 10% or more |
| Improve credit terms | reduce credit costs by up to 75% |
| Capture 'green' premiums in Northern markets | increase income by up to 10% or more |
| Negotiate income-sharing agreements with manufacturers | increase income by up to 10% or more |
| Purchase consumer goods in bulk | reduce costs by up to 50% |
| Transport consumer goods in bulk | reduce costs by up to 10% or more |

6.4.7 Certification

Dutch policy sees certification (at the level of the management unit) as an important instrument with which to promote sustainable forest management. If a consumer country imports certified timber, it knows that the forest from which that timber has been extracted is being managed properly. Agreements have also been made within the context of ITTO that (as of the year 2000) timber can only be traded on the international market if it has been produced in a sustainable manner.

A reliable certification system for sustainable forest management needs to include the following components:

1. *Standard*: in order to say anything worthwhile about properly managed forests, a standard is necessary against which to measure the management system involved (criteria and indicators).
2. *Independent inspection and monitoring*: inspection must be carried out so as to determine whether the management system involved meets the standard set. This needs to be done by a competent professional organisation with no vested interest in the result of the inspection. This organisation must not be the same one as that which develops and applies the standard mentioned under point 1.
3. *"Chain of custody"*: in order to be able to identify the products of a certified forest on the market, it is essential that they can be reliably traced from the forest to where they are ultimately sold. This component is referred to as the "chain of custody" and must be inspected and monitored by the certification organisation.
4. *Product label (mark)*: identification on the market is necessary so as to be able to distinguish certified products from other technically equivalent products. This is done by labelling the end product.

The **advantages** of certification are:

1. The timber bears a common label, which makes it more identifiable. This may also lead to the development of more market alternatives.
2. A label makes processors/dealers more ready to deal in new species or products.
3. There is a greater chance of finding financing, including from commercial banks. Commercial banks are setting an increasing number of requirements with respect to the ecological sustainability of their investments.

4. Certified products may well command a better price within certain international niche markets (for example the Netherlands, the UK and the US) than technically equivalent non-certified products. The higher price is consequently recompense for the extra efforts made by the producer to meet the certification requirements. It is often virtually impossible to command a premium for certified timber on the local or national market. On the international market, also, considerable effort is needed to command such a premium, which is then likely to be between 5 and 10% at most.
5. Periodical checks may make it possible to involve forest managers –who often work in relative isolation– in a learning process, together with the certification organisation. The systematic approach to all aspects required by certification raises forest management and internal operational management to a *higher level*. Internal monitoring of operations is one of the requirements of certification, something which is ultimately only to the benefit of operational management.
6. Certification reinforces the *position of forest managers* within the enterprise (commercial or community). The production manager –whether of a commercial concession or of a community forest management project– cannot simply exceed the maximum permissible harvest so as to keep the workers and machines at work. Forest management regulations cannot simply be relaxed in order to involve more farmers in a community project.

The following **disadvantages** of certification are often mentioned:

1. Certification forces local communities to work according to a *business system* with clear long-term agreements.
2. Certification costs money. The costs involved in certification include the cost of evaluations and pre-evaluations, annual monitoring, and an annual contribution to the certification organisation as well as the cost of necessary changes in the management system. These costs can in part be compensated for by increased efficiency, health and safety. During the initial phase, the costs involved in certification can be paid from external sources, but from a certain point on they need to be paid by the producer or producers.
3. In order to comply with certification requirements, the management of the enterprise must display a high level of *involvement*. If this is insufficient, the label may easily be lost.

In each concrete situation, the advantages and disadvantages of certification will need to be weighed up against one another. It may be, for example, that all the products can be disposed of relatively easily on the national market and at a favourable price. In such a situation, it may well be unnecessary to gain certification.

6.5 Results of local sustainable forest management

6.5.1 Effects of forest management on local population

The effects of sustainable forest management on the local population –the target group– include (after Siwatibau et al., 1998):

- Material effects. The money earned can be used for such things as improving housing, household goods and outboard motors, paying for school fees and uniforms etc. In many cases, the material income will be restricted. Rapid short-term exploitation, which is often not sustainable, can lead to a temporarily high level of income.
- Cohesion and organisation of the community. Management can improve the level of internal organisation so that other matters can also be tackled.
- Awareness of the management of natural resources. The local population can begin to realise that the forest can provide a source of income for a long period, if managed in a sustainable manner. There may also be a gradual shift in mentality from unlimited collection or extraction towards sustainable management of the resource concerned. This may lead to large-scale timber harvesting being rejected because although it produces short-term financial profits it can cause a great deal of damage.
- Working for the market places producers under a certain amount of pressure because they are required to meet commitments on the quality of the product and the quantities to be supplied.
- Producing for the market often demands an entirely different cultural background to the normal culture of the village, definitely if the project involves indigenous people. In general, producing for the market will influence the traditional life-style, culture and values. According to Gram et al. (1996), cultural differences can only be reconciled within a participatory process. One may add that the myths etc. of the traditional culture can provide support for increased

- awareness of sustainable forest management, something which projects can make use of.
- Introduction of the market can also encourage alcoholism (for example among indigenous peoples, but not only among them). Alcoholism can in turn have a negative influence on sustainable forest management because alcohol consumption requires a large amount of money, which can be earned by quickly cutting down a large number of trees. It may well be necessary to discuss this problem within the communities concerned.

The effects which have been mentioned, particularly the first three, are more than merely effects; they are also the necessary preconditions for continuing sustainable forest management.

6.5.2 Distribution of the income

One important point is how the proceeds generated by forest management and the processing and marketing of products should be distributed.

- One very common socio-political pattern for communities which have been exploited or oppressed for a long period in the past is that an internal relationship is reinforced despite efforts being made to eliminate it externally. Patron-client relationships must not be re-created, nor must existing relations be reinforced (Clay, 1996).
- In some cases, communities are themselves able to work out the right way of distributing the proceeds among individuals and spending them on communal facilities such as a church or community centre.
- If no measures are taken, the men may, for example, use the money primarily to increase their alcohol consumption.

The last point mentioned is a very real danger and it is therefore advisable for the community to agree at the earliest possible date on how proceeds should be distributed.

6.5.3 Economic yield

It is not entirely clear whether sustainable forest management at local level and implemented by local communities can be economically profitable. Referring to a study carried out among the Yanasha Indians in Peru, Gram et al. (1994) point out that a large number of obstacles have to be surmounted before sustainable management of natural forest for timber production can be a success, but that the biggest obstacle is economic. In the short term, sustainable methods cannot compete with non-sustainable methods, meaning that financial aid is necessary. This aid needs to be continued until the prices achieved on the market reflect the costs of sustainable practices necessary for producing timber products. The writers do not, however, indicate how to determine whether this is the case.

Salafsky et al. (1998) ask themselves whether community timber production enterprises and other enterprises involved in processing and selling forest products can be technically, financially, politically and socially sustainable. This is a highly complex question. The authors come to the preliminary conclusion that such enterprises can only be sustainable in a restricted number of cases and that support is necessary, at least in the initial phase. As with start-up companies in the economically developed world, there are likely to be a large number of casualties.

After analysing 20 projects at the interface between enterprise and protection of biodiversity, the Biodiversity Conservation Network (1998) identifies three stages in the development of a profitable enterprise:

1. During the first phase, the enterprise covers its variable costs.
2. In the second phase, the enterprise covers its variable costs and overheads and produces a genuine profit.
3. In the third and final phase, the enterprise develops the necessary systems to respond to changing market situations by adapting its costs and prices. During this phase, the costs of monitoring natural resources are also covered by the enterprise.

The programme commenced in 1993, and by the end of 1997 one product had reached stage 3. An external subsidy is therefore necessary for a time, in particular for monitoring and for certain marketing costs.

Sustainable forest exploitation can also be seen as part of a process of transition, with people using forest exploitation as a means of escaping from the spiral of poverty (Dijkman, pers. com.).

We may conclude that it will not be an easy matter to make sustainable forest management economically profitable. It should be noted that there are few projects which make use of all the available opportunities to reduce costs and increase efficiency (see the table in section 6.4.6).

6.5.4 Ecological sustainability

If an enterprise involving sustainable forest management has been certified by an independent body, we can assume that its ecological sustainability is in order, at least when measured by current insights and the current situation. Ecological sustainability involves a large number of different aspects and at present we often do no more than say that method x is more sustainable than method y. We are therefore in a position to make production more sustainable, but whether it is genuinely sustainable in the long term is something which remains to be seen. It is naturally extremely difficult to predict what sustainable forest management will lead to in 50 or 100 years time. This is, however, not a reassign to argue that ecological sustainability is less important. On the contrary, monitoring during many years of impacts of sustainable forest management on the biodiversity and re-growth capacity of the forest, should be an important issue in every project for sustainable forest management.

If an enterprise is not certified, adverse economic developments may well lead to its slipping back into less sustainable practices.

Ecological sustainability has a lot to do with economic profitability and the cultural situation. The Biodiversity Conservation Network (1998) is supporting two initiatives aimed at setting up enterprises to help protect biodiversity in a number of areas in Asia and the Pacific. Experience has shown that generating significant income for members of communities, particularly in the short term, can function as a catalyst for such protection. Enterprises must therefore generate significant income for the members of the community as rapidly as possible. This income is not necessarily income at the personal level. It may also be at the communal level, e.g. improvement of certain services in the village. If the income does not go beyond a certain level, people will continue to act in ways which can endanger biodiversity.

7. INCORPORATING SUSTAINABLE FOREST MANAGEMENT INTO RURAL PROJECTS

Policy-makers need to consider two important points when making sustainable forest management part of projects in rural areas:

- Managing natural elements within agricultural areas is a policy matter which is set to become increasingly important in the coming years. This will involve such elements as ecological networks and the maintenance of agro-biodiversity.
- Sustainable forest management which targets production is a highly suitable element of programmes aimed at combating poverty.

In rural development projects, the emphasis of forestry activities is often on agroforestry: trees, bushes and small areas of woodland within agricultural areas. Agroforestry is not really the topic of the present study. Other aims, for example combating erosion, improving the microclimate, and thus increasing agricultural production, are important. However, it should be noted that processing and marketing forest products and tree products within agroforestry projects are activities which often play a minor role in agroforestry. The main focus is usually on planting new trees and bushes.

Sometimes, however, opportunities are neglected. Examples exist of communities in relatively degraded areas which already had trees or bushes available to them which could immediately provide a product for processing and marketing (for example fruits from bushes which could be used to make jam for sale in the cities). It is of course questionable whether opportunities exist on a larger scale in such cases.

The experience which has provided the basis for the previous sections of this document has been gained in the context of projects focusing entirely on sustainable forest management. It will not always be possible to extrapolate that experience to rural areas where natural resources in the form of forests and trees are less dominant. This does not mean, however, that developing countries are no longer dependent on forest resources. In southern Africa, some 2.3% of the rural population and 0.8% of the urban population acquire some part of their income from small-scale activities involving reeds, grass or bamboo. In the more forested zone of Ghana, some 10% of the rural population acquire part of their income from activities involving forest products. Small-scale enterprises based on forest products are frequently to be found where there are widespread rural markets for cheap, simple products and where high transport costs protect these markets from competition from urban areas. They are also to be found in locations where the resources can be extracted effectively on a small scale. The importance of income generated by forest activity is often to be found in the timing rather than in the extent: it allows gaps to be filled in the flow of cash income. Many of these activities, those involving domestic and craftwork, are labour intensive, produce little profit, and are found in impoverished, stagnant rural economies. Some, however, for example furniture production, are enterprises which are growing and whose products can compete on the modern market. Some policy-related conclusions which can be drawn are the following (after Arnold and Townson, 1998):

- It is important to distinguish between forest product activities undertaken because there is no alternative and those undertaken in response to market demand. The latter category has a much more secure future and it may well be worth determining whether this category can create more employment.
- People with unfavourable prospects in this sector may be well advised to switch to an entirely different type of activity rather than aim at optimising their present activities.
- Enterprises in various different stages of development (start-up, expansion, further upgrading etc.) each require a specific type of support.
- Despite the changing economic situation, forests may remain an important socio-economic buffer in times of scarcity ("nest egg" function, assured food supply).
- Demand is likely to become concentrated on a restricted number of products of growing commercial importance.
- Forest products may in the long run become less important to rural communities. Institutional arrangements must not place such high demands on communities that they become unable to continue to comply with them.
- Shortages of raw materials are becoming an increasing problem for many producers. Managing natural resources therefore needs to focus not just on forests but also on farms (including agroforestry).
- Assigning land rights is an important means of guaranteeing rights of usage and of preventing

plants dying out which produce resources.

Little is as yet known about the concrete incorporation of sustainable forest management into projects aimed at rural development. The following points are clear, however:

- Instituting sustainable forest management, including processing and marketing products, is an activity which requires a great deal of attention. It is not something which can simply be undertaken on the side as just one of many activities within the framework of a project.
- The SWIFT project for sustainable forest management is one which came about within a wide-ranging programme of rural development. A need for specialisation was felt so as to initiate an activity which effectively increased the cash income of the target group. The decision was taken to focus entirely on sustainable forest management and on marketing timber.
- If a rural area project involves a land use component, managing natural elements of the landscape will quickly become an issue. The first requirement is to carry out a survey of the available natural resources and the potential.
- It is only worth setting up small-scale companies to harvest, process and market forest and tree products if this is done on a certain scale. In other words, there needs to be sufficient forest containing sufficient potential products and sufficient demand for those products. Nevertheless, even if not much appears to be available in the first instance, it may well be worth carrying out an analysis of the natural resources.
- Rural area projects always in fact have a role for environmental education. Small areas of woodland and trees, and the associated animals, often play an important role, for example in providing products, in the microclimate, water management and in dealing with pests. This role is often insufficiently recognised.
- If a community already has the organisation and infrastructure for processing and marketing agricultural products, it may well be possible to use them, or to use them partly, for forest products.

The problem can be put differently: to what extent can sustainable forest management also act as a form of rural development? The answer is that the local population gains the maximum profit from the riches that are disappearing from the forest: community forestry via concessions granted to the local population, commercial plantations on abandoned agricultural land, improved local taxation which companies are required to pay to the villages (schools, dispensaries, other facilities, education etc.), obligations to take on local people, control partly in the hands of the local population, attention to NTFPs (Toornstra, pers. com.). In doing this, however, it is necessary to monitor –for a considerable period– whether there is genuine integration of the objectives of environmental sustainability and poverty alleviation (Van der Top, pers. com.).

CHECKLIST

1. List of concerns to be considered in relation to sustainable forest management at national level

| Aspect | Concerns or reasons |
|---|---|
| General | <ul style="list-style-type: none"> • Sustainable forest management programmes at national level often neglect important aspects at the national (and international) level. It is important, however, to keep abreast of developments at national level. |
| Participatory policy-making | <ul style="list-style-type: none"> • Create platforms at various levels in which all interest groups, including representatives of local groups, can negotiate on forest policy. • Ensure that important interest groups are actively involved in the decision-making process. • Ensure that proper information is provided about the process. • Some key concepts are: negotiation, gaining confidence, conflict management, avoidance of “free rider” conduct, co-management. • Work towards recognition at national level of the importance of the rural population in national development. • Recognise the importance of local institutions and knowledge. • Ensure that accurate and reliable basic information is provided about the forest. • Find key persons who are prepared to devote themselves to the cause of sustainable forest management. • Forest management does not only involve ecological and forestry aspects; the policy pursued must also take social aspects into account. • Altered relationships will eventually need to be embedded in legislation. |
| Drawing up criteria and indicators for sustainable forest management | <ul style="list-style-type: none"> • Special attention needs to be paid to social equitability, NTFPs and biodiversity. • Create links with international or regional initiatives (for example CIFOR tests). • Insufficient forest cultivation data is often available for effective criteria and indicators to be determined. Research is then necessary. • In some countries, the working groups set up to arrive at common criteria and indicators do not function effectively. The interests of the different groups are too diverse, or the common interest is not recognised. • It is also important to familiarise the general public with the concept of “sustainably produced” so that certified products will actually sell. • Once a set of criteria and indicators has been produced, measures will need to be taken to enable forest managers to have their enterprises certified (on a trial basis). Financial assistance will also be necessary. |
| Training and educating institutes in the forest sector | <ul style="list-style-type: none"> • It is advisable for training programmes to focus on a variety of different groups within the forestry sector so that an exchange of views can take place during training and the network can be further extended. • Training programmes must take seriously the experience already gained by the participants. • Training should be made available to the various echelons within the organisation in an equitable manner. |

| | |
|---|---|
| Professional training and forestry training programmes | <ul style="list-style-type: none"> · Many forestry training programmes pay a disproportionate amount of attention to technical aspects. In order to alter programmes, a basis of support is required within the society concerned. Interest groups must be involved in determining the curriculum. · Programmes can also be provided by an NGO, but then extra attention must be paid to institutional sustainability. · Programmes need to focus a great deal of attention on practical work. · Communicative skills and participatory methodologies are extremely important. · Are sufficient qualified personnel available to introduce new programmes? |
| Research for sustainable forest management | <ul style="list-style-type: none"> · Interest groups must participate in deciding on research priorities. · The first priority should be to develop national capacity and only then to involve foreign consultants or Dutch researchers. · Regional and international co-ordination may be necessary. · Attention must be paid to disseminating research results and their practical application and incorporation into policy. · An institutional analysis is necessary: are sufficient researchers available to carry out the required research? · Take account of indigenous knowledge. |

2. List of concerns to be considered for projects at local level

| Aspect | Concerns or reasons |
|------------------------|--|
| General | <ul style="list-style-type: none"> · Experience can be divided into four categories: organisation of local actors, forest management, organisation of the production activity, and the results of sustainable forest management. · In general, these aspects are not given equal weight within projects. The emphasis is often on only one or two categories. An uneven approach has a negative effect on the potential end result. |
| Organising the actors: | |
| Raising awareness | <ul style="list-style-type: none"> · Raising awareness must be kept separate from commercial activities. · Raising awareness must be tackled systematically and should also lead to a more profound understanding of the subject. · A campaign to increase awareness in a village may lead to the conclusion that further intervention is pointless. |
| Local participation | <ul style="list-style-type: none"> · Implementing the most participatory option is not always the obvious choice. Co-management (responsibility shared by authorities and local communities) may be a better option. · Produce an analysis of local institutions. · All information on forest management and business information on processing and marketing must be presented in a transparent manner. · It is valuable to make use of techniques for ensuring participatory planning, evaluations and technology development. · Participatory forest management takes time and requires involvement on the part of all stakeholders (groups and individuals with rights and interests). · Roles and responsibilities need to be made clear. |
| Promoting land rights | <p>Land rights are a key issue in sustainable forest management, but the possession of land rights does not automatically result in sustainable forest management. Land rights can be promoted by:</p> <ul style="list-style-type: none"> · Making amendments to legislation at national level. · Instituting regional land use planning. · Assisting individual farmers or groups to survey the land and to acquire land rights on paper. · Physical demarcation of territories and property. |

| | |
|---|--|
| Women and sustainable forest management | <ul style="list-style-type: none"> Both men and women often recognise that heavy work in the forest is unsuitable for women. However, sustainable forest management involves a large number of other activities and decision-making where women can play a major role. |
| Training | <ul style="list-style-type: none"> Training in all the aspects discussed in this chapter is necessary, but aspects such as entrepreneurship and sustainable harvesting techniques should take priority. It is not only individual qualities which are important but also team-building and collaboration. Collaborate with similar projects and with business and industry. Training is a continuous process, one for which employees also share responsibility. |
| Management of the forest: | |
| Management plan | <ul style="list-style-type: none"> Management plans may be hundreds of pages long or they can be simple standardised forms which have been filled in effectively. The management plan must cover plant-based production (timber and NTFPs), animal-based production (game and fish), protection of biodiversity, and perhaps tourism. Management also often places unequal emphasis on just a few aspects while forgetting about others. Monitoring is an essential component of a management plan. Special attention needs to be paid to long-term monitoring of biodiversity and of the re-growth capacity of the remaining forest. Management plans must be drawn up in a participatory manner. |
| Management for plant-based production: | |
| Choice of species | <ul style="list-style-type: none"> Are sufficient numbers of species being used, not just timber production species, for example? Is there in fact a demand for the species concerned (marketing aspects)? |
| Forest surveys | <ul style="list-style-type: none"> Estimate of number of harvestable trees/plants per ha per vegetation type. Information on the number of trees in each diameter class, per species (age distribution of the population). |
| Studies of production | <ul style="list-style-type: none"> Measure trees of different diameter for a number of years. Local collectors can play a major role here. |
| Regeneration studies | <ul style="list-style-type: none"> This involves seedlings and young trees. These data can be combined with data produced by the forest survey to provide a complete picture of the population of species to be exploited, from seedling to old tree. |
| Harvesting methods | <ul style="list-style-type: none"> Is planning of the right type and are “best practices” being applied (for example directional felling, removal with winches in the case of logging, and measures to restrict damage in the case of NTFPs)? The health of the trees and plants being exploited should be assessed during harvesting (particularly NTFPs). |
| Adapting of the harvest | <ul style="list-style-type: none"> If the seedling density falls, harvesting will need to be adapted. Two options are available for adaptation: regulating the number and size of the plants to be exploited and restricting the harvesting area. |
| Forest cultivation measures | <ul style="list-style-type: none"> If exploitation leads to a reduction in rejuvenation and additional growth of the products which are to be harvested, cultivation measures are an option (as is reducing the quantity harvested). No prescription can be given for cultivation measures, but it is important to monitor the results of such measures. |

| | |
|---|---|
| Management for animal production (hunting/fishing) | <ul style="list-style-type: none"> • Forest management involves more than just timber, trees and plants; it also involves fish and land animals. Hunting and fishing are often unfortunately forgotten. • Special attention needs to be paid to: <ul style="list-style-type: none"> • Integrating hunting and fishing into the management plan (which must be drawn up in a participatory manner). • Animals with low density. There is no point in carrying out research on sustainable harvesting levels; such animals must simply be protected. • Encourage selective hunting and fishing techniques. • Rear wild animals in captivity. • Keystone plant resources which are important to many species of animal during periods of scarcity. |
| Management to maintain natural values in production forest | <ul style="list-style-type: none"> • Surveys must be carried out of the areas which are of special importance with respect to biodiversity (wetlands, watercourses, special habitats). These areas require special management (for example, less intensive harvesting). • Basic information is necessary on the biological value of the area, for example endangered species. Universities can help in carrying out biological surveys. • Besides the production function, it is also important for parts of the area to be protected with a view to biodiversity. • Trees with holes in them, standing dead trees and rotting fallen trees fulfil an important ecological function. • It is important that certain areas of forest should be kept free of exploitation (and not merely “bad” areas). |
| Management for tourism | <ul style="list-style-type: none"> • Tourism can only contribute to sustainable forest management and local development under certain preconditions. The potential first needs to be investigated. • Define clear aims for management and determine how tourism can fit in with these aims. • If it is not possible to control tourism in the area, it may well be better to do without it. • Determine the acceptable changes in ecosystems. Make use of monitoring and zoning of areas. • Develop and implement management plans which make it possible to control, regulate and promote tourism. <p>How can the local population be involved in tourism?</p> <ul style="list-style-type: none"> • Collect information about the impact, options and potential for ecotourism and determine mechanisms for involvement in planning and development. • Investigate the opportunities for local people to acquire ownership of ecotourism enterprises. • Explore niches in the market for craftwork, artwork, and applied arts. • Investigate ways of levying local taxes on ecotourists to pay for local development initiatives (for example small hotels or restaurants). • It may be necessary to draw up a code of conduct for tourists. |

| | |
|---|--|
| Organisation | |
| Various organisations | <ul style="list-style-type: none"> • Distinguish between the organisation carrying out the project, the village organisation, and the forest management and processing company. • A distinction must be made between the commercial component of the activities and information/awareness and training at the earliest possible stage. • The organisation implementing the project must include expertise in the fields of entrepreneurship and marketing. • It is not necessary for processing companies to be the property of the village organisation. The following aspects are important with respect to the management and processing company: <ul style="list-style-type: none"> • Transparency with respect to local producers is vital. • It is essential to draw up professional, feasible business plans for every production company. The plans should indicate how practical forest management, as set out in the management plan, is to be implemented. • It may well be better to set up a separate company to manage the export activities of various companies and products. • Attention must also be paid to safety, good working conditions and internal environmental protection. |
| Degree of mechanisation | <ul style="list-style-type: none"> • In the past, many projects have fallen into the trap of starting with too high a level of mechanisation. The results include: a low economic return, management problems. • In the case of timber exploitation, a power saw with a frame may be enough to saw planks. • When raising the level of mechanisation, a pilot study should first be carried out. One of the things this should focus on is the minimum level of production needed to ensure an acceptable economic return on the investment. This level of production must be ecologically sustainable. |
| Product choice and diversification | <ul style="list-style-type: none"> • The market may change and it is therefore important to sell more than one product. • It is also possible to sell various different qualities of a single product. • It is better to develop a new product for a whole region than for a single producer or community. |
| Storage and processing of forest products | <ul style="list-style-type: none"> • Storage can sometimes add to the value of a product. • Processing forest products is by no means always the best option. It may be better to supply a semi-manufacture. • It is important to systematically look for ways to reduce waste and losses. |
| Marketing | <ul style="list-style-type: none"> • Marketing aspects of sustainable forest management are grossly underestimated when projects are being planned and implemented. • Creating a market for unknown products takes years. • Before starting to produce products, it first needs to be established whether or not there is a market for them. • Marketing costs time and money. This needs to be taken into account when drawing up a project proposal. • Some Dutch companies are prepared to make their knowledge of marketing in Europe available for products from rainforest areas. Twinning is difficult but not impossible. |

| | |
|--|---|
| Financial aspects | <ul style="list-style-type: none"> • It is important to gain an understanding of the cost structure as it applies to the whole chain of production of a raw material, through processing and marketing right up to the consumer. • It is easier to reduce costs than to raise the price of the product. A large number of options are available to achieve this. • In order to invest, money is needed. It is better to provide this in the form of loans than in the form of gifts. • Existing informal types of credit may be a cause of deforestation or forest degradation. If this is the case, thorough investigation will be needed in order to find solutions to this problem. • As yet, it is difficult to make sustainable forest management economically profitable. Outside support is necessary for a number of years, particularly for marketing products and monitoring natural resources. |
| Certification and monitoring of sustainable management | <ul style="list-style-type: none"> • Certification may be a useful means for the donor to implement sustainable forest management and proper operational management at field level. • The advantages and disadvantages of certification must be weighed up against one another. |
| Results of sustainable forest management: | |
| Effects of forest management on local population | <ul style="list-style-type: none"> • Entry into the market economy may erode the traditional culture. The relationship between the traditional culture and sustainability should be emphasised. • Within the framework of sustainable forest management, it may be necessary to instigate discussion of the question of alcoholism. |
| Distribution of the income | <ul style="list-style-type: none"> • Agreements need to be made within the community about the distribution of the income from sustainable forest management and processing and marketing of products. This should be done at an early stage. |
| Economic yield | <ul style="list-style-type: none"> • It is no simple matter to implement sustainable forest management in such a way as to produce an effective economic return. However, there are few community enterprises and projects which grasp all the opportunities available to them to reduce their costs and increase their efficiency. |
| Ecological sustainability | <ul style="list-style-type: none"> • Without independent certification, ecological interests can rapidly be overshadowed by economic considerations. • An enterprise should produce significant income for the members of the community as rapidly as possible. If the income does not go beyond a certain level, people will continue to act in ways which can endanger biodiversity. |
| Fitting sustainable forest management into rural development projects | <ul style="list-style-type: none"> • Sustainable forest management, including the processing and marketing of products, is an activity requiring a great deal of attention, including within the context of rural development projects. • The first requirement is to survey the natural resources available and determine their potential. • It is only worth setting up small-scale companies to harvest, process and market forest and tree products if this is done on a certain scale. • Existing businesses need to be analysed so as to determine how competitive they will be on the national market. • Forests can remain important as a socio-economic buffer in times of scarcity. • Demand is likely to become concentrated on a restricted number of products of growing commercial importance. • If a community already has the organisation and infrastructure for processing and marketing agricultural products, it may well be possible to use them, or to use them partly, for forest products. |

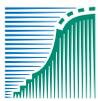
| | |
|--|--|
| <p>Other option: having sustainable forest management contribute to rural development as much as possible</p> | <p>Basically allow the local population to profit as much as possible from the riches which are disappearing from the forest:</p> <ul style="list-style-type: none"> · community forestry via concessions granted to the local population, commercial plantations on abandoned agricultural land, · improved local taxation which companies are required to pay to the villages (schools, dispensaries, other facilities, education etc.), obligations to take on local people, · place control partly in the hands of the local population, · attention to NTFPs. |
|--|--|

BIBLIOGRAPHY

- Abdallah Saleem, N. (1998).** Updating the curriculum of the Department of Social Forestry, University of Juba, Sudan. Task paper int. course local management of trees and forests for sustainable land use. IAC, Wageningen. 10 pp.
- Abramovitz, Jannet N. (1998).** Taking a Stand: Cultivating a New Relationship with the World's Forests. Worldwatch Paper 140, Worldwatch Institute, Washington USA. 84 pp.
- Anonymous (1998).** Editorial, Rural Development Forestry Network Newsletter, issue 23.
- Arnold, M. and I. Townson (1998).** Assessing the potential of forest product activities to contribute to rural incomes in Africa. Natural Resource perspectives number 37. ODI, London. 4 pp.
- Aus der Beek, Robin (1998).** Simple participatory inventory: a key factor for sustainable forest management. RECOFT International Seminar, September 23-25 1998. Bangkok. 12 pp.
- Bass, Stephen (1998).** Forest Certification – The Debate about Standards. RDFN Network paper 23b. 20 pp.
- Biodiversity Conservation Network (1998).** Annual report 1997. Evaluating an enterprise-oriented approach to community-based conservation in the Asia/Pacific Region. Biodiversity Support Program, WWF, Washington, USA. 120 pp.
- Bonita, M. and P. Sophathilath (1998).** Closer to nature: village forest management based on low-intensity logging. RECOFT International Seminar, September 23-25 1998. Bangkok. 12 pp.
- Brandon, K. (1996).** Ecotourism and Conservation: A Review of Key Issues. Environment Department Papers No. 33, Worldbank, Washington. 69 pp.
- Caspary, Hans-Ulrich (1999).** When the monkey goes butcher: hunting, trading and consumption of bushmeat in the region of Tai National Park, Côte d'Ivoire. In: Seminar "Research on Non-Timber Forest Products in the Tropenbos Programme: results and perspectives" Wageningen, Netherlands. 28 January 1999.
- Carter, J., M. Stockdale, F. Sanchez Roman and A. Lawrence (1995).** Local people's participation in forest resource assessment: an analysis of recent experience, with case studies from Indonesia and Mexico. Comm. For. Rev. 74(4) p. 333-342.
- Camino, R. de, and M. Alfaro (1998).** Certification in Latin America: Experience To Date. RDFN network paper 23c, 24 pp.
- Clay, Jason W. (1996).** Generating Income and Conserving Resources: 20 Lessons from the Field. World Wildlife Fund, Baltimore, USA. 76 pp.
- Enríquez, J.C., L. Román, K. van Dijk (1998).** Programa de manejo de Bosques de la Amazonía Boliviana PROMAB. Misión de Evaluación de Medio Término 14 de septiembre a 27 de septiembre 1998. Informe + anexes.
- Filer, Colin, with Nikhil Sekhran (1998).** Loggers, donors and resource owners. Papua New Guinea Country Study. Policy that works for forests and people series no. 2. IIED, London, UK. 416 pp.
- Fuller, Joanna. (1998).** Participatory monitoring of forest resources: current methodologies being developed in Thailand. RDFN paper 23^e. ODI, UK. p 23-27.
- Fernside, T. (1995).** Australian hardwood logging and the sustainable harvesting of tropical rainforests. Comm. For. Rev. 74(3), p. 204-207.
- Gram, S., J. Klint & F. Helles (1994).** Forestry among indigenous people in natural rain forests – a case study from Peru. Centre for Alternative Social Analysis (CASA), Copenhagen. 114 pp.

- Guiang, Ernesto S. (1998).** Participatory planning and resource inventory in selected community-based forest management sites in the Philippines. RECOFT International Seminar, September 23-25 1998. Bangkok. 13 pp.+ app.
- Kotey, E.N.A, J. François, J.G.K. Owusus, R. Yeboah, K.S. Amanor and L. Antwi (1998).** Falling into Place. Policy that works for forests and people series no. 4. IIED, London, UK. 138 pp.
- Markie, J., A. van Bodegom and F. Vreden (1999).** Evaluation report "Forestry Advisory Assistance to the Ministry of Natural Resources" (GCP/SUR/001/NET). Suriname Ministry of Natural Resources, FAO/Netherlands. 35 pp.
- Meijboom, M. (1997).** Animal functions in tropical rain forest. Werkdocument IKC Natuurbeheer nr. W-145. IKC-N, Wageningen. 53 pp.
- Ministerie van LNV (1997).** Houtcertificering en duurzaam bosbeheer. Notitie voor Tweede kamer der Staten-Generaal. 24 pp.
- Molina Barrios, R., K. van Dijk, M. Zabalaga (1995).** Evaluación externa: Apoyo para el campesino del oriente Boliviano APCOB. 52 pp. + anexos.
- ODA - Overseas Development Administration (1996).** Sharing forest management . Key factors, best practice & ways forward.
- Peters, Charles M. (1994).** Sustainable Harvest of Non-timber Plant Resources in Tropical Moist Forest: An Ecological Primer. The Biodiversity Support Program, c/o WWF, Washington DC, USA. 45 pp.
- Prabhu, Ravi, Cariol Colfer and Gill Shepard (1998).** Criteria and Indicators for Sustainable Forest Management: New Findings from CIFO's Forest Management Unit Level Research. RDFN paper 23a. ODI, UK. 20 pp.
- Proyecto Forestal Chorotega IDA – FAO – Holanda (1994).** Manejo del bosque natural. Guía para un manejo participativo de los recursos naturales en los asentamientos IDA de la región Chorotega. (Edición Preliminar). IDA, FAO, Liberia, Guanacaste, Costa Rica. 21 pp.
- Röling, N. (1998).** Creating human platforms to manage natural resources. In: Proceedings of the Seminar on Co-Management in the Forest Context. Sept. 23rd – October 5th 1998. IAC, Wageningen, Holland.
- Salafsky, Nick (1998).** Eleven Steps for Setting up Community-Based Timber Harvesting Enterprises. An overview of the IRECDP Experience in the Islands region, Papua New Guinea. European Union – Islands region Environmental & Community Development Programme (IRECDP), Kimbe, PNG. 18 pp. + annexes.
- Salafsky, N, B. Cordes, M. Leighton, M. Henderson, W. Watt, R. Cherry (1997).** Chainsaws as a Tool for Conservation? A Comparison of Community-based Timber Production Enterprises in Papua New Guinea and Indonesia. ODI Network Paper 22b, Winter 1997/98. 32 pp.
- Scrase, H. (1995).** The Forest Stewardship Council: its contribution to independent forest certification. Comm. For. Rev. 74(3), p. 192-195.
- Siwatibau, S., M. Habu and A.J. van Bodegom (1998).** Report of the independent Evaluation Mission of the SWIFT Project, Solomon Islands. Munda, Solomons. 42 pp.
- Stortenbeker, C.W., E.M. Blom en E.M. Lammerts van Bueren (1999).** Principes, criteria en voorbeelden van indicatoren, afgeleid van de DDB set-94 gegroepeerd volgens het Tropenbos hiërarchische framework. Tropenbos, Wageningen. 8 pp.
- Top, Gerhard M. van den (1998).** The social Dynamics of Deforestation in the Sierra Madre, Philippines. Thesis University of Leiden, The Netherlands. 437 pp.

- Wal, H. van der (1998).** Chinantec Shifting Cultivation and Secondary Vegetation. A case-study on secondary vegetation resulting from indigenous shifting cultivation in the Chinantla, Mexico. BOS document 19, Bos Foundation, Wageningen, Holland. 121 pp.
- Watson, V., S.Cervantes, C.Castro, L.Mora, M.Solis, I. Porras and B. Cornejo (1998).** Making space for better forestry. Policy that works for forests and people series no. 6. Centro Científico Tropical and IIED, San José and London. 110 pp.
- Wieren, S van (1999).** Statements on NTFP research. In: Seminar “Research on Non-Timber Forest Products in the Tropenbos Programme: results and perspectives” Wageningen, Netherlands. 28 January 1999.



landbouw, natuurbeheer
en visserij

Wageningen, june 2000



iac