

NTFPs

Their role in sustainable forest management in the tropics



NON-TIMBER FOREST PRODUCTS (NTFPs)

their role in sustainable forest management in the tropics

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FOREWORD

This document is intended to provide a background to the discussion on sustainable forest management which is currently taking place among those responsible for policy-making in the area of international nature management and development co-operation. The exploitation and management of “Non-Timber Forest Products” (NTFPs) is increasingly proposed as a potential means of ensuring sustainable management of forests and of biodiversity. Up to now, however, no overview has been available of the experience, the practicalities and the impracticalities of such use. The aim of this document is to meet that need. It is intended for policy-makers and those implementing government and non-government policy – both in the Netherlands and elsewhere – who are involved in identifying, formulating, assessing, monitoring and evaluating forest conservation and NTFP activities.

NTFPs are taken to mean all products removed from forests, except for industrial timber: foodstuffs, medicines, roofing materials, aromatic substances, flavourings and colourings, and animals as trophies and for international trade. People make use of these products to support themselves and for healthcare purposes, and they also constitute a source of income and employment. Some non-timber forest products even play an important role in the national economy. International trade in NTFPs is estimated at USD 11bn. The European Union, the US and Japan together account for 60% of world-wide imports of NTFPs. Besides their socio-economic importance, it is often stated that harvesting NTFPs has no influence on the structure and function of forests. This assumption is the basis for the belief that the use and management of NTFPs in forests can potentially contribute to sustainable forest management and to combating poverty. In this context, combating poverty is also taken to mean improving capacity and control with respect to the management of natural resources (“empowerment”).

This document surveys various examples of the management and use of NTFPs. It then deals with a number of ways in which NTFPs can and cannot be used in the context of sustainable forest management. Given the diversity of NTFPs and situations, the document makes no claim to completeness. It should be seen as an initial attempt, one that can provide a basis which can then be worked out and put into practice for each particular region and situation.

The fact that this document deals with NTFPs separately from timber products is simply because of the specific complexity and neglected importance of this category of forest products. In recent decades, national and international attention has focused mainly on timber as the most important forest product. Sustainable forest management ought, however, to be based on a more balanced overall view with respect to the variety of forest products, whether they be timber or non-timber. The use and management of NTFPs is therefore one possible component of a more wide-ranging system of forest management and land use.

Given that this document is intended to instigate further study, readers’ comments are very welcome.

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SUMMARY

The use and management of Non-Timber Forest Products (NTFPs) is a diverse and complex matter. However, an understanding of this matter is essential to determine when, and to what extent, the use and management of NTFPs can contribute to improving sustainable forest management. This document is intended to provide an introduction to this subject.

Section 1 includes a definition of the concept of NTFPs and a specification of just what it includes. It then goes on to provide an outline of policies (both Dutch and international) on forest management in general and on NTFPs in particular. Section 2 deals with a number of categories of NTFPs and indicates the differences between the use and management of NTFPs in Latin America, Africa, and Asia.

Sections 3, 4, 5, and 6 outline current experience in the use and management of NTFPs in tropical forests from the ecological, socio-economic, socio-cultural, and political-institutional perspectives. Such experience varies significantly, depending on a large number of factors specific to the location and species concerned. Several general lessons are drawn and the reader is encouraged to fill in the details according to region and situation. Although the subject is treated from a variety of different perspectives in separate sections, it becomes clear that only an integrated approach can be successful. For example, marketing NTFPs can only provide a sustainable source of income and thus make the forest a more valuable resource if it is based on an ecologically sustainable extraction system. Furthermore, without user and property rights to NTFPs, none of those involved will be motivated to support the long-term conservation of forests. It also becomes clear that women play a major role in harvesting, processing and marketing NTFPs. The success of NTFP extraction systems will therefore be greatly enhanced if women are actively involved in their development. These 'experience sections' can be read in three ways:

- the lessons alone;
- the lessons and the specific cases presented in the boxes;
- the text as a whole.

Section 7 discusses the potential for the use and management of NTFPs as an instrument of sustainable forest management, as well as their limitations, on the basis of the experience already outlined. A number of areas are suggested where NTFP use has the greatest potential: buffer zones around protected areas; flood plains; mountainous areas; forest fringes; and degraded forest. A proposal is also made for further investigation of the potential for the combined extraction of NTFPs and timber in sustainably managed forest concessions.

Finally, section 8 (Conclusions) presents a number of components which should be included in projects and programmes for the development of NTFPs in sustainable forest management. These need to be applied with the necessary flexibility.

1. INTRODUCTION

1.1 Definition and specification of the term NTFP

For the purposes of this document, NTFPs are defined as “all tropical forest products (plants and animals, or parts thereof), other than industrial timber, which are (or can be) harvested for human use at the level of self-support or for commercial purposes”.

This includes products which are used as food, cosmetics (oils), herbs, aromatic substances and flavourings, feed for animals, medicines, firewood, construction material, ornamental plants, paint and rubber, and also animal products from hunting, for food, medicines, trophies and international trade.

In this context, minerals, gold, diamonds and stones do not count as NTFPs, nor do the other functions of the forest, such as the regulation of abiotic factors, as a living environment, and as a reservoir for biodiversity (see Box 1 for a short explanation of the functions of forests). These functions, as well as eco-tourism, involve specific problems and will therefore not be covered by this document.

Box 1. Various functions of forests

1. **Regulatory function:** maintenance of the quality of the soil, air and water; protection of river catchments, stabilisation of climate;
 2. **Supportive function:** living environment (including land for agriculture and cattle rearing), tourism (including eco-tourism);
 3. **Production function:** forest products (timber and non-timber);
 4. **Information and reservoir function:** ecological processes, biodiversity, genetic material, social, cultural and spiritual values, intrinsic natural value.
- (De Groot (1992), in Sector Policy Document on Forests and Forestry [*Sectorbeleidsdocument Bossen en Bosbouw*, 1997])

Two products which do count as NTFPs in this connection are firewood and wood for small-scale construction, this being in contrast to the FAO’s definition (“Non-Wood Forest Products” (NWFPs)). This document adopts the position that the same socio-economic factors play a role in the case of firewood and wood for small-scale construction as in the case of the other products mentioned above. In addition, many local communities view firewood as one of the most important forest products. Collecting firewood does often have destructive consequences for the forest and savannah landscape (specifically in arid areas), but precisely for that reason it should be given a place in sustainable forest management systems. In some cases, harvesting of other NTFPs can be just as destructive.

Tropical forest is defined as in the Sector Policy Document on Forests and Forestry: lowland formations, mountain formations, wetland formations (mangrove, river bank and (swamp forests)) and open formations with trees (savannah). This covers not only primary forests but also secondary, degraded and planted forests.

Various different interest groups are involved with NTFPs. These include users within local communities (men, women, children, the elderly, elites, etc.), district councils, city dwellers, provincial authorities, national authorities, the market, business enterprises, research institutes and the international commercial market and research institutions.

The harvesting of NTFPs is often referred to as “extraction”. Extraction means the harvesting of NTFPs from natural forests, in contrast to the “production” of NTFPs, which refers to the cultivation of NTFPs on plantations.

1.2 Current Dutch and international policy on NTFPs

1.2.1 Sustainability

From the policy point of view, NTFPs form part of Dutch international policy on sustainable forest management. Sustainability can be interpreted in a variety of ways:

1. ecological sustainability (maintenance of biodiversity);
2. economic sustainability (maintenance of economic benefits);
3. social sustainability (equitable access and distribution of proceeds);
4. institutional sustainability (maintenance of various management institutions at a variety of levels: government, NGOs, local communities).

Management systems may be set up on the basis of all these different aspects of sustainability. The management and use of NTFPs will therefore be examined with these various aspects in mind.

1.2.2 Dutch policy in general

The policy of the Netherlands on NTFPs attempts to adopt an integrated approach. In most situations, however, it is not possible to achieve all the aims envisaged and compromise is necessary. Policy on sustainable forest management is set out in the following documents:

International Nature Management Programme 1996-2000 (PIN, 1996)

PIN (*Programma Internationaal Natuurbeheer*) sets out guidelines for all efforts by the Netherlands in the area of international nature management. One of the spearheads is sustainable management of tropical forests and the maintenance of biodiversity in forests and other ecosystems. This provides a general framework for the use and management of NTFPs.

Government Position Document on Tropical Rain Forest (RTR, 1991)

In the context of “Main Policy Guideline III” (promotion of land use planning, land organisation and sustainable agriculture and forestry), the Government Position Paper on Tropical Rain Forest (*Regeringsstandpunt Tropisch Regenwoud*) states that the sustainable use of “forest by-products” will be encouraged. As a means of achieving “Main Policy Guideline VII” (reinforcement of political and social support in the tropics), support will be provided for reinforcing “research capacity with respect to the ecological and economic aspects of sustainable forest management aimed at the production of timber and other products). However, other main policy guidelines also provide a framework for NTFP use and management.

1.2.3 Dutch policy on international co-operation

Dutch policy on forestry within the context of international co-operation identifies NTFPs as an important focus of attention. They are specifically mentioned in the following two policy documents on international co-operation:

Sector Policy Document on Biodiversity

The Sector Policy Document on Biodiversity (*Sectorbeleidsdocument Biologische Diversiteit*) (DGIS 1995) mentions NTFPs a number of times as a means of maintaining biodiversity, on the one hand, and of improving the economic situation of the local population, on the other. It is stated that native groups often make use of a sustainable method of forest management and are often located in regions with a high level of biodiversity. In order to maintain biodiversity, the preconditions need to be created to enable the local population to apply such traditional methods of forest management.

Sector Policy Document on Forests and Forestry

The central aim of forestry policy as stated in the Sector Policy Document on Forests and Forestry (*Sectorbeleidsdocument Bossen en Bosbouw*) (DGIS, 1997) is based on the various functions of forests. The most effective basis for sustainable conservation of forests is to be found in simultaneous performance of those various functions. As an NTFP-related policy guideline, the document states that encouragement will be provided for the sale of forest products from sustainably managed forests in countries involved in international co-operation on the Dutch and European markets. Support will also be provided for activities at the level of local production and

small-scale processing of forest products (timber and non-timber), if this is related to sustainable forest management and to combating poverty.

1.3 International policy on NTFPs

NTFPs have also been on the agenda at international level in recent years, namely within the following contexts:

International Forum on Forests (IFF), successor to the International Panel on Forests (IPF)

NTFPs were dealt with as part of the action plans formulated at the final meeting of the IPF in March 1998. It was recognised, for example, that national forest and land use programmes should be based to a greater extent on a wider appreciation of forest products. In this context, forest products are taken to include not only timber but also the non-timber and ecological functions of forests. The IPF states that forests are under increasing pressure from the use of forest products (timber and non-timber) and other forest functions. There is also an increasing demand for land for other purposes. This requires more inter-sectoral decision-making with respect to land use planning. The IFF has also indicated that there may be a positive link between the trade in forest products and sustainable forest management but that there is insufficient information on the opportunities for trade in NTFPs. The IFF intends to implement and monitor the IPF's proposals for action.

Convention on Biological Diversity

The importance of protection of biodiversity at local level is a major focus of attention in the Convention on Biological Diversity (CBD). The CBD emphasises the importance of equitable distribution of the benefits of the use of biodiversity, including among local and native communities. It encourages member states to develop national legislation "to promote the wider application of the knowledge, innovations and management techniques of local communities, with the approval and involvement of those communities, and with encouragement being given to the equitable distribution of the benefits".

Convention on International Trade in Endangered Species

The Convention on International Trade in Endangered Species (CITES) regulates international trade in endangered plant and animal species.

Forest Stewardship Council

The Forest Stewardship Council (FSC) is currently drawing up guidelines for certification of NTFP use and management, alongside the existing guidelines for certification of sustainable timber production.

2. VARIOUS CATEGORIES AND USES OF NTFPs

2.1 Categories of NTFPs

NTFPs can be subdivided into various categories, making clear the large variety of products covered by the term NTFP:

- by user purpose (for example for food, medicines, roofing materials, etc.)
- by level of use (self-supporting, commercial)
- by type of NTFP harvested (for example leaf, fruit, stem, exudate, skin).

The fact that some species are used for several purposes means that there may be some overlap in the categorisation by user purpose. There are various different categories of use, two of which are mentioned in Box 2. Nor is it possible to strictly separate NTFPs by their level of use; NTFPs are nowadays used both for self support and commercially. The third category – the type or part of the NTFP used – is an effective way of clarifying the impact of harvesting on the individual NTFP and on the NTFP species but also on the forest ecosystem (see section 3). This is therefore a useful basis for sustainable systems for managing NTFPs (Box 3).

Box 2. Categorisation of NTFPs according to users' purposes

1. Bamboo and rattan
 2. Food plants
 3. Cattle feed
 4. Craftwork
 5. Medicinal plants
 6. Toxins
 7. Aromatics
 8. Bio-chemical products
 9. Fibres
 10. Ornamental plants
 11. Animals and animal products
 12. Services (land for grazing cattle, national parks, tourism, etc.)
- (FAO, 1991)

or:

1. Edible plant products
 2. Edible animal products
 3. Medicinal products
 4. Non-edible plant products
 5. Non-edible animal products
- (De Beer & McDermott, 1996)

The categorisation of NTFPs made by De Beer & McDermott (Box 2) will be used to help give a short explanation of these categories. Just what do they include and who uses them?

1. Edible plant products

a) food, b) edible oils, c) herbs, d) animal feed

Many plants and plant products taken from forests are used as food for humans and animals. These include whole plants, leaves, roots, fruits, nuts and mushrooms. User groups can be found at local level, but also at other levels: Brazil nuts and herbs such as cardamom, for example, are traded internationally on a large scale.

2. Edible animal products

a) terrestrial animals, b) animal products (eggs, birds' nests, honey), c) fish and invertebrate water animals

For many people in rural areas, forest animals are an important source of protein. Besides larger animals such as pigs, deer, crocodiles etc., insects are also an important component of diet. In urban areas, larger game animals have often become "luxury" items. Birds' nests are not eaten locally (Borneo, Malaysia, Thailand) but are marketed internationally as a delicacy (for example in China). Honey is a good example of an edible animal product that may be of great significance

both locally, regionally and internationally. Fresh-water fish, given that they form an integral part of the forest ecosystem, count as NTFPs. Fish and invertebrates which are dependent for a large part of their life on mangrove forests can also be classified as NTFPs.

Medicinal products

a) plant and b) animal products

This category is only mentioned separately because of the enormous number of products with medicinal properties. In practice, however, it does not constitute a separate group since many plants with one or more medicinal properties are also used as food or as ornamental plants, or are a source of nuts, resin or tannin. Animal products may also have medicinal properties, for example honey or bear's gall. Here too, user groups range from local traditional "healers" to the international market and the pharmaceutical industry.

4. Non-edible plant products

a) rattan, b) bamboo (also classified as an edible plant product), c) ornamental plants, d) chemical components (exudates and extracts), e) non-industrial timber, f) fibres and leaves

This is a large and varied category. Rattan and bamboo are among the most familiar and useful NTFPs, specifically from Asia. Besides their local value in "forest gardens" and in traditional ceremonies, ornamental plants are of great value on the international market (botanical gardens, houseplants). The chemical components of plants consist of a large group of exudates (resins, gum, latex) and extracts (essential oils, tannin, paint, aromas). Non-industrial timber means timber in the form of poles for local construction, storage for crops, fencing etc. Timber is also used for tools, instruments, artistic or cultural objects, and as firewood. A great deal of this type of wood is used at local level, but there is also a local and national market for firewood and construction wood. Fibres and leaves are used for clothing, baskets, mats, roofing materials, etc. Humus from the forest is mixed with manure and used in agriculture.

5. Non-edible animal products

a) insect products (wax, lacquer, mainly collected), b) game products and living animals (pets, trophies, traditional ceremonies, clothing, often traded internationally)

Beeswax is used both at local and commercial level (cosmetics, batik). The "lacquer" exuded by aphids has a wide variety of uses, varying from high-quality varnish and lacquer to insulation for electricity cables. Animals are hunted not just for food and medicines; a large proportion are hunted to serve as pets, for ceremonial purposes, as trophies, for clothing, and for trade with the city and at international level (for example parrots, butterflies, elephant ivory).

Categorisation by type or part of the NTFP which is harvested (Box 3) shows the potential impact of harvesting. Harvesting fruits, nuts and seeds (the so-called reproductive plant parts) is the least destructive. The destructiveness of harvesting plant exudates depends on the intensity of the harvest. Harvesting products from vegetative structures is generally the most destructive, often causing the death of the individual NTFP and sometimes even the species.

Plants can also be classified on the basis of their life form. Harvesting products from trees which take a long time to reach maturity has a greater effect, relatively speaking, since this life form takes more time to recover. Annual plants, on the other hand, have the ability to recover rapidly because of their short life-span, their relatively high production, and the fact that they place lower demands on their environment.

These categories show that attention is still focused primarily on plant NTFPs, with less attention being paid to animals and animal products as NTFPs.

Box 3. Categorisation according to type or part of the NTFP

1. Reproductive plants parts: fruits, nuts, seeds, oil seeds
2. Plant exudates: latex, resin, nectar
3. Vegetative structures: fibres, roots, bark, growing tips of stems (palm hearts)
(Peters, 1996b)

or:

1. Trees with a long development period (period between germination and maturity)
2. Medium-length development period
3. Annual plants (for example grasses) with a short life-span
(Cunningham, 1996)

2.2 Differences in NTFP use between continents

In Latin America, Africa and Asia, NTFPs have long played an important role in sustaining human life. Examples are everywhere apparent of ways in which mankind has manipulated the natural environment in order to make use of forest products. Differences are also apparent, however.

The development of a large number of the NTFPs in Latin America is characterised by a process of “boom and bust”, namely the rapid development of NTFP extraction followed by overexploitation as a result of increasing demand, and a shift towards production on plantations or the production of substitutes. Spanish and Portuguese colonists had a major influence on Latin-American culture. They showed little concern with sustainable agricultural production or forest management. This meant that native knowledge came to have a disadvantaged position within society. The influence of the Western market economy has meant that forest development in Latin America has focused on a number of economically viable products such as rubber and Brazil nuts.

In Asia, colonial rulers have perhaps been somewhat less directly involved –more so at a distance– in the use and exploitation of forests. It is partly for this reason that knowledge of the use and management of NTFPs has been better preserved at all levels of society. The relative population pressure is higher, meaning that local forest use has developed in a more diversified manner. Such factors as the accessibility of forest products, the relative position of ethnic minorities, and traditional agriculture probably also play a role.

Another difference is the extent to which an NTFP is domesticated. A great deal of bamboo grows in Columbia, for example. This is exported but not planted as in Asia. It may well be that domestication has taken place to a greater extent in Asia because of the greater population pressure and the longer agricultural tradition than in other continents.

In Asia, the trade in NTFPs is dominated by a few large urban or provincial companies and a large number of small private businesses. The traders are usually men. In Africa, by contrast, the traders are almost exclusively women operating independently. In Latin America, the trade is a feudal system with contractors (male).

Only a small amount of literature is available on the differences in NTFP use and the reasons for them. It would be interesting to gain an understanding of the historical development of NTFP use and management and of any differences between the continents. A better understanding of the specific historical developments in various regions would make it possible to plan NTFP activities in a more rational manner.

3. ECOLOGICAL AND MANAGERIAL EXPERIENCE OF NTFP USE AND MANAGEMENT

3.1 Ecological and management lessons

1. Harvesting NTFPs can have a major influence on the species concerned and/or on the forest ecosystem. An understanding of ecological strategies of plants and animals is therefore essential; this understanding needs to form the basis for the construction of forest and NTFP management systems. Native management systems are indeed often based on such knowledge.
2. There is a major need for the development of a short, simple, participatory method – based on native knowledge – which can generate the knowledge necessary for taking management decisions. Such a method should be applied at the level of the management unit concerned.
3. In natural forests with a relatively low level of biodiversity (for example flood plains in the Amazon), NTFP management is simpler and productivity higher. In forests with a relatively high level of biodiversity, the potential of NTFP use for economic purposes will depend in part on the presence of NTFPs which can allow for a high production level both from the point of view of quantity and quality.
4. In order to increase production of NTFPs in natural forest, NTFP species which only occur in low densities can be planted (“enrichment planting”). This reduces the impact of harvesting on the NTFP species and increases the daily income of those harvesting it. Many native forest management systems include such enrichment techniques.
5. If there is a major demand for an NTFP from which a relatively large proportion of the biomass is harvested, cultivation on plantations is the best management approach. In the case of lower demand and a relatively smaller proportion of the biomass, sustainable management in natural forests is an option.

3.2 The impact on the NTFP individual and the species

The impact of harvesting NTFPs depends on the type and/or part which is harvested (see Box 3). Repeated and intensive use may have a negative effect on the NTFP population and even on the species.

- fruits, nuts, seeds:

Generally speaking, harvesting nuts, fruits and seeds (for example Brazil nuts, *Bertholletia excelsa*) does not need to have a negative influence on either the tree or the species. However, constant harvesting of fruits may reduce the number of fruits to such an extent that the number of seedlings (some of which will in any case die naturally) will be too low for the species to survive successfully. In particular, commercial extraction of fruits, nuts and seeds may also have an impact on the genetic composition of the species. Continual harvesting of large, tasty fruits from the same population will ultimately result in a population of trees bearing small and less tasty fruits and these will consequently have a lower economic value.

Box 4. Palm heart: single-stemmed/multi-stemmed

The tasty palm heart is produced by various species of palm but it is generally derived from *Euterpe* species from Latin America. It is primarily *Euterpe edulis* which is harvested. This is a single-stemmed species, which means that harvesting the meristem (actively dividing cells forming new tissue) kills the plant. As a result of overexploitation, this species has virtually died out in southern and south-eastern Brazil. Other species (*Euterpe cuatrecasana* and *oleracea*) are clonal, meaning that they carry numerous shoots of different ages. After one or more of these has been harvested, the plant can put out shoots again (Broekhoven, 1996).

- latex, resin, nectar

The effect of harvesting latex, resin and nectar varies according to the intensity and the species concerned. Despite the fact that tapping rubber from *Hevea brasiliensis* in the Amazon seems not

to be harmful, it is known that intensive tapping causes slower growth and decreased reproduction (fruits) (Peters, 1996a).

- fibres, roots, stems, leaves, bark, growing tips of stems

These are the most viable parts of a plant and they contain a relatively large amount of biomass. Harvesting the single-stemmed species of rattan is always destructive. The multi-stemmed (clonal) species can however put out new shoots again after low-intensity harvesting (as can the palm heart, see Box 4). Removing the bark (for medicinal purposes) is generally destructive. Some species of tree can survive fairly intensive harvesting of their bark (*Prunus africana*). In the case of commercial extraction (high demand), however, the bark is harvested again before it has recovered completely; this ultimately kills the *Prunus* tree (Box 5).

- animals

There are a very large number of examples of over-hunting leading to species becoming endangered or even extinct: the rhinoceros for its horn, the elephant for ivory, the tiger for medicines extracted from the bones.

3.3 The impact on the forest ecosystem/biodiversity

Intensive harvesting can reduce the number of fruits to such an extent that fruit-eating animals (such as rats, agoutis, pacas) are disadvantaged. These animals will then leave the area concerned in search of forest areas where more fruits are available. The animals may also spread (or carry the pollen of) other species of plants, which can ultimately have a major influence on the overall composition of the forest (Box 5).

Box 5. Potential influence of NTFP harvesting on the forest ecosystem: *Prunus africana*

The Afromontane hardwood species *Prunus africana* has long been used by the local population for its wood and as a medicinal product. Since it became known internationally that the bark contains a substance which combats prostate cancer, harvesting of the bark has increased enormously. The bark is currently still harvested from wild populations in Cameroon, Zaire, Kenya and Madagascar. The bark (or the extracts) is exported to Europe, where it is processed. Generally speaking, *Prunus africana* is able to survive the removal of its bark. However, the high demand for the product means that the pressure of harvesting is too great: trees are dying off. The fruits of *Prunus africana* are an important food source for endemic birds and mammals. Destructive harvesting of *Prunus africana* may well reduce their numbers (Cunningham & Mbenkum, 1993).

3.4 The importance of sustainable management systems

The experience described above makes clear that it is essential to understand the ecology of plants and animals. Native and/or traditional forest management systems are often based on such an understanding. It is assumed that native management systems are only sustainable when the population and market pressure is low. Additional studies are therefore necessary of the relationship between extraction and ecological sustainability. However, these are still few and far between. One example of such a study is the research project carried out by Utrecht University and its Bolivian counterparts (PROMAB: Programa Manejo de Bosques de la Amazonía Boliviana) for which DGIS provided funding (Box 6).

Besides long-term scientific studies, it is important to be able to assess the sustainability of harvesting in the short term. Monitoring of the harvest also needs to be carried out at local management level. One example of such a quick method of assessment is "Rapid Vulnerability Assessment" (RVA, Box 7). This is a rapid method of assessing whether a particular plant species is sensitive to use by humans and therefore in need of management and monitoring. The advantage of the method is that it allows a management framework to be created within a relatively short time without first needing to determine precisely the maximum allowable level of harvesting. The sustainable extraction level can then be determined more precisely in the course of management activities.

Box 6. PROMAB: Forest management in the Amazon region of Bolivia

The aims of Programa Manejo de Bosques de la Amazonía Boliviana (PROMAB) are:

1. To generate an ecological and socio-economic basis for sustainable forest management systems for the exploitation of timber and non-timber products.
2. To develop methods for analysing and evaluating the sustainability of various different forest exploitation systems.
3. To improve research, information and institutional capacity in the field of sustainable forest exploitation.

The ecological component of the first of these aims involves carrying out botanical and ecological studies to produce a predictive analysis of sustainable harvesting levels. Studies of the dynamics of the species concerned make it possible to indicate forest cultivation measures aimed at maintaining or improving the productivity of the forest. Work is also being done to investigate the feasibility of “enrichment planting”, specifically in secondary forest (PROMAB, 1994).

Before developing a method to ensure that harvesting is sustainable – or to make it so – it is necessary to understand why harvesting is not in fact sustainable. When setting up a management and monitoring system, it must also be clear who is responsible for monitoring the NTFPs. It is not always easy or realistic to undo non-sustainable harvesting: what happens if it turns out after a number of harvests that the chosen method is not in fact sustainable? Who is to make the choice between sustainable exploitation and exploitation based entirely on economic growth? (Peters, 1996).

Box 7. Rapid Vulnerability Assessment

Rapid Vulnerability Assessment (RVA) is a method which is capable – in a rapid, participatory manner – of assessing which NTFPs will be sensitive in use and which management measures can best be applied. The plant species which will be sensitive are:

- species which are slow growing, long living and which produce relatively little (depending on the life form);
- species with a highly specific preference as regards their living environment (living environment preference);
- species which occur infrequently and which are not widely distributed (occurrence and distribution);
- species which are slow growing (rate of growth);
- species which do not grow again or which do not increase their rate of growth after being harvested (reaction to harvesting).

Other factors which influence sensitivity and which are being investigated by means of RVA are:

- the part of the plant which is used: using leaves has the least impact; using branches, the trunk and the bark has more impact; using the whole plant naturally has the greatest impact;
- demand (quantity and frequency of harvesting) for the NTFP;
- seasonal NTFP production: demand may be lower if the NTFP availability is seasonal;
- commercialisation can increase demand and therefore the likelihood of non-sustainable use;
- the availability of substitutes will reduce the sensitivity of an NTFP occurring in its natural environment.

The core of RVA is integration of native knowledge with scientific knowledge (Wild & Mutebi 1996).

3.5 Combined use of timber and NTFPs

Logging influences the composition and structure of the forest and thus the occurrence and distribution of NTFPs. If logging is uncontrolled, this is a negative impact. Sustainable logging can however encourage the growth of some NTFPs: some species of plant (cardamom, bamboo, grass) profit from selective controlled cutting, because this means that for a time more light falls on the soil. Some species which are cut for timber may have potential value as an NTFP (Box 8). There is therefore potential here for the combined management and use of timber and non-timber products.

Box 8. Timber and non-timber use of trees

Okoumé (*Aucoumea klaineana*), from the forests of Gabon, is a valuable timber species. In addition, its leaves, bark and side branches can be used for medicinal purposes. This additional use of the same tree can take place before controlled selective logging without having a negative effect on the logging concession. Such combined use can have benefits for a wider public than just the logging company and the government (Clark & Tchamou 1998).

3.6 Forest type in relation to NTFP harvest

It is often stated that NTFPs are primarily harvested from secondary forests and waste land, and the role of NTFPs in primary forests is said to be minimal. One reason for greater use of NTFPs from secondary forests (apart from the fact that there are an increasing number of secondary forests) is that these are located closer to the living environment of the NTFP collector. In general, such forests have a lower diversity of species than primary forests and a greater density of certain NTFPs. Less time is therefore needed to find the NTFPs, and it consequently takes less time to harvest a given quantity. The collector therefore gets a higher return on the time he/she invests.

There are situations, however, in which important self-support products in fact involve plant and animal species which are dependent on undisturbed forest. In Sarawak, the most important animal food source is the “bearded pig” (*Sus barbatus*), which occurs only in undisturbed forest. Another important food source consists of river fish, which are also highly dependent on undisturbed forest (Sayer 1993). There are, moreover, primary forests in which NTFPs are relatively abundant, for example palms along river beds.

Instead of differentiating between primary and secondary forest, the potential of NTFP use and management should be seen in relation to the density of occurrence of NTFPs and their distance to the living environment of the NTFP collector. There is little potential for commercialisation of NTFPs in:

- forests with a high level of diversity (except for NTFPs which produce a large amount per quantity of biomass harvested, Box 9)
- remote forests where there is only a minimum level of social organisation and infrastructure (see also section 4).

There is potential for intensifying NTFP use in forest fringes, buffer zones of protected areas and nature reserves, inhabited forests with the necessary infrastructure, and flood plains. Here, NTFP exploitation can provide additional income, thus preventing more forest being reclaimed (Pendelton 1992).

Box 9. Choice of NTFP use in relation to type of forest

The subtropical forest in Péten, Guatemala, has a relatively low species diversity (50-100 per hectare), as a result of which there is a relatively greater number of individuals per species. The tropical forest in Kalimantan has a high level of species diversity (150-225 per hectare) and therefore a lower occurrence of individual plants and animals, including NTFP species. In the latter forest, the economic proceeds from most of the potential products are outweighed by the amount of time needed to harvest them. Collectors will concentrate on those NTFPs which produce most per individual or which occur in a predictable manner or in clusters (Salafsky et al., 1993).

Gaharu, the resin harvested from the infected core of the *Aquilaria* tree, is an important NTFP from Kalimantan. It is used in the production of perfume. Exploitation of gaharu can earn several thousand dollars per tree on the local market (De Beer & McDermott 1996).

There is also a relationship between the aridity of an area and the extent to which plant species are used for several purposes. In drier areas (or areas with a greater scarcity of native species), multiple use of a given species is more common.

3.7 Enrichment of the forest with NTFPs

The potential for NTFP use in forests with a high level of biodiversity can be increased by planting extra specimens of those NTFP species which already occur in the natural forest at low density. This is known as “enrichment planting”. Many traditional forest management systems have long made use of enrichment techniques (Box 10). Enrichment planting is also used in “normal” forestry to cultivate timber trees.

In some cases, however, the costs involved in enrichment may be greater than the proceeds, so that conservation of the relevant NTFPs in agroforestry systems or plantations might be a better solution.

Box 10. Forest enrichment with Brazil nuts

Traditional communities in the Amazon (Indians and caboclos, descendants of Indians and immigrants) have had a major influence on both primary and secondary forests. Annual plants are grown in small clearings in the forest, leading in many cases to “oligarchic forests”, forests dominated by a small number of tree and palm species. In large areas of the Amazon, there are old, tall forest formations in which large numbers of Brazil nut trees (*Bertholletia excelsa*) occur. The nuts have a high nutritional value and have long been a sought-after food. Many researchers believe that “natural” formations of Brazil nut trees are in fact the result of traditional “enrichment techniques” carried out by Indians (Dubois, 1996)

3.8 Production of NTFPs on plantations and in agroforestry systems

Cultivating NTFPs on plantations or as part of agroforestry systems is often seen as a strategy for reducing the pressure on the natural forest and the NTFPs it contains, for example in the case of increased demand resulting from commercialisation. Commercialisation in fact has a negative influence on the forest and the NTFP if harvesting the NTFP is already destructive in itself (see 3.2).

However, domestication followed by a decrease in productivity may also lead to lower prices and consequently to a reduction in the value of the NTFP occurring in natural forest. This may then reduce motivation with respect to conservation. Maintaining NTFPs in natural forests is therefore of continuing importance for increasing the value of the forest. Moreover, natural forests are an essential genetic pool which remains necessary even in the case of domestication.

A third method of “domestication” is to introduce systems for managing NTFPs in rainforests which lead to higher production. In natural palm forests in Brazil, for example, those species of tree are felled which compete with the particular palm that produces palm hearts. This probably results in a reduction in biodiversity.

The decision to introduce NTFP management in natural forests or to cultivate NTFPs in agroforestry systems or plantations is dependent (within the limits of ecological possibility) on:

- the demand for the NTFP concerned (extent of commercialisation);
- the relative quantity of biomass harvested.

If both of these are low, little or no negative impact on the forest is to be expected, so that no additional management is necessary. If demand is high and a relatively large quantity of biomass is harvested, this may have a major influence on both the NTFP and the forest. In such cases, domestication is the best management option. Between these extremes, a sustainable management system for NTFPs in natural forests is desirable.

4. SOCIO-ECONOMIC EXPERIENCE IN THE USE AND MANAGEMENT OF NTFPs

4.1 Socio-economic lessons

1. The extent of dependence on NTFPs is different in each particular situation. One generalisation which may be made is that in marginal areas NTFPs are often the only means of survival. For the wealthier section of the population, NTFP use means something extra (hunting for pleasure, flavourings and aromas, “bushmeat” as a luxury food). Women play a particularly large role in collecting and processing NTFPs and much of their income comes from this source.
2. Knowledge of the value of NTFPs and of rights of ownership to them may improve the negotiating position of the local population with respect to outsiders, as well as increasing their motivation for long-term forest conservation.
3. In order to promote the marketing of NTFPs, it is necessary to ensure that:
 - information on NTFP management and market-related information is accessible to local user groups;
 - the choice of NTFPs is based largely on an existing self-support and market value;
 - marketing is based on several NTFPs or NTFP functions which can produce supplies at various different times of year;
 - NTFP activities do not conflict with other activities (for example agriculture) carried out by the local NTFP user or with the distribution of responsibilities within the community and household (making tasks more arduous or marginalising incomes);
 - the local and national market is given preference over the international market, in view of the fact that the latter is much less stable and imposes higher quality demands;
 - the value of the NTFP at the location where it is harvested increases as a result of improved methods of processing and storage and local capacity in this field, as well as an effective infrastructure;
 - any trader or middleman has a facilitatory role for the NTFP collector. If it is desirable for there to be a middleman, it is also essential for there to be an organisation of NTFP collectors so as to improve their position where equitable distribution of the proceeds is concerned;
 - the NTFP enterprise is run as a proper business according to business principles;
 - the influence of commercialisation of NTFPs on local communities is monitored;
 - commercialisation must not endanger the necessary self-support function of NTFPs;
 - marketing is based on an ecologically sustainable management system for the NTFP.

4.2 The importance of NTFPs for self-support, ensuring the food supply and health

Many forest dwellers are dependent to a greater or lesser extent on NTFPs to survive. NTFPs, in particular insects, increase the variety of their diet and provide the necessary extra vitamins, proteins and energy. Besides being a food source, they are also often a source of income (see Box 11 and 4.3). Plants for human and animal consumption are generally used and processed by women, as food, drink, herbs, medication, animal feed etc. Women are also the most important collectors and users of firewood. Processing construction timber and firewood is generally done by men, although women assist in virtually all of these activities.

Food NTFPs are used as “snack food” during work on the land or while tending cattle, and they have a buffer function in times of scarcity. If access to the NTFP food source is restricted, it can lead to serious consequences for health. The “miombo woodlands” of Africa (savannah) are extremely important as a source of firewood, charcoal, timber for small-scale construction, and to feed and graze cattle.

Box 11. Food and income in the Miombo Woodlands: caterpillars and honey

In Africa, insects are an important source of proteins, vitamins and energy. They are often eaten as a supplement to the high-carbohydrate staple diet. In the miombo woodlands, bees are kept as a source of honey, wax and spawn. For those living in the vicinity of the Kasungu National Park in Malawi, caterpillars and honey are the most important of the park's products. Firewood, material for small-scale construction and mushrooms are second. The traditional management systems of Zambia and Zaire prohibit harvesting the caterpillars before they have almost reached their maximum size. Removing the living branches of certain trees when collecting caterpillars is also forbidden. Women burn off the savannah to stimulate leaf growth as a food source for the caterpillars.

The caterpillars are also a source of income. As a result of commercial harvesting for local markets, the traditional management systems are under pressure. Most of the collectors are women and they collect 18 kilos of caterpillars an hour, which are then dried and smoked to preserve them. Collectors can earn R2500 (USD 715) in seven weeks. This is 95% of the average income of farmers in this area. At the moment, there is a major need for a management system for the caterpillars, including a ban on burning the miombos too late in the year, on felling trees, and on harvesting the pupae of the insects. (Clarke et al. 1996).

Bee-keeping is also an important source of food and income in the form of honey and spawn. This is a specifically male activity, although in Zambia an increasing number of women collect honey in order to earn additional income. Bee-keeping has long been viewed as damaging to woodlands because the timber and/or the bark of the trees is used to construct hives. However, bee-keeping often produces more than harvesting the timber. Selective felling and controlled harvesting of the bark does not need to be destructive for the miombo woodlands. The advantage of bee-keeping is that it does not conflict with other types of land use. It can also be used as a strategy for protecting miombo woodlands: beekeepers oppose burning vegetation too late in the year because this destroys the flowers which produce nectar for the bees (Fisher 1993).

A large proportion of NTFPs have medicinal properties. For at least three-quarters of the world's population, traditional medicine is the only source of medical treatment (70-80% in Africa). The areas concerned are usually remote ones, where the availability of national non-traditional healthcare is likely to remain restricted even in the long term. Medicinal plants are also used to treat diseases in cattle. Initiatives to better manage medicinal plants can lead to improved local healthcare (Box 12).

Box 12. Medicinal plants in local healthcare

In Daulaghiri, part of the Himalayas near the Tibetan border, lies Dolpo. Numerous aromatic and medicinal plants occur here which are popular in three important traditional medicine systems applied in the region: the Ayurvedic, the Tibetan, and the Chinese systems. The area is extremely remote and therefore economically and administratively isolated. Its inhabitants have virtually no access to Nepal's national healthcare system (based on western medicine) and are entirely dependent on traditional medicine.

"Amchis" (traditional Tibetan doctors) have an extensive knowledge of medicinal plants. The problem, however, is that they have restricted access to the medicinal materials they need, to medical texts and to financing (given that they provide their services free of charge). Moreover, their knowledge does not always reach the women who are responsible for healthcare within the household.

WWF Nepal recently started a project in Dolpo as part of the People and Plants Initiative organised by WWF, UNESCO and the Kew Royal Botanical Gardens. One of the aims of the project is to set up a sustainable management system for medicinal plants in the region. In June 1998, all the Dolpo amchis (45) were to meet to strengthen their position and to look for ways of transferring relevant aspects of their knowledge to women so as to improve primary healthcare (Aumeeruddy-Thomas, 1998).

4.3 The importance of NTFPs in the local economy and in employment

Many communities also acquire income from collecting, processing and marketing NTFPs. Estimates of the number of people who are dependent on NTFPs for at least part of their income range from 200 million world-wide to 1 billion in Asia and the Pacific. Many of these activities are on a small scale and are not registered. The importance of NTFPs for survival and as a source of income is therefore not fully appreciated by national governments (Mittelman et al., 1997). The role of NTFPs in the local economy may become greater as a result of crop failures or the collapse of the agricultural economy (Box 13). In many African countries, hunting is an important source of income.

Employment opportunities based on small-scale trade in NTFPs are of increasing importance for the rural economy in almost all developing countries. Population increases mean that there is a growing market for NTFPs. These markets are not only an important source of employment for NTFP collectors but also for traders.

Box 13. Importance of NTFPs after economic collapse

As a result of economic collapse caused by repeated forest fires in agricultural areas and waste land, three-quarters of the women in Kwampanin (Ghana) are currently dependent on collecting leaves (*Marantaceae spp.*) as packaging material, specifically for foodstuffs. Most of them do this five days a week, often for more than 12 hours a day. The leaves are mainly harvested from damaged forest areas and waste land, but also from the forest. Alternative packaging materials are available, but *Marantaceae* leaves are preferred because they are cheap and durable and can resist heat. For an average day's work, collectors earn 600 cedis (GBP 1.10). The collectors sell the leaves to distributors in their village or sell them themselves at the weekly regional market. Collecting leaves does not require investment, except in the form of time, and the market is a broad and accessible one. The trade is dominated at all levels by women.

Marantaceae leaves make an important contribution to the regional economy, providing an assured income for a large proportion of the rural and also urban distributors. At a rough estimate, the monthly demand for the leaves amounts to a million bundles, worth more than GBP 47,000. Although harvesting levels up to now appear to be sustainable, the large quantities harvested are expected to lead to problems in the future. A sustainable management system needs to be developed (Falconer 1994).

4.4 The importance of NTFPs in the national economy

NTFPs can make a significant contribution to both the national and world economies. Some 25% of the medication prescribed world-wide contains ingredients extracted directly from medicinal plants; the total economic value of medication extracted from plants is estimated at USD 43 billion a year. However, many of these plants are not harvested from natural forests but in cultivated form (Mittelman et al., 1997). When NTFP harvesting is commercialised, there is often a transition from natural forest harvesting to plantations (Box 14). In Latin America, however, there is also commercial exploitation of NTFPs from natural forests. Extractive reserves are an example of this.

Box 14. Economically important NTFPs from India

In the late 70s, NTFPs (excluding firewood and wood for small-scale construction) accounted for 40% of the total net proceeds in the forestry sector (i.e. 40% of INR 3355m) and 55% of total employment in the forestry sector. "Tendu" leaves (*Diospyros melanoxylon*) make the greatest contribution. These are used like cigarette papers: they are filled with tobacco and rolled up to form a small cigarette known as a "bidi". The leaves are taken from a medium-sized tree from arid mixed deciduous forests. They are generally harvested from natural forests, but there are also some plantations. Undergrowth is removed to encourage leaf growth. The "bidi" factory is a well-organised and flourishing small-scale industrial enterprise, with proceeds amounting to USD 200m per year (FAO, 1994: Non-wood News 1). Some 7.5 million people are involved part-time in collecting tendu leaves and another three million in processing them (Nair 1993).

Between the Second World War and the 70s, there was a large international trade in animals and animal products. Since 1970, trade has been restricted by national and international legislation. Many countries have ratified CITES. However, observance of CITES legislation leaves much to be desired. In 1995, Interpol estimated that the value of the illegal trade in plants and animals – both alive and dead – (25% of the legal trade) amounted to USD 20 billion. This is more than the combined value of illegal trading in both arms and drugs (NRC 18 March 1998).

The value of NTFPs for the national economy is not always recorded in national statistics. In the 70s (rise of the tropical timber industry), the FAO ceased to maintain statistics on NTFPs but it recently began to do so again. Nevertheless, information is far from complete. In Cameroon, a new method of assessing the socio-economic value of NTFPs is currently being tested at national level (Box 15).

This kind of data on the value of NTFPs can have a positive influence on management decisions on forests at national level. It may nevertheless be disadvantageous for the local population, who may then have to pay taxes on the use and sale of NTFPs. Such a taxation system was recently

introduced in Cameroon. For many of the female distributors, this tax amounts to at least 10% of their net income. The result may be to discourage the trade in NTFPs, meaning that NTFPs would contribute less to the collector's livelihood, making him/her less highly motivated to help protect forests (Ndoye et al., 1997/98).

If the aim is to combat poverty at local level, it is preferable in many cases to allow local and national markets to take precedence over the international market. The local market often offers better prices, is relatively stable as opposed to the international market, and imposes lower (and more appropriate) quality requirements. The export of NTFPs provides a country with the necessary foreign currency, but is not necessarily advantageous for NTFP collectors or producers. If exports are desired, attempts should be made to access the specific international market which gives local collectors or farmers the best possible price, namely the "eco" or "green" market or "fair trade" channels (FAO 1995b; see below).

Box 15. The riches of the forest: Methods of assessing the economic significance of NTFPs

A recently developed method of assessing the socio-economic value of NTFPs – developed jointly by the Cameroon organisation CERUT and the Dutch AIDEnvironment – was recently tested in two provinces in Cameroon. Up to the present, the production and trade in NTFPs have hardly been examined on a national scale. The aim of the method is to produce a reliable estimate – expressed in volumes and prices – of the economic value of NTFPs. The main elements of the method are as follows:

- it is capable of flexible application to large areas, up to regional or national level;
- it makes use of geographical sample frames involving producers and traders;
- field interviews carried out locally are restricted to randomly selected NTFPs (with the option of analysing specific NTFPs);
- the manner of sampling and data collection is determined by the market chain.

Data produced by this method can serve as indicators of sustainable development (trends in extraction, trade chains, price levels, role patterns, etc.). The method can also contribute to:

- making policy-makers and the local population more aware of the value of their forests;
- improving the supply, processing and commercialisation of NTFPs;
- institutionally reinforcing forest management and property rights.

In the long term, this can lead to improved management and protection of forest systems and to improved understanding of poverty and gender in forest areas and the role of the various parties concerned (AIDEnvironment 1998). The study in Cameroon is partly aimed at strengthening the appreciation of NTFPs by local NGOs, such as AIDEnvironment's partner CERUT.

4.5 The influence of prosperity on NTFP use

Increasing prosperity can lead to a shift in the need and preference for certain NTFPs (Box 16). It is important to gain an understanding of the way the significance of NTFPs varies between the poor and wealthy sections of the population. This makes it easier to determine which NTFPs should be focused on in order to help the poorer section of the population. It is also important to understand the effect of increased prosperity on NTFP use so as to be able to estimate the consequences for forest management. If there is a shift to synthetic alternatives, or if products are bought on the market, there will be less motivation to manage the forest.

In fertile areas, agriculture is often the main source of income and NTFPs are of less importance for survival or as a source of income. However, agriculture does not always produce more per quantity of land or work than NTFPs extracted from natural forest. With increasing value of labour (along with increasing prosperity), collecting forest products will become less attractive than buying them. In more arid areas where cattle rearing also takes place, a number of NTFPs may actually become more important with increased prosperity (Box 15). Increased prosperity may lead to "high-value" NTFPs becoming increasingly important. The wealthier section of the population uses NTFPs particularly as flavourings and scents (perfumes!), as "exotic" food ("bushmeat" in urban areas), as decoration, and as part of the illegal trade in rare and endangered plants and animals (tiger parts for medicinal purposes, plants and animals as specimens for collections) (Mittelman et al., 1997).

Box 16. Differences in use and preference for NTFPs between rich and poor

Mountain forests in Vietnam

A study of dependence on food NTFPs among mountain communities in North Vietnam reveals a difference in use by various types of household (in terms of prosperity). The wealthier section of the population use forest vegetables for their own consumption or buy them from the poor. The poor sell vegetables, bamboo shoots and mushrooms from the forest and use the money to buy rice. Wealthier families hunt for pleasure and to improve the quality of their meals, while poorer families hunt game and then sell it. For their own consumption, they utilise less “valuable” animals such as crabs, fish and snakes (Yen et al., 1994).

Miombo woodlands in Zimbabwe

Wealthier households in savannah areas are often larger and therefore consume more firewood. The wealthier the household, the more cattle they may have and the greater their need for woodlands for grazing, cattle feed, manure etc. Preferences may also differ. Many food NTFPs, for example, such as edible insects, small animals, roots, leafy vegetables etc., are seen as food for children and the poor. This is not true of big game: the higher the household’s income, the greater their consumption of big game. These status aspects need to be borne in mind when carrying out surveys: many food NTFPs are not mentioned because they are considered inferior and of lower status (Clarke et al., 1996).

4.6 The role of NTFPs in reinforcing local communities (“empowerment”).

Local communities are not always aware of the economic value of NTFPs. By quantifying this value for local user groups (for example by comparing it with the value of timber or agricultural products) it may become clear that it is more profitable for them to allow the forest, or specific trees, to remain. This also strengthens their position with respect to outsiders such as logging companies and mining corporations (Box 17).

Box 17. Strengthening the position with respect to outsiders

Communities on the Capim river, 220 kilometres upstream from the port of Belém at the mouth of the Amazon, live mainly by extracting NTFPs (including hunting and fishing) and small-scale agriculture. Over the past few decades, the area has been attracted an increasing number of logging companies, which offer the villagers money for their land, timber and game. This is in fact the only source of income for the villagers. With technical help from the outsiders, surveys are carried out of the economic value of NTFPs extracted from the forest (in particular fruit, game, fish and medicinal plants). The result is then communicated to the whole community with the aid of a variety of educational materials. This makes clear to the community that the sale of fruit, for example, produces a higher income than the one-off sale of the whole tree for its timber. This means an extra income opportunity for the community during the 4-5 month fruit season.

Knowing the value of “their” NTFPs has also led to other benefits for the community. They were able to demonstrate, at national level, the importance of fish, game and fruit for local communication, thus enabling them to prevent the establishment of mining operations in the river area. Information made available by plotting the density and distribution of various types of fruit was also used in negotiations with logging companies and helped to delineate forest reserves (Shanley et al., 1996).

Box 18. Brazil nut industry in Bolivia: Whose position improved?

After the collapse of the market for rubber, Bolivia has developed into an important exporter of shelled Brazil nuts. In the rubber economy, it was the owners of the barracas (small-scale rubber enterprises in the forest) who were in charge. The same was expected to be the case in the Brazil nut industry, but matters developed differently. The owners of the processing industries in the three major cities in this area (Riberalta, Cobija and Guayaramerín) bought up the barracas (now in use as Brazil nut enterprises) in order to ensure the supply of Brazil nuts to their factories. The nuts are harvested mainly by seasonal workers from the cities, a large proportion of the rural population having migrated to the cities after the collapse of the rubber industry. The processing companies in Riberalta are given credit by the “Bolivia Exports” foundation to enable them to improve the infrastructure within the barracas. It is hoped that improvements in productivity and quality will eventually benefit the seasonal workers. Current developments are marginalising small producers and these are increasingly switching to agriculture. The Cooperativa (co-operative of Brazil nut collectors in forest) has now set up its own processing factory, but this has only a small share (3%) of production (Assies, 1997).

In order to strengthen the position of “the local population”, it is necessary to appreciate that they do not form a homogeneous group but consist of various different interest groups (“local institutions”, see section 5). In strengthening their position with respect to outsiders, it is important to focus not only on the interests of elites and of men (Box 18).

4.7 Obstacles to marketing NTFPs

Marketing NTFPs can further strengthen the position of local user groups. There are however a number of obstacles which need to be overcome to actually achieve this.

no access to information

A lot of information about marketing opportunities, but also about ecological aspects, is not available at the level of local users. Even if information has in fact been published, it is often contained in documents (internal) produced by government bodies, universities and nature conservation organisations. A study carried out by CIFOR shows that world-wide there are about 30 databases dealing with NTFPs or specific products. Most of the information has to do with biology/ecology, usage, and domestication. The databases contain far less information about the market, production, prices and trade. In general, the databases are isolated and are seldom linked to others (Cheng Tan et al., 1996).

It is necessary to make ecological and marketing information accessible to local NTFP users. Information about the production of natural NTFPs and a reasonable price for the product can already significantly strengthen the position of NTFP collectors. One example of a database providing wide-ranging information for local users is the Minor Forest Product Database managed by the Centre of Minor Forest Products in India (Box 19). There are a number of initiatives aimed at generating information about various marketing aspects. However, these initiatives need to focus on usefulness at the level of the NTFP collector (Box 20).

Box 19. Minor Forest Products Database in India

The database is still under development but currently includes 1280 Indian species. It has the following parameters:

- Botanical species and family name, local name, occurrence and distribution, forest type, rainfall, altitude, temperature, soil type;
- Use, part of NTFP used, active ingredients, value-added products, technology used, production (per tree and per hectare), feasibility of domestication, potential substitutes;
- supply, demand, trade;
- cultivation possibilities, production and harvesting techniques;
- processing, storage, pests/diseases, employment opportunities, additional use;
- important references, contact persons.

The data are largely descriptive and can be used effectively by local user groups. The database is suitable for a wide range of parties involved in sustainable management and use of NTFPs (foresters, forest conservation workers, businessmen, researchers, policy-makers and planners, economists, social scientists, etc.) (Shiva, in: Cheng Tan et al., 1996).

lack of consistent supply

The market often has a consistent demand for a certain product but because many NTFPs grow or occur seasonally it is difficult to meet this demand. It is therefore wise for NTFP collectors and traders to focus on a wide range of NTFPs, allowing them to supply NTFPs throughout the year and thus to ensure themselves of a constant income. Improved storage also allows NTFPs to be supplied over a longer period. If the collector is also engaged in agriculture, NTFPs should be selected whose harvest does not take place at the same time as agricultural work.

restricted infrastructure and processing possibilities

There is often insufficient infrastructure for marketing NTFPs. Little value is added to the harvested NTFPs on the spot because the means are not available. This means that local collectors receive only a small percentage of the market value of the product. Improved technology for processing on the spot could increase this percentage. However, it is necessary to guard against a shift in tasks: if an NTFP is upgraded and more technology is applied, doing so rapidly becomes a male task, meaning that women may be marginalised.

Box 20. Improved access to market information about NTFPs

- RECOFTC Market Systems Analysis and Development (MSA&D) Manual
During the first meeting of the IUCN NTFP network for South and South-East Asia in late 1995, a method of identifying marketable NTFPs was viewed as the highest priority. The RECOFTC- MSA&D was chosen as the basis and would require further development for use in the field.

The MSA&D method is based on a set of social/institutional, economic, ecological and technological criteria which are to be used in selecting an NTFP. The analysis follows the product from the harvesting location to the final destination in order to produce all the information on the trade and market situation needed to develop a new product or a new market.

The process is as follows:

step 1: Preliminary study: evaluation of the existing market with respect to existing and new products and markets;

step 2: Feasibility study: identification of potential and restrictions for new products and markets;

step 3: Product and marketing plan: development of a marketing strategy;

step 4: Implementation of the marketing strategy: marketing test, constant monitoring.

For each step, the manual indicates the information needed and how it should be accessed. There is constant emphasis on the fact that sustainable management of the NTFPs is essential and the potential uses and restrictions are indicated for each step (RECOFTC 1997).

- FTTP Marketing Information Systems (MIS)

In 1992, the Forest Trees and People Programme (FTTP) produced guidelines for developing a market information system at local level. The aim was to increase income from small-scale NTFP enterprises for producers and to reinforce marketing capacity. MIS covers the collection, analysis and distribution of market information as an aid to strengthening the position of local NTFP producers in negotiations and decision-making.

The use of MIS in Uganda allowed NTFP producers and sellers to determine more effectively which NTFPs provide the highest proceeds both now and in the future. At the end of each month, an analysis is carried out of what has been sold, providing an insight into the quantity and quality of products which are most in demand among customers. MIS has improved business skills and marketing results. The effect was greatest in the village where the community was actively involved in drawing up the MIS (Banana, 1996).

limited business competence

When NTFPs are marketed, it is often forgotten that business competence is necessary (Box 21). In many cases, this involves extra work for the NGO or the local community, which do not necessarily have the relevant expertise. Time therefore needs to be devoted to developing business skills within local enterprises. An alternative would be to set up or develop small-scale companies specialising in marketing.

Box 21. Importance of capacity of a local NTFP enterprise

The rich biodiversity (including snow leopard, black bear and musk deer) in the mountains of the Garhwal district in Northern India is threatened by overgrazing and over-exploitation of NTFPs (including firewood and animal feed). In order to generate sustainable income and to ensure sustainable forest management, small-scale enterprises are being set up for tasar silk and honey with the aid of the Biodiversity Conservation Network. The honey enterprise involves beehives located near houses, with the bees collecting their nectar from the natural forest and alpine meadows. Tasar silkworms (*Antheraea proylei*) live on the leaves of oak trees in village and state forests. Families (in particular women) run enterprises which rear silkworms on natural oak leaves. A number of villagers are being trained in technical and business skills. They in turn train those who rear the silkworms. The increase in competence has also led to increased productivity and quality, thus raising the level of income. This in turn has made villagers more unaware of the economic value of the oak forests and the importance of protecting them (BCN, 1998).

unequal balance of power – unequal distribution of proceeds

There may be an unequal balance of power between the middleman and the NTFP collector. It would be undesirable and unrealistic, however, to argue in favour of removing this link entirely. In a number of cases, this might be possible, namely where collectors live close to their markets. In many cases, however, collectors of forest products live in remote areas where the large amount of time they have to devote to collection means that they do not have the time to take the products to market themselves (Salafsky et al., 1993). In that case, the middleman can actually provide them with assured sales of products.

fickle market/possible substitutes

The market for NTFPs is subject to change. As soon as alternatives (including synthetic ones) become available, or if it becomes possible to cultivate the NTFP more cheaply on plantations, the natural NTFP market may collapse. The chance of substitution on the international market is great given the difficulty of ensuring a constant supply of natural NTFPs (see above). In an international context, the potential of the natural NTFP market is likely to be found specifically in the field of green, eco and “honest” markets. The local market is relatively stable (see 4.4). Domesticating NTFPs may also influence the balance of power or the distribution of income within a community or household (see 5.5).

potential influence of commercialisation on self-support aspect

The development of a market for NTFPs must not be allowed to jeopardise the self-support function of NTFPs. The commercialisation of a plant-based paint for baskets and bags for the international market, for example, may take place at the cost of the self-support function for the local community that uses this species of plant for medicinal purposes and that eats the fruit. Commercialisation may also benefit the elite (see 4.6 and Box 18). A greater understanding is necessary of the effect of commercialisation on the rural economy and the distribution of prosperity within a community.

risk of over-exploitation resulting from high market demand

The tragedy of NTFP marketing is often repeated: as soon as the market value increases, there is an increase in the external interest and demand for the product, resulting in over-exploitation (“boom and bust”). Marketing should therefore only take place on the basis of an ecologically sustainable extraction system.

An NTFP development which is not initiated locally may also be less successful because the NTFPs conflict with the local culture and preferences (see 5.5).

5. SOCIO-CULTURAL EXPERIENCE OF NTFP USE AND MANAGEMENT

The socio-cultural aspects are inextricably linked with the management and socio-economic aspects. They are nevertheless dealt with separately here in order to focus on the cultural and religious significance of NTFPs.

5.1 Socio-cultural aspects

1. Native knowledge and management practices are essential in setting up a sustainable forest management system. The cultural and religious significance of forests (sacred forests) can also play a role in forest management efforts.
2. The success of an NTFP extraction system is to a great extent determined by the extent of participation by women. Women have an extensive knowledge of the use, management and processing of NTFPs and could play a greater role in the production, diversification and development of economically important NTFPs. One should also not underestimate the knowledge of NTFPs among children.
3. The local community is not homogeneous. Various types of organisation are usually present, sometimes with conflicting interests regarding NTFPs. These interests need to be considered when developing NTFP activities. In addition, the advantages and disadvantages for each interest group need to be defined.
4. NTFPs need to be developed in such a way that they tend to strengthen and support the traditional culture rather than undermine it. Care must also be taken to ensure that increasing commercialisation, changing technology and product diversification do not have negative consequences for women.
5. The way forests and NTFPs are regarded is determined by culture, religion and prosperity. The various different views need to be clear when starting to use NTFPs and organise NTFP management for forest conservation.

5.2 Spiritual and cultural value of forests

It is essential to understand the cultural and spiritual value of forests because this determines the extent to which people are dependent on them. When NTFPs are considered from the economic point of view, their cultural value is often neglected. Sacred forests (forests with spiritual, cultural and religious value) are often disregarded in the context of forest conservation projects. If this happens, the intended aim may not be achieved and the opportunity to link conservation to the needs and spiritual life of the population will be lost (Box 22).

Box 22. Sacred forests in South-West China

In the south of the province of Yunnan in South-West China, there are some 400 “dragon hills” which provide for the spiritual needs of the local population. When setting up a WWF project in Xishuangbanna, neither the Chinese project partners nor the WWF itself had thought of including the “dragon hills” in forest conservation efforts. The focus was on centrally managed nature reserves which were of only peripheral value for the local communities. The sacred forests, on the other hand, are important as a source of traditional Chinese medicine. In addition, some of the medicinal plants found there are potentially of commercial value. The Kunming Botanical Institute has identified a number of these, for example *Tripterygium hypoglaucum*, a plant much used by the Dai minority and containing substances which are effective in treating rheumatism and gout. The sacred forests also play an important role in supplying water (Sochaczewski, 1998).

5.3 Native management of NTFPs

A native forest management system is often an integrated plant and animal management system which can ultimately increase biodiversity and improve soil conditions and the ecology (IUCN, 1997). These systems endow the forest with greater ecological value. Other management measures decrease biodiversity, for example by removing climbing plants in the interests of fruit production or by cutting undergrowth to encourage the growth of medicinal plants.

The Confederation of Indigenous Peoples of the Amazon Basin (COICA) has systematised local land and forest management systems. COICA represents – through more than 400 native organisations – some four million inhabitants of the Amazon region. It has drawn up a “Plan for Amazon Conservation and Development” based on local native management systems and incorporating NTFPs as the main element in sustainable development (FAO 1995a).

The Miombo Woodland in Africa also has native management systems. These are based on the need to protect natural resources, but also on religious motives (Box 23).

Box 23. Native management systems in the Miombo Woodland

Restricted use in the interests of conservation

Only dead wood is permitted to be used as firewood. In some areas, local leaders control the felling of trees for use in small-scale construction. Certain trees are only permitted to be used for certain purposes and the quantity harvested is also monitored. In some places, the bark may only be harvested on the west and east-facing sides of the trunk, because it is here that most potential medicines are supposed to be found. This is a method of preventing “ring barking”.

Management based on taboos or religious sanctions

There is a strict taboo on felling fruit trees in this region. Other trees which are considered valuable are also not permitted to be felled. In Zimbabwe, Zambia, Tanzania and Mozambique, trees growing around sacred water sources may not be felled for fear of the water drying up. Individual large trees are thought to have ties to the spirits and are therefore also not permitted to be felled. They are often used in rain ceremonies. In the Dodoma district of Tanzania, 11 species of tree are traditionally protected against felling because of their function in traditional rituals or another important function, for example as a buffer against drought. The Babato district of Tanzania also has 7 types of traditional forest reserves. These are used for the circumcision ceremony, as meeting places for wise men, burial places, private reserves for harvesting medicinal plants, as the location for instructing young women, etc. Felling trees in these areas is strictly prohibited. Harvesting NTFPs is only permitted if certain rules are observed.

Individual rights of use on communal lands

In this region, there are various ways of ensuring individual or group rights to the use of NTFPs on communal lands. In Zimbabwe, it is generally accepted that trees growing near a house and farm belong to the family and cannot be harvested by others. Rights to honey, caterpillars or fruit can be acquired by marking the tree or product concerned. Agreements are also made on group rights, for example firewood areas for women and fruit collecting routes for children (Clarke et al., 1996).

Besides native systems of NTFP extraction from natural forest, there are also more productive systems such as “enrichment planting” (see 3.8), agroforestry systems, small-scale shifting agriculture with NTFP production, and “multi-purpose tree gardens”. In setting up management systems for forests in general and for NTFPs in particular, it is essential to make use of the native knowledge already available.

5.4 Gender and age aspects

Men and women have differing roles in collecting, processing and marketing NTFPs. Women in particular are to a considerable extent dependent on NTFPs for self-support and income (Box 24). For many women, this is the only way to earn an independent income. In Central Africa, most of the traders are women. NTFPs may also have a social function for women. In Pakistan, the dwarf palm “mazri” (*Nannorrhops ritchiana*) is harvested by groups of women. This is their only opportunity for social contact outside the family (C. de Pater, personal communication).

The way NTFPs are used also differs between men and women. Women, for example, can generally state more uses for each species of tree than men, specifically medicinal uses and types of firewood. Men are much more concerned with agricultural uses. Given the extensive knowledge women have of the use, management and processing of NTFPs, they should be closely involved in the production, diversification and development of economically important products. This can increase the success of NTFP extraction systems (Kainer & Duryea, 1992).

Box 24. The role of women in collecting, processing and marketing NTFPs

A study in West Bengal, India shows that:

- three times more women than men are involved in collecting NTFPs;
- NTFP consumption is the same among women and men;
- NTFP processing is a task carried out by women;
- twice as many women as men are involved in marketing NTFPs;
- 71 species are harvested by women, 23 by men and 10 by both;
- women are responsible for 75% of marketing of mushrooms, fruit, flowers and liquor; and
- men are largely responsible for marketing sal leaves, kendu leaves (bidis) and mats (ref. in Ford Foundation, 1998).

Ownership rights and rights to use NTFPs may also be determined by gender. In Cameroon it is traditionally only men who have ownership rights to land, because they cultivate it. Most agricultural fields owned by women have therefore been given to them by men. Decisions within the community on the use of land and NTFPs are taken by men (Vabi, 1996). Increasing the value of the NTFP and improved technology generally attracts men, which may disadvantage women.

Income from NTFPs may be important for children. Fruit, rodents, insects and birds are also an important source of food for children and poor households, as a supplement to a one-sided diet. This means that children often know a great deal about NTFP use and occurrence.

5.5 Diversity of local institutions

Participation by the “local community” in forest conservation and management is essential. However, there is as yet insufficient understanding of the socio-cultural composition of “the community”, which is not homogeneous but consists of various different groups and “institutions” with differing interests and involvement in NTFPs. The influence of “outsiders” is also often underestimated. The arrival of migrants usually leads to a reduction in the diversity of local institutions. The number of different institutions and thus the potential number of conflicting interests within a community is determined by the quality of the forest and the distance from village to market. Local institutions may include village councils, traditional communities, women’s groups, groups of young people, elites, village development committees etc. (Box 25).

It is important to appreciate the diversity of local institutions which may be present. “Development activities” often focus on only a restricted portion of the community, specifically chiefs, district councils and elites. This means that the interests of women, children and the poorer section of the community are often neglected.

5.6 Diversity of local situations

Traditional or cultural beliefs may lead to a preference for particular products or, in contrast, to a taboo on other products. Commercialisation of NTFPs must take cultural preferences into account. The growth in trade in NTFPs may also alter traditional relationships and rights. Increasing pressure on NTFPs often restricts traditional rights of use or may even entirely eliminate them. In the past, trade was based on personal relationships with reciprocal obligations; it is now increasingly based on short-term competitive relationships (De Beer & McDermott, 1996).

Domestication may result in changes within a community. Marketing wild fruit from the miombo woodlands of central and southern Africa is a task for women and children. Women are also

responsible for selling exotic fruit from plantations, but they are not the ones who manage the income this produces. They do manage the income from the sale of wild fruit (Packham, 1993).

Box 25. Various interest groups within communities in the Korup Forest of Cameroon

Various communities

- Remote communities: surrounded by intact forest but with restricted access to the market. Isolated communities are therefore socially fairly homogeneous.
- “Creek settlements”: most of these are surrounded by intact forest, but with better access to the market in Cameroon and Nigeria. They have therefore developed a variety of forest, mangrove and agriculture-related methods of survival, and are consequently a more diverse community.
- “Roadside settlements”: good access to the market in the South-West Province and elsewhere; greater population pressure means more degraded forest. These communities are the most diverse, including migrants from remote communities, the North-West Province and Eastern Nigeria.

Various local institutions

- Village councils: mainly older men who have traditional rights to agricultural and forest products within the boundaries of the community. The Government Chief is chosen by the village council and plays an important role in local forest management along with the members of the village council.
- Traditional communities: men and women responsible for cultural and ritual matters. These play an important role in imposing punishments for contravention of NTFP use. Their political influence is declining, particularly in “roadside settlements”.
- Elites: most prominent representatives of the rural communities at regional level. These are successful, influential and prosperous people (civil servants, businessmen, politicians etc.). The elites are usually the senior figures in the traditional communities. They play an intermediate role between interest groups at regional and national level (government bodies, NGOs and logging concessions).
- Young people: men and women aged between 10 and 30. These form a relatively new local institution, one which has developed as a result of declining confidence among young people in traditional leaders. Young people accuse the elites and community leaders of selling land to outsiders such as logging companies, with their own profits taking precedence over community interests.
- Village development committees: these have been set up by the Ministry of Agriculture to co-ordinate development activities (school building, water supply). They are chosen by the village as a whole and are therefore less “elitist” than the village councils. The poorer section of the community is under-represented, however (Malleon, 1998).

5.7 Attitudes to forests and NTFPs

An understanding of local attitudes to the forest and to NTFP use is important when starting NTFP activities. Indians and migrants differ, for example, in the way they see the forest. In general, NTFP use by the native Batak has been shown to be more sustainable than that by immigrants, in particular as a result of differences in attitudes to forest and knowledge of it. There is also a difference between the poorer and wealthier sections of the community in their needs and preferences with respect to NTFPs (see 4.5).

There are also differences in attitudes to forests at national level. A country may, for example, see its forests as potential agricultural land, as a timber production system, or as a source of necessary biodiversity. These differing forest management systems mean that forests and NTFPs occupy different positions within the national economy.

6. POLITICAL AND INSTITUTIONAL EXPERIENCE OF NTFP USE AND MANAGEMENT

NTFP use and management is only one of many types of land use. The use made of forest products and the way this is done is highly dependent on policy and legislation on forests and land use. Much of the experience gained with the use of NTFPs in this context is therefore identical to other land use at communal level or comparable with it. There are also specific aspects, however.

6.1 Political-Institutional aspects

1. Governmental institutions are often insufficiently aware of the importance of NTFPs in forest management. Reinforcing the governmental institution responsible for forest management is also essential to improve the way in which it monitors compliance with legislation and regulations. Given the multi-disciplinary nature of the use and management of NTFPs, it is important that the various responsibilities are clearly defined.
2. Clearly-defined policy and legislation on NTFPs collectors' land rights and rights of use are the essential first step in developing NTFPs as a means of maintaining forests. Extractive reserves (see page 25) are a good example. It is also necessary for there to be policy and motivation for forest conservation. The role of traditional community rights and the integration of these rights into forest legislation is of major importance. Steps also need to be taken to ensure that NTFP enterprises continue to operate on a small scale.
3. NGOs and forest conservation projects can play a crucial role in creating the necessary legal and institutional framework for community-based forest management systems and the production of NTFPs. More lobbies of this kind are necessary.
4. There are insufficient property rights to native knowledge, on the basis of which a potential medicine may, for example, be "discovered". Mechanisms therefore need to be developed to distribute the benefits resulting from bio-prospecting equably and to ensure that they accrue to native communities.

6.2 The weakness of governmental institutions

One general problem in forest conservation is the restricted capacity of the government body responsible for monitoring compliance with legislation on forest conservation and NTFP use. In Malawi, Tanzania and Zambia, for example, the law says that charcoal can only be produced for sale if a permit has been issued by the forestry department. Little is done to enforce this legislation, however, so that illegal felling of trees for charcoal production is widespread. Increasing the capacity of the Forest Service (or other government bodies responsible for forest management) is essential. The emphasis here should be on the facilitatory role of the Forest Service, instead of giving it a repressive role.

Given the multi-disciplinary nature of NTFP management and use, numerous bodies (including government bodies) are involved. To increase their effectiveness, the institutions need to clearly define their sphere of activity and to consult regularly.

6.3 National policy on land and user rights to NTFPs

The importance of NTFP in forest management is often insufficiently understood. As a result, few countries devote specific attention to NTFPs within their forestry policy. Because NTFPs do not have a place in forestry legislation, legislation and regulations on the harvesting and marketing of NTFPs, and the international trade in them remain unclear. In order to allow sustainable development of NTFPs in a regional context, it is necessary that the legislation applicable in various

adjacent regions and countries should be co-ordinated. Such a policy should incorporate guidelines for the sustainable harvesting of NTFPs and for monitoring (Clark & Tchamou 1998).

Many NTFPs can be accessed and harvested by all (“open-access resources”). Without rights to ownership and use, users are not encouraged to manage natural resources in a sustainable manner. Policy aimed at government control of forest use and management often undermines the authority and effectiveness of local institutions at community level aimed at forest management. If policy does exist which permits local user groups to collect NTFPs, this is often only for use at self-support level. The right to collect NTFPs for commercial purposes is granted only to concession holders (including foreign organisations). If local collectors were to enjoy this economic benefit, they would be more highly motivated to manage communal forests for long-term purposes.

In Papua New Guinea, local communities have rights of use to more than 90% of the forest. In many cases, this decentralised forest management is sustainable. In some cases, however, it has led to serious degradation of the forest in situations where no sustainable management systems were applied, or where timber rights were sold to external commercial logging companies. Ensuring communal management is therefore not the only precondition for sustainable forest management. Policy aimed at forest conservation and at the value of NTFPs for local communities is also required.

Many NTFP enterprises are small-scale ones and are likely to remain so. They are involved in an unequal struggle with large-scale export-oriented enterprises which are often granted privileges by national governments. A lobby is needed to promote greater support for small-scale NTFP enterprises.

6.4 Creating institutions to implement decentralised management

Reinforcing or developing local institutions to manage NTFPs may be the initial impetus for policy and legislation on decentralised management. Many of the decentralised local “institutions” described below were set up to manage natural resources in general. They can, however, benefit the management and use of NTFPs.

Community Forests in Nepal

User groups (“Community Forest User Groups”, CFUGs) in Nepal have drawn up management plans for “Community Forests”. These are approved by the forestry service. This gives the CFUGs rights to the way forest products are used and legal control over them. However, NTFP collectors do not have a major influence on decision-making within the CFUG.

Joint Forest Management schemes in India

Since the 70s, India has had a “Joint Forest Management (JFM) Programme”. The government forestry service currently has contractual agreements with local user groups in six states: so-called Forest Protection Committees. These contracts give local villagers rights to use various NTFPs (fallen branches, leaves, mushrooms and grasses) and they receive 25% of the proceeds of harvesting timber in return for protecting degraded forest. It is estimated that in 1996 between 12,000 and 15,000 villages in eastern India were managing between 1 and 2 million hectares of regenerated forest (Ford Foundation, 1998). JFM is only applied, however, to degraded forest, meaning that natural non-degraded forest, which may be more important to the local population where NTFPs are concerned, receives insufficient attention.

Ancestral Domains in the Philippines

In the early 90s, “Certificates of Ancestral Land Claims” (CALCs) were issued in the Philippines. These involved small areas of village or agricultural land for each community (100 hectares). Since 1993, new legislation has provided for the issuing of “Certificates of Ancestral Domain Claims” (CADCs). This involves recognition of complete native territories, including forests (10,000-20,000 hectares). The land remains the property of the state, but via the CADC the local population has access to, and responsibility for, protecting “their” NTFPs, on the basis of a management plan drawn up by the native communities (De Beer & McDermott, 1996). Concrete preparations were made in late 1997 for “Certificates of Ancestral Domains Titles” (CADT), which give native communities property rights to their territory.

Extractive Reserves in Brazil

In an attempt to resolve conflicts between landowners and farmers on the one hand and Indians and NTFP collectors on the other, the Brazilian government has defined 14 extraction reserves in the Amazon area. This involves leasing the land to NTFP collectors for a minimum period of 30 years. The land thus remains the property of the state. This long-term right of use encourages local collectors to protect the forest and to manage it in a sustainable manner. Other countries in the region are considering the possibility of applying this system within their own national context (Ruiz Pérez et al., 1993).

Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe

The CAMPFIRE programme forms part of the legal mechanism provided for by the Parks and Wildlife Act (1975), which assigns authority to rural village councils. CAMPFIRE ensures that the proceeds from selling game (hunting concessions, safaris, trophies, eco-tourism) accrue to village councils and local communities. This gives the councils a reason to promote sustainable game management (Box 26). Much depends, of course, on the ability of the authority responsible to monitor matters. CAMPFIRE has provided a useful example for other countries with savannah, and a number of comparable management systems involving the distribution of proceeds have since been developed¹.

Box 26. CAMPFIRE: Experience and lessons

The principles of CAMPFIRE are:

1. Reinforce local communities by giving them access to, control over, and responsibility for game management.
2. Local communities must have the right to take decisions on game.
3. Local communities must enjoy the benefits of the exploitation of natural resources.

CAMPFIRE operates in 22 districts of Zimbabwe where it has formed partnerships with district councils and village communities. The programme has been successful in:

- causing the local population to reconsider their attitude to game;
- reducing illegal hunting;
- improving environmental management; and
- increasing household income and ensuring the availability of food during periods of drought.

The main obstacle in the programme is the fact that the village councils are not prepared to give up their responsibility and power (and thus income) to local communities. The lessons which can be drawn from CAMPFIRE are the following:

- the management unit implementing the programme must also be the unit within which the benefits and proceeds are distributed equally;
- there must be an authority which is in a position to monitor whether responsibilities are in fact being met (IIED, 1994).

Administrative Management Design (ADMAD) for Game Management Areas (GMA), Zambia

ADMAD aims to ensure that the proceeds and benefits of game management in buffer zones of nature reserves accrue to local communities. More than 90% of the proceeds come from safaris, hunting and rights to hunting and concessions. The proceeds are deposited in a Wildlife Conservation Revolving Fund. One obstacle within the programme is that local organisations do not have legal authority. There are also conflicts between the district councils and village communities, and improvements are necessary in the participatory techniques and mechanisms necessary to distribute the proceeds.

Collaborative management in Ghana

In 1993, the Ghanaian forestry department began working directly and collaboratively with local communities to manage forests, with the idea that all sections of the population should be able to profit from natural forests. The policy and legislation is already far advanced as regards increasing the value of forest for farmers, landowners and rural communities, and introducing new management strategies for timber and NTFPs. A Collaborative Forest Department Unit has been set up within the department with the task of encouraging partnerships with the local population. Recognising the importance of forests for local communities has proved to be an important step in

¹ When this report was published, the future of CAMPFIRE was unclear (ed.).

reducing conflicts between the Forestry Department and the local population (Matose & Wily, 1996).

In general, NGOs and forestry conservation projects have played a crucial role in setting up the above-mentioned community-based forest management systems and policy. They have mobilised local institutional capacity and have lobbied at national policy-making level. One example of this is NATRIPAL (the United Tribes of Palawan), a consortium of 20 native village organisations in Palawan. They – and the NGOs which support them – have constituted a powerful national lobby, enabling them to make a major contribution to introducing “Certificates of Ancestral Domain Claims” (De Beer & McDermott, 1996).

6.5 Bio-prospecting

The enormous biodiversity within tropical forests has created an industry which concerns itself with searching for commercially and scientifically relevant products, such as bio-chemical material for the pharmaceuticals industry. This is known as bio-prospecting. One important component of the Convention on Biological Diversity (CBD) is to emphasise – in an international context – the importance of ensuring that native communities also benefit from the use made of biodiversity (see 1.2). However, clear mechanisms for achieving this are not available.

Much native knowledge is being lost because of socio-cultural and economic changes. That knowledge is also used by universities and companies, however, to help them find NTFPs which are of medical or scientific relevance. Intellectual Property Rights (IPR) do not provide a sufficient framework for protecting native knowledge. There is no legal obligation to pass on even a part of the proceeds of this knowledge to the local community. Many shocking examples can be cited (Box 27).

Box 27. Commercialisation of NTFPs at the cost of native knowledge

Thaumatine is a natural sweetener extracted from the berries of the Kareme bush (*Thaumatococcus danielli*), which is found in the forests of Central and West Africa. This protein is some 2000 times sweeter than sucrose, but it is much lower in calories. It has been used for centuries as a sweetener and aromatic. The British preserves company Tate & Lyle recently began marketing the product under the name Talin. The berries come from the company's own plantations in Ghana, the Ivory Coast, Liberia and Malaysia. Because of the high extraction and transport costs involved, experiments are currently taking place, using DNA techniques, to isolate the gene responsible for the production of thaumatine. Beatrice Food has been granted a US patent for cloning the gene in yeast. Researchers from the Lucky Biotech Corporation and the University of California have received a US patent for all trans-genetic fruits, seeds and vegetables containing the gene for thaumatine. In the US alone, the market for low-calorie sweeteners amounts to some USD 900 million a year. None of the proceeds are finding their way back to the countries where the Kareme plantations are situated (IUCN, 1997).

In 1986, a patent (a temporary monopoly on the exploitation of a “discovery”) for the medicinal plant ayahuasca (*Banisteriopsis caapi*) was awarded to Loren Miller, the owner of the American pharmaceutical company International Plant Medicine Corporation. Miller had been given the plant by a Secoya Indian in Ecuador when he visited the Indian's village. It was not until 10 years later that the Indians in Ecuador became aware of the patent. Ayahuasca plays an important role in religious ceremonies and rituals among the Secoya. Shamans extract an hallucinogenic drink from the plant which they believe gives them access to the spirit world. Wasting the ayahuasca drink is taboo. Miller wishes to use the plant as a disinfectant, as medication for Parkinson's disease and as an ornamental plant. The Amazon Indians will not receive any of the profits from sales of the new medication. Indeed, the American government is pressing the Congress in Ecuador to sign an agreement whereby native peoples in all five countries of the Andes would be required to pay for a licence to use ayahuasca (NCIV, 1997).

A number of examples can be found of bio-prospecting on a more equitable basis: in tropical forests and coral reefs (Box 28). The large quantities of biological material which are investigated do lead to potentially effective substances being discovered, but the percentage which are actually commercialised for medical purposes is small. The chance that the major investment made in bio-prospecting actually benefits the native population and aids in ensuring bio-diversity is therefore small.

Box 28. Bio-prospecting on a more equitable basis

Costa Rica's National Biodiversity Institute (INBio) has signed a 2-year agreement with the pharmaceutical company Merck & Co. INBio is a non-profit organisation aimed at maintaining biodiversity by ensuring that sustainable use is made of it by national and international companies. Merck will pay INBio USD 1m over two years in return for an unspecified quantity of plant and insect material and micro-organisms. INBio will also receive a percentage of the net proceeds from the sale of marketable products derived from this material. Merck will also pay USD 183,000 for material necessary for processing facilities in Costa Rica. Merck is giving INBio a protocol for researching the extracts. The agreement therefore covers not just financial benefits (although these are extremely small) but also knowledge transfer in the form of training and technology.

Of the USD 1 million provided, 10% will be devoted to Costa Rica's national parks. Forty percent will go to provide support for the survey programme. Of this 40%, a quarter will be spent on INBio's parataxonomists, local inhabitants of protected areas who have been trained in collecting biological material for the survey programme. The agreement will only yield these benefits, however, if new medication is discovered and marketed (De Silva & Atal, 1995).

In May 1997, the University of the South Pacific (USP) signed a bio-prospecting agreement with the Strathclyde Institute of Drug Research (SIDR) in Glasgow, Scotland. Instead of selling coral reef specimens, the extracts from them are evaluated by SIDR. After one year, SIDR can either patent the samples or return them. USP has an agreement with a "district" (Verata) consisting of seven villages which supply the samples. So far, 100 samples have been supplied, with the expected proceeds coming to USD 20,000. The Verata Development Council will decide how this money should be used. Methods are under development to screen extracts for their potential effectiveness in treating cancer and malaria. In addition, a biodiversity monitoring system has been set up to compare harvested and non-harvested areas. Fiji is a relatively small country and project participants have close links with the persons in authority who are responsible. The project has therefore played a role as a catalyst in policy-making with respect to bio-prospecting and the equitable distribution of the proceeds. Until recently, the Fisheries Department permitted unlimited research and harvesting, without realising how valuable these were. A consultation process has now been defined by the Department and the USP to evaluate proposed harvesting of marine resources (BCN annual report 1997).

7. POTENTIAL AND RESTRICTIONS WITH RESPECT TO NTFP DEVELOPMENT

NTFPs are used and managed in a great variety of ways. The potential for sustainable forest management within the framework of anti-poverty programmes is therefore highly specific to the particular location and circumstances. However, it is possible to indicate a number of general factors, which then need to be specified according to the situation.

7.1 Restrictions on NTFP use and management

Without going into the specifics of particular species and situations, NTFP development involves a number of restrictions on forest management:

1- Low NTFP density

NTFPs in natural forests often occur far apart and at low density. There is generally little point in marketing NTFPs from forests with a high level of species diversity. This does not apply to NTFPs which naturally have a high level of both quantitative and qualitative production, in other words which produce a great deal per biomass. NTFPs may well have a major self-support function and cultural or religious value.

2- Sustainable extraction systems

Harvesting almost any NTFP has a certain influence on the forest. Ecologically sustainable extraction is always necessary. Developing such a system requires time and effort.

3- Poverty status of NTFPs

NTFPs often have a "poverty image" (with certain exceptions, see section 4.5 and Box 16). This means that when developing NTFPs for "conservation and development" (C&D) the value of the NTFPs must always be considered.

4- Domestication

The best management method for marketing NTFPs which allow a large percentage of biomass to be harvested is generally domestication. Domestication can reduce the pressure on the NTFP and forest concerned. However, removing the NTFP activity from the forest means that there is no increase in the value of the natural forest. The question therefore arises as to whether domestication ultimately leads to forest conservation or not.

5- Shift in power and tasks

Increasing the value of NTFPs (technological improvements, processing) may simply reinforce (unintentionally) the positions of elites and of men more than those of women, children, or the poorer section of the community. Efforts need to be made to guard against this.

6- "Commons"

NTFPs are often accessible to all. Without ensuring property rights and rights of use on the part of NTFP collectors, developing the market for particular NTFPs will not result in forest conservation.

7- Fickle export market

The export market for NTFPs is fickle and unpredictable. Solid market research and improvements in business competence are necessary. The focus in the first instance should be on the local and regional market. From the C&D point of view, the greatest potential on the international market is in the area of the green/eco market and "fair trade".

7.2 Possibilities of NTFP use and management as part of “conservation and development”

NTFP use and management for C&D is most successful if it forms part of a wider land use system: small-scale sustainable agriculture, “forest gardens”, “timber and non-timber” extraction areas, and protected areas which can supply a few products and services (spiritual services, eco-tourism, river area protection, gene bank for NTFPs, etc.). NTFPs must be the focus of explicit attention both within and beyond these. If the restrictions mentioned in section 7.1 are kept sight of, NTFP development can best be supported in the following areas.

1- Buffer zones for protected areas and nature reserves

Setting up a protected area or a nature reserve reduces opportunities for the local population to make use of the forest. This may lead to major conflicts between the park and the local people. Setting up buffer zones within which specific user groups are permitted to make controlled use of a number of NTFPs can reduce these conflicts (Box 29).

Box 29. NTFPs and conflict reduction

The Bwindi Impenetrable National Park and the Mgahinga Gorilla National Park were created in 1991. These two parks represent the Afromontane forests of Uganda, Rwanda and Zaire. Creating the parks led to conflicts because the local population (200-400 people per km²) needed the forests to support themselves. Ultimately, no woodland was able to survive outside the borders of the parks, increasing the pressure on the park itself. Uganda National Parks (UNP) therefore decided to permit the exploitation of a number of NTFPs within the borders of the parks. This got the local population involved in park management because management was carried out jointly by the authorities and local people.

The methods used are PRA, Logical Framework Analysis and Rapid Vulnerability Assessment. The results were used to determine the permitted user group, harvest maxima and the harvest time for each particular NTFP. In order to do this, Memoranda of Understanding (MoUs) were drawn up between the UNP and the individual districts. In the case of NTFP user groups with only a low impact (bees, medicinal plants, restricted use of leaves, bamboo), controlled harvesting was permitted in multiple-use zones within the park. For NTFPs with a high impact (material for small-scale construction, firewood), alternatives were offered outside the park. The MoUs also provided for monitoring and for adaptations. In the course of the process, the relations between park personnel and the surrounding communities have improved and forest degradation has been reduced.

The success of the system is determined by there being a relationship based on mutual trust between the user groups and the community as a whole, effective leadership by the community in collaborative management, and the use of specific local (native) knowledge. It is also necessary for Uganda National Parks and the Uganda Wildlife Authority to have the ability to work with the local communities and to ensure that the MoUs and park regulations are observed (Cunningham, 1996, Wild & Mutebi, 1996).

2- Flood plains

The vegetation in flood plains in tropical forests is often dominated by a number of economically important species, for example palms in the *varzea*, the flood plain of the Amazon. Sustainable exploitation of these species of palm can contribute to C&D.

3- Mountainous areas

The people of mountainous areas are often poor. The forests there are under great pressure from advancing agricultural land. Developing small-scale NTFP extraction may offer a means of combating this process of marginalisation.

4- Forest margins

In the marginal areas adjoining forests, NTFPs can be marketed alongside agricultural products as a source of additional income. The existing infrastructure makes marketing possible. The extra income generated can prevent the expansion of agricultural land.

5- Sustainable management of logging concessions

Commercial production of NTFPs can also be integrated into the management of logging concessions. It is worth investigating how such integrated management could be organised and how the proceeds could be passed on to NTFP collectors.

6- Degraded Forest

At present, degraded forest – at least in Asia, for example – is often used for the production of wood pulp. One interesting option might be to create a communal forest “enriched” with rattan, fruit trees, nut trees, and other species (Valkenburg, 1997).

8. CONCLUSIONS

On the basis of the above, and with the lessons, restrictions and possibilities in mind, we will now indicate a framework for integrating NTFP exploitation and management into forest conservation projects. These are merely general guidelines; the specific potential for NTFP exploitation is naturally dependent on the particular location. What is given below is simply an overall framework which needs to be filled in on the basis of the specific circumstances and experience. It is definitely not to be seen as set in stone; projects and programmes must be as process-driven and flexible as possible. Before each step, it is necessary to consider what local knowledge is available with regard to the particular point concerned.

1. Choose the area

- forest areas with a relatively low NTFP density, where NTFPs can resolve conflicts etc. (see 7.2);
- where a large number of user groups are dependent on NTFPs to a great extent;
- define and delineate the area.

2. Survey the situation

- define interest groups (including external ones), their interests and the extent of their dependence on NTFPs (by means of PRA, Logical Framework, etc.);
- ensure participation by all interest groups, under existing leadership or new leadership;
- native knowledge, short estimate of sensitivity (for example RVA, see 3.4) so as to provide an understanding of sensitive NTFPs and pressure on the forest.

3. Sustainable management system

- specific management and exploitation system set up on the basis of surveys, RVA etc., for each NTFP and user group;
- monitor and evaluate management (internal and external).

4. Improve competence

- reinforce the way various user groups are organised;
- if necessary, increase relationship of trust between user group/groups and the community as a whole;
- if necessary, reinforce internal leadership;
- reinforce the monitoring and enforcement task of the authority responsible;
- provide training in business and administrative skills within the NTFP enterprise and/or the administrative organisation.

5. Marketing

- solid market research, spread of risks, NTFP diversification;
- NTFPs need to benefit villagers as soon as possible;
- reinforce the infrastructure (transport, storage, processing, marketing);
- monitoring (including the effect on any shift in power), both internally and externally.

6. Exchange of experience and information

- ensure as much exchange as possible of experience with respect to NTFP management and information on ecology, marketing, etc. This needs to be done throughout the whole process at local, regional, national and international level.

7. Influence national and international policy and attitudes (parallel to other components)

- learn from countries which have changed over to community forestry or another type of decentralised management (which factors played a role here?);
- focus lobby on the importance of land, exploitation and property rights for local user groups and NTFPs within sustainable forest management;
- create a relationship – at the earliest opportunity – with important government personnel so as to ensure spin-off from project activities at policy-making level;
- reinforce honest and equitable distribution of the benefits of NTFP use among forest dwellers and NTFP collectors.

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Annex 1. Literature for further reading (per region)

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People and Plants Initiative

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an organ of IUCN and WWF which coordinates an international network to monitor trade in game and to implement CITES

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BCN (Biodiversity Conservation Network)
BCN is managed by the Biodiversity Support Program (BSP), a consortium (financed by USAID) of the WWF, The Nature Conservancy and World Resources Institute (WRI)
aim: to provide support for activities in the field of the conservation of biodiversity through small-scale enterprises. The network focuses on improving marketing.
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COMFORTS (Centre of Minor Forest Products)
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<http://www.angelfire.com/ma/MinorForestProducts>

FTPP Asia (Forest, Trees and People Programme - Asia)
network of 17 institutions in 10 Asian countries to develop and improve training and education in community forestry (partly financed by RECOFTC)
Address: see RECOFTC

ICIMOD (International Centre for Integrated Mountain Development)
Mountain Enterprise and Infrastructure Division
GPO Box 3226, Kathmandu, Nepal
Tel: 977-1-525.314
Fax: 977-1-524.509 / 524.317
Email: mei@icimod.org.np

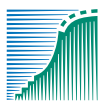
ICRAF SE Asian Regional Programme
research on agroforestry and domestication, including of NTFPs
Jl. Cifor, Situgede, Sindangbarang
P.O. Box 161, Bogor 16001, Indonesia
Tel: 62-251-625.415
Fax: 62-251-6225.416
Email: icraf-indonesia@cgiar.org
Http://www.cgiar.org/icraf/regional/region_5/region_5.htm

INBAR (International Network for Bamboo and Rattan)
promotes the interchange of experience, technical assistance and dissemination of information on bamboo and rattan
Branch Box 155, P.O. Box 9799, Beijing 100101, China
Fax: 86-10-6495.6983, Email: inbar@rif.forestry.ac.cn
<http://www.idrc.org.sg/inbar>

IUCN Regional Office S & SE Asia
IUCN runs a number of NTFP projects in the region
Andrew Ingles
P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand
Tel: 66-2-524.6248 / 5394, Fax: 66-2-524.5392, Email: ingles@ait.ac.th

PROSEA (Plant Resources of Southeast Asia)
produces a large number of publications on useful plants in South-East Asia, including many NTFPs
Johan van Valkenburg
P.O. Box 341, 6700 AH Wageningen, The Netherlands
Tel: +31-317-48.2879/3160, Fax: +31-317-48.4917, Email: johan.van.valkenburg@prosea.pt.wau

RECOFTC (Regional Community Forestry Training Center)
aim: training in community forestry (incl. marketing NTFPs), research, technical assistance, interchange of information, workshops, seminars
Kasetsart University
Michael Victor
P.O. Box 1111, Bangkok 10903, Thailand
Tel: 662-940.5700, Fax: 662-561.4880, Email: ftcss@nontri.ku.ac.th



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Wageningen, June 2000



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