CHAPTER 7

PROMOTING WISE MANAGEMENT OF FORESTS

CHAPTER OUTLINE

7.1 SUSTAINABLE FORESTRY: AN INTRODUCTION

In Chapter 6 we saw how natural forest management can have important consequences for nature conservation: if it is done badly, then it can be very damaging, but if it is done well, then it can be fairly benign. In this chapter, we want to consider how to make sure that management of the natural forest estate is carried out in as "wise" a way as possible, so that it fits in with the overall aim of sustainable development. In doing so, we will need to bear in mind the ten principles that should be common to all forms of environmental management (Box 7.1).

By using the word "wise", we are implying that we are using the forest resources sustainably. **Sustainable use** is defined by IUCN/UNEP/WWF (1991) as ***using renewable resources at rates within their capacity for renewal.*** For forestry, this implies that we must pursue **integrated forest management**, defined in the above document as ***management which maintains indefinitely, without unacceptable impairment, the productive and renewal capacities as well as the species and ecological diversity of forest ecosystems.*** Wyatt-Smith (1987) put it this way: *"Sustainable forestry means to harvest forest in such a way that provides a regular yield of forest produce without destroying or radically altering the composition and structure of the forest as a whole."* Sustainable forestry, according to Vanclay (unpubl.) is *"rather like a major civil engineering undertaking: we need land use plans, community consultation, the timely involvement of many individuals from many different disciplines, quality control in all operations, and efficient accounting and revenue collection."*

The need to address these issues is now urgent almost wherever the world's natural forests are being managed. This is made very clear in the conclusions to a recent survey conducted for the International Tropical Timber Organisation (Poore, 1989) (Box 7.2).

7.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

7.2.1 What is EIA?

EIA is the process of systematically acquiring and analysing information in order to assess the impact a specific development will have on the environment. The rationale is that such an assessment will enable one to better judge whether the development should go ahead, and if so, whether any modifications need to be made to the original plan to minimise environmental damage and maximise benefits. Although it is normally used when major projects such as dam-building or other civil engineering works are being considered, the techniques employed are equally useful for assessing smaller or more diffuse activities, such as forestry operations.

Box 7.1
The ten principles of environmental management (Rhodes, 1994)

- **The duty of care**. All consequences of an action should be examined carefully, before undertaking the action.
- **The precautionary principle**. Due to the large amount of uncertainty, risk and irreversibility involved in environmental processes and relationships, actions should err on the safe side.
- **Empowerment**. Decisions and actions should, where possible, be from the ground level upwards: the users should have the power to decide how to use their environment.
- **Subsidiarity**. The scale of management used should be appropriate to the problem and at the lowest effective level.
- **Social learning**. All members of a community should have an equal chance to participate and managers should listen to and respect their views.
- **Sustainability**. Any actions should be able to maintain, indefinitely, the environmental systems and processes.
- **Areal equity**. Each area should be treated with respect to the endowments it possesses and not over-utilised.
- **Intergenerational equity**. The environment passed on to future generations should be of the same quality or better than it is today.
- **Procedural equity**. All actions undertaken should be transparent and accountable.
- **The polluter pays principle**. Any pollution events are the full responsibility of the polluter to clean up.

Box 7.2
The main findings of a recent international survey of the state of natural forest management (Poore, 1989)

- The amount of tropical moist forest worldwide being managed for the sustainable production of timber is negligible (< 1 million ha), compared with the area nominally being managed for timber (828 million ha).
- Many countries have the intention, expressed in their legislation, to manage forests sustainably. In a number of countries, partial forms of sustainable management are being practised either deliberately or by default.
- There seems to be some awareness in most of the producer countries, particularly among their foresters, that action is needed.
- Nevertheless, progress in establishing stable sustainable systems is so slow that the general decline in quality and quantity of forests continues.
- Comprehensive and urgent measures are necessary if the tropical timber trade is to continue in the long term to handle material which even approaches the quantity and quality to which it has become accustomed.
- The future existence of large areas of tropical forest, perhaps even the majority, depends on the establishment of sustainable systems of management, many of which must have timber production as their basis.

Carrying out an EIA of natural forest management, for instance, clarifies which operations are likely to have greatest impact, and enables us to think more clearly about how adverse impacts can be minimised. These ideas can then be fed into the management planning and monitoring process.

7.2.2 How is an EIA carried out?

The unique nature of each project means that it is not possible to prepare definitive guidelines for EIA procedures. However, most systems operating throughout the world contain a number of common stages, which together add up to a reasoned and agreed body of knowledge. Typically the following stages are included:

- **Project description.** At the outset a clear description of the project and its location may suffice; intricate detail is unnecessary.
- **Scoping and baseline studies.** *Scoping* is the term used to describe the focusing of the assessment process into areas of importance. Three blocks of information are needed to focus an assessment programme accurately:

  - Full project description, including construction and operational procedures.
  - Definition of the receiving environment. An understanding of the environment as a continuum is vital in targeting areas of study and prediction of impacts.
  - Definition of the human populations affected by the project. This not only includes people on or close to the development site but also transitory populations, such as tourists.

  The first two categories define the scope of an EIA programme. Correlation of one category against the other will focus research efforts and avoid unnecessary coverage. A commonly used method for achieving this is the **matrix.** In its simplest form this consists of plotting project attributes on one axis (a), against the environmental components on the other (b). This minimises the risks of environmental impacts being overlooked and, equally importantly, demonstrates the logic behind their identification. An example of a matrix is given in Table 7.1.

  Introducing the third (social) dimension to the scoping process can be done by ranking the areas of concern identified by the biophysical matrix according to the impact they will have on the local community.

- **Detailed studies, analysis and impact prediction.** Once the matrix has been generated by the scoping procedure the impact on the environment of every element involved in all stages of the project is assessed. This is done by describing the impact a specific element will have on each of the components of the receiving environment. Time spent establishing the agreed scope of a programme should save effort and expenditure at the detailed investigation stage. The significance of this impact will be the extent to which it affects humans and the environment. However, it is impossible to forecast the significance of changes with precision as by nature predictions involve uncertainty.

- **Development of mitigation measures.** There are no hard and fast guidelines for the drafting of mitigation measures. At this stage attention is focused on development processes and any which indicate a negative impact should be altered or excluded.

- **Production of non-technical summary, including decision to permit or refuse development.** This should contain the findings of the assessment, including details of whether the proposed development should go ahead or not, and if so in what form.

- **Monitoring programme.** The impact of the development, if it goes ahead, should be constantly monitored so that any deviation from predicted impacts can be detected at an early stage and management practices developed to accommodate such changes. This will also help improve forecasting accuracy in the future.

Table 7.1.
An example of an Environmental Impact Assessment matrix for assessing impact of logging activities. Based on Zimmermann (1982)

	Logging	Forest clearing with fire	Forest roads, skid trails & yarding areas	Log hauling by road	Logging camps	Sawmilling & other transform-ations	Demograph-ic and economic expansion
Land forms and soils							
Water resources							
Climate and air quality							
Vegetation							
Wildlife and fisheries							
Traditional cultures /subsistence							
Cash economy & demography							
Epidemiology							
Conservation & amenity areas							
Other							

7.2.3 EIA and natural forest management

Let us imagine that there is a proposal to open up an undisturbed part of Budongo Forest to logging and pit sawing. It is clear that this will have environmental implications, since we know that Budongo Forest is important for nature conservation. It may also have sociological consequences. We now want to investigate these in more detail. One way to do this would be by visiting areas where pit sawing and logging are currently being carried out, so that the impacts these activities are having there can be identified, along with any mitigating measures that could be taken to reduce any adverse impacts.

The first stage is to design a matrix in which to record all the information on impacts and mitigation measures. Down the left-hand side we list various aspects of the forest or human environment that might possibly be affected, while along the top we list the possible activities associated with the logging (or pit sawing), broken up into logical groups if possible. Note that each of these boxes is a summary only: a memory-jogger. For instance, sub-categories of the "vegetation" category could include forest clearance, loss of species (rare, commercial and others), species diversity, genetic resources, forest regeneration, influx of weeds, persistence of weeds, unknown species, phytopathology, slash and other debris, fire hazard, adjacent uncut forest, exotic species, herbicides and so on.

The matrix is then taken into the field, and a cross put in any box where it is felt that there may be some environmental impact, even if in practice the impact could be avoided. For instance, if one of the possible activities along the top of the matrix were log hauling, then aspects of the forest environment listed down the left-hand side that might be affected by this could be land forms and soils, vegetation and wildlife and fisheries, and so on. After the field visit, the filled-in matrix can be examined, looking particularly at those boxes containing crosses.

Now is the time to use this information to decide (1) whether the whole project is too environmentally damaging to go ahead, or (2) if it is going to go ahead, what mitigating measures can be taken to minimise damage? For instance, the management or development plan could specify minimum standards for road construction, installation of drainage ditches and tunnels, and maximum road widths, if it is felt that these could help reduce damage to environmentally acceptable levels. It is possible that the result of the analysis is that we do not yet have enough information to decide whether the development should be permitted, in which case we could recommend delaying implementation until sufficient information (for instance on presence of rare species) has been gathered.

7.3 WISE MANAGEMENT OF NATURAL FORESTS

Many forests in Uganda have been managed for timber production, and it is likely that some will continue to be managed primarily for this purpose in the future. It is important, therefore, to be aware of the management decisions that can be taken to help minimise adverse impacts. These make good sense not only for the conservation of nature, but also for the long-term sustainability of timber production. It therefore also makes good long-term economic sense.

7.3.1 Minimising impacts on the ground

The Environmental Impact Assessment outlined above points to a number of areas where potentially damaging impacts may arise from normal forestry operations. Many of these impacts can be minimised relatively simply by taking a few precautions. Box 7.3 lists some of the more essential precautions that should be taken.

7.3.2 Logging or pit sawing?

The issue of whether logging or pit sawing is a better form of harvesting in natural forest is complex. There are good arguments for and against each activity, and which method wins probably depends very much on the location of the forest and its surroundings. In theory, pit sawing should have much less environmental impact on the forest than logging, with all its associated roads, skidder tracks and loading bays. However, in practice this is not necessarily the case: well-planned and controlled logging is preferable to unplanned and uncontrolled pit sawing. Some of the points to bear in mind when considering which method would be most appropriate for a given area are given below:

- **Ecological effects:** regeneration, species composition, knock-on effects etc. Pit sawing normally preferable, but if uncontrolled then timber stands can easily be over-exploited.
- **Ease of monitoring**. Logging normally easier, because operations are centralised rather than dispersed.
- **Ease of changing course if necessary**. Pit sawing normally easier, because once a sawmill is established, there are financial reasons for making sure that it keeps running even if to do so exceeds the renewal capacity of the forest.
- **Harvesting efficiency** (proportion of each tree harvested and its value once processed). Logging normally more efficient, harvesting a higher proportion of each target tree and often producing a more valuable product.
- **Financial efficiency** (capital, loans, overheads etc.) Pit sawing requires much less investment, so does not usually face the problems of running into debt that can be faced by logging operations, especially when imported spare parts are costly or unavailable. A study in Rwanda (Rohner, 1978) found that high-quality pit sawing earned the country \$28 per m^3 , whereas mechanical logging lost \$13 per m^3. Furthermore, logging normally requires large forest areas to be financially viable, whereas pit sawing does not.
- **Social acceptability:** employment, wage labour, immigration, haves and have-nots etc. A complex issue. Sawmilling probably creates a smaller but better paid workforce; workers more likely to be from outside the area.

In countries such as Uganda, where forests are normally small, surrounding populations are high, and illegal activities difficult to control, the question of ease of monitoring is crucial to deciding whether pit sawing or logging is preferable. In Budongo Forest, which has sawmills and (illegal) pit sawyers, it has proved very difficult to keep pit sawing under control. Box 7.4 lists some of the reasons for this suggested by participants of the conservation training courses recently held at Nyabyeya Forestry College.

The list suggests that pit sawing has become the main method of timber extraction, whether we like it or not. Possibly the best course of action for the future would be to find a way of controlling pit sawing, rather than seeking to stop it altogether. One recent suggestion is that pit sawyers should be responsible for felling of marked trees and initial processing of logs, which they should then take to the sawmills for further processing. That way, pit sawyers could continue to make a living, while the operation would be easier to control (and tax), and the timber products would be of a better quality and higher value.

Box 7.3
Some of the precautions that can be taken to minimise ecological damage during logging operations in natural forest (Jonsson and Lindgren, 1990)

- Survey of timber trees and saplings and seedlings of commercial species
- Thorough road planning and mapping
- Planning and marking of extraction trails
- Climber cutting
- Marking and mapping of trees to be harvested and recommended felling directions
- Marking of seed trees to be saved and left standing
- Marking of areas with valuable regrowth to be retained
- Marking of areas which must not be logged over for other reasons
- Scouting with representatives of the forest department together with the concessionaire or operators

In addition, loggers should be issued with written instructions, specifying:

- Boundaries of the logging tract
- Species allowed for harvest
- Volume allowed for harvest
- Minimum girth diameter
- Silvicultural considerations, e.g. damage to residual stand
- Silvicultural obligations, e.g. replanting
- Weather conditions when operations should cease due to risks of soil damage and erosion
- Machinery to be used/not to be used
- Maximum allowable open ground area
- Penalties if agreements are violated

Box 7.4
Some possible reasons for the difficulty of controlling illegal pit sawing in Ugandan forests, as suggested by practising Ugandan foresters at recent training courses

- Most people living around the forest are very poor. They look at the forest reserve as a source of employment and survival.
- There is no alternative local source of income which is as quick and easy.
- There are no alternative local sources of affordable building materials and furniture.
- Local people view the forest as God-given, and therefore available for them to use as necessary.
- Local people may view sawmillers as exploiters who came to take away their riches.
- Rich men and politicians are also involved, making control very difficult.
- Forest Department staff often work far away from their homes on very low and irregular salaries and allowances. The temptation to get involved in earning some extra money is high.
- Those who have invested in the timber business will fight to retain their investments rather than abandon them.
- The methods used in tackling illegal pit sawing are rigid and inflexible.
- Some pit sawyers are armed, making it difficult to confiscate tools from them.
- District security staff are also involved in the business, so support from them is hard to come by.
- Hard evidence of involvement is not easy to find, making it easy for accusations to be levelled at innocent people, or for people to deny that others are involved, either for money or favours.
- Few financial resources are available to combat illegal pit sawing, and the forest is very large making it difficult to patrol.
- Much of the transport of timber from the forest to the road and beyond occurs at night.
- The demand for mahogany is high, making illegal trade lucrative. Nearly all mahogany on sale in Uganda comes from Budongo.
- There are no marketable trees left on public land which pit sawyers could cut legitimately.
- Many pit sawyers know no other livelihood than pit sawing.

7.3.3 Monitoring operations and the use of indicators

Whatever precautions are taken to ensure that logging or pit sawing is carried out sustainably, there is always a need for **monitoring**, to determine the success or otherwise of the precautions. Monitoring is made easier if use is made of a set of ***indicators*** which, when taken together, point to the success or otherwise of management. Indicators can be geared to particular levels of management, for instance whether institutional/managerial or operational.

Table 7.2 gives an example of an internationally recognised list of criteria and indicators for sustainable natural forest management. The list is not exhaustive, but gives an idea of the range of indicators that could be used. The idea is that an institution involved in forest management and conservation (such as the Forest Department) could use such a set of indicators to assess its own performance, and to look at ways of improving the situation if found to be deficient in any particular area.

Table 7.3 gives a more simplified set of indicators that could be used at the operational level, in this case, based on the logging situation in Sabah, Malaysia. It is a very simple system: for example, it does not require the manager to have detailed knowledge of rare species. This may be a weakness in some cases, but in most instances a system like this would have more chance of acceptance than one that required detailed monitoring of rare plants and animals, particularly if the really important areas for biodiversity conservation were already excluded from timber concessions anyway.

Many may find that the indicators selected for this particular example would not be suitable in their own situation. If this were the case, then a more appropriate set could be devised: the very act of drawing up a list of indicators is useful. The most valuable thing about the system is that it enables the manager to check that things are going according to plan at every stage. If they are not, it enables the manager to identify clearly where things are going wrong, and to make amends accordingly.

Table 7.2.
Criteria and indicators that could be used to assess the sustainability of natural forest management at the level of the individual forest (ITTO, 1992)

Criterion	Examples of indicators
Resource security	• The legal establishment of forest areas or management units
	• Existence of a management plan
	• Clear demarcation of boundaries in the field
	• The presence or absence of illegal exploitation and encroachment
	• The duration of concession agreements
The continuity of timber production	• The presence of clear, official harvesting rules • Long-term soil productivity
	• A pre-logging stand inventory
	• The number of trees and/or volume of timber per hectare harvested
	• Provision for monitoring the residual growing stock after logging
	• Records of annual product outputs over time
	• Net productive area
	• Records of annual areas cut over time
The conservation of flora and fauna	• Protection of ecosystems in the concession or management unit • The extent of vegetation disturbance after logging
An acceptable level of environmental impact	• Extent of soil disturbance • Extent and spatial distribution of riparian and other watershed protection areas
	• The extent and severity of soil erosion
	Provision for protection of bodies of water
Socio-economic benefits	• The number of people employed • The nature and extent of benefits from forestry activities
Planning and adjustment to experience	• Community consultation • Arrangements for forest management to take into account traditional forest utilisation

Table 7.3.
Some operational criteria for assessing sustainability in logging operations. After Udarbe et al. (1994)

Criterion	Indicator	Specification	Mitigating measures
Ensure natural regeneration capacity of the timber stand is maintained	Size-class of tree harvested	Harvest only trees >60 cm dbh and <120 cm dbh	• Tree marking
	Number of trees retained per hectare	Protected species (e.g. rare trees, figs) >5 trees >60 cm dbh as seed source if regeneration is insufficient Potential crop trees in next cycle (10-40 cm dbh)	• Tree marking
	Proportion of damaged trees in the residual stand	<35% of total stem number	• Tree marking • Directional felling • Low impact yarding • No felling on slopes >25 ^{o}
Ensure that the impact of the felling operation is limited	Felling damage	<20% of the residual stem number	• Directional felling • No felling on slopes >25 ^{o}
Ensure that the impact of the yarding operation is limited	Area of bare soil exposure	<15%	• Restricted tractor yarding on slopes <15^{o} • Skyline systems on steeper slopes
	Yarding damage	<15% of the residual stem number	• Felling in herring-bone pattern according to yarding infrastructure • Bucking of logs to length <8 m

7.4 THE FOREST MANAGEMENT SYSTEM

7.4.1 Major components of the forest management system

For effective management of natural forests, wise management is required at three main levels: at the level of the institution (such as Forest Department or Ministry), at the level of the forest management unit (such as Forest Reserve or Working Plan Area), and at the level of forest compartment. Each of these levels will tend to have a different planning horizon, and each will require different sorts of management input. Table 7.4 attempts to illustrate the main components of such a management system. Although this system was developed for the forest estate of Sabah, Malaysia, the principles should also be useful for a country like Uganda.

7.4.2 Forest management planning

7.4.21 The role of forest management plans

A well-designed **management plan** is vital for sustainable natural forest management, although it is not the only plan that is necessary, as Table 7.4 demonstrates. In recent years, the area of tropical forest that actually has a management plan has fallen sharply, except in Asia. The fall has been particularly severe in Africa, as Figure 7.1 shows. The 1983 figure for Africa is mostly composed of managed forest in Ghana and Uganda (Mather, 1991), since few other countries in Africa have any functional management plans at all. So although Uganda is ahead of some other countries, there is still a great deal of work to be done to bring long-expired plans up to date. Although in this chapter we have been concentrating on timber operations, we should remember that a forest management plan will almost always have to meet other objectives too. Figure 7.2 is a reminder of some of these.

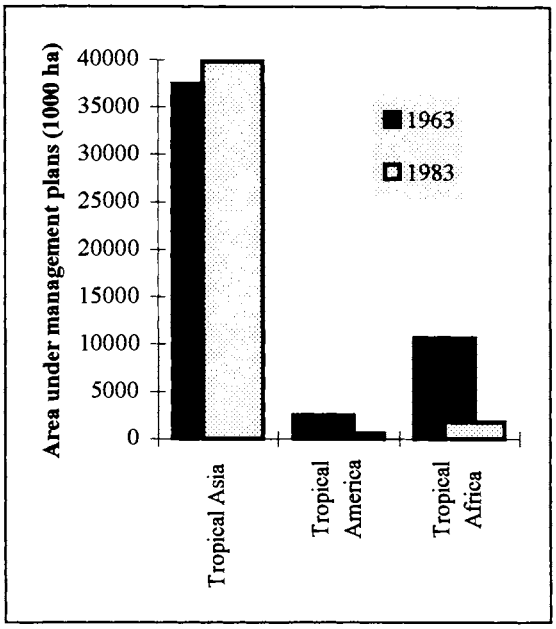

Figure 7.1. The area of tropical moist forest under management plans in the three main tropical regions, 1963 and 1983. After Mather (1991).

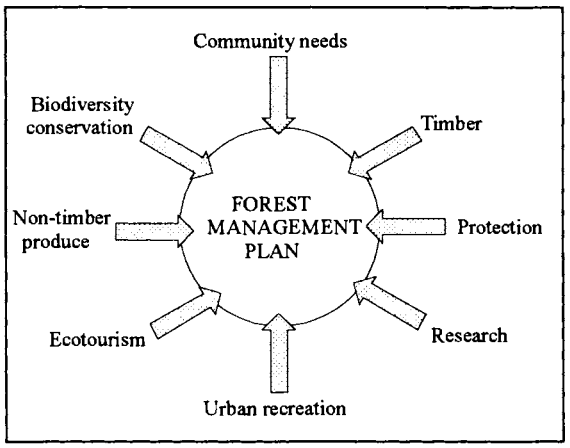

Figure 7.2. Some of the objectives of natural forest management. After Udarbe et al. (1994).

Table 7.4.
Suggested major components of a forest management system (Udarbe et al., 1994)

Management level	Planning horizon	Major components
Institution	10-20 years	Forest Sector Plan Forest Policy Forestry and related Legislation
Forest management unit	5-10 years	Management Planning Monitoring and Evaluation Environmental Impact Assessment
Forest compartment	Annual	Implementation Resource Accounting

7.4.22 Structure of a management plan

A management plan is basically a statement of *goals* and measurable *objectives* that guide the management of a given forest area. Goals are the basis for determining what actions to take, where they should be taken, and the budget and personnel needed for their implementation. A plan covers a specific period, such as five or ten years, and is used as a basis for developing annual operational plans. A good management plan should be dynamic and subject to modification as new information becomes available; there should be a feedback loop through monitoring the effectiveness of activities carried out in the operational plans.

A management plan should not be overburdened with biological information and scientific descriptions of the area. Such information is important, but its place is in a separate report, or perhaps in an appendix to the plan. The intended users of a management plan (planners, managers and local government officials, for instance) are likely to be confused by too much scientific information.

The content and organisation of a management plan may vary from place to place. Every plan for which conservation is one objective (including most natural forest reserves), would benefit from inclusion of the main points listed in Box 7.5.

7.4.3 Drawing up a management plan

Management plans are intended to be useful documents. All too often, plans are written and then never consulted; as often as not, this is because the plan is too detached from reality to be useful. It is useful to think of the process of drawing up a management plan in terms of the following points:

1. Where are you now? *(assessment stage)*
2. Where would you like to be? *(identifying objectives and constraints)*
3. How could you get there? *(exploring and choosing options)*
4. Decide on and plan your route *(finalising the management plan)*
5. How will you know when you have arrived? *(setting measures of performance)*
6. Go! *(implementation)*

Box 7.6 looks at how these points can be translated into more formal stages.

Drawing up a good management plan is not easy. To help in its preparation, it is useful to compile a list beforehand, covering the available information on current management. This encourages the writer to think about the area's role and to what use existing information could be put in compiling the plan (MacKinnon et al., 1986).

Box 7.5
The main components of a management plan for a protected area. After MacKinnon et al. (1986)

1. **National and regional background**. This sets the stage, providing an overview of the area within the national and regional context, from the perspective of national forestry and conservation objectives. Also included is a review of the regional economy, land uses in adjacent areas and communications networks.
2. **Description and inventory of the reserve**. Land forms, geology and soils, climate, biological aspects, and the socio-economic and historical background of the area described. This description should be interpreted in the context of forestry and conservation, for example, how soils affect native flora and timber species, drainage and erosion. Other data are filed as appendices.
3. **Management considerations**. Consist of evaluation and projection, as well as a clear definition of objectives. Special limitations and constraints are identified, and the significance of the area is evaluated. It is under this component that the zoning plan for the area is given.
4. **Management programmes**. This component practically addresses resource management, human use, research and monitoring, as well as the administrative requirements of the reserve.
5. **Development programmes**. This component includes all requirements of buildings and equipment, with the financial and personnel implications of the plan, including a development schedule indicating priorities and critical paths.
6. **Appendices**. These should summarise data used as the basis for the plan, including:
   - Details of the legal establishment of the reserve
   - A complete reference list of all relevant publications
   - Species check-lists
   - Pertinent climatic and socio-economic data
   - Supporting maps and air photos

Box 7.6
A process for preparing a management plan for a protected area. After MacKinnon et al. (1986)

1. **Form a planning team.** This team should include all those who are involved in the management of the resources. It is now advocated that this means that local people must also be consulted.
2. **Collect background material.** This should include legislation, cultural resources, socio-economic data, geology and geomorphology, climate etc.
3. **Carry out a field inventory.** This is usually necessary to assess the nature of the resource.
4. **Carry out an analysis of limitations in available materials.** What you would like to see in the plan, and what is achievable given limited resources.
5. **Draw up a statement of objectives.** What you would like the plan to achieve and by when.
6. **Examine the implications of any zoning and boundary demarcation.** These are basic considerations for any protected area, and need to be examined early in the planning process.
7. **Action planning.** Consider how each objective is to be managed and by whom.
8. **Consider financial implications.** There is no point making grandiose plans if they are too expensive.
9. **Prepare a draft version of the plan.** The plan's implementation will affect many people. The ideas of the planning team should form the backbone of the plan, but do not assume that everyone will agree with it.
10. **Circulate the draft.** All interested parties should have an opportunity to comment and respond.
11. **Prepare the final version of the plan.** Consider responses of all interested parties.
12. **Implement the plan.** Do not deviate from it unless circumstances change.
13. **Monitor implementation, evaluate regularly and revise if necessary.** Plans are made to be adhered to, but not unquestioningly so: they are a guide rather than a set of laws. If they need revision, do not be afraid to do so, but follow the same steps as in the initial preparation.

7.4.4 Guidelines for sustainable forest management

Recently, there has been an upsurge of interest in developing guidelines for sustainable forest management. This interest has come not only from conservation organisations, but also from the timber industry itself, in recognition of the fact that if the industry does not support sustainable forest management, then its own future is in jeopardy. Box 7.7 contains a series of guidelines drawn up jointly by ITTO and IUCN (Poore and Sayer, 1991), based on an earlier report by ITTO (1990). The first twelve objectives are rather general, but the remainder are particularly relevant to this chapter, and all have a bearing on nature conservation.

7.5 NATURAL FOREST MANAGEMENT AND TIMBER CERTIFICATION

Because of the widespread concern about poor management of tropical forests, and the consequences for conservation and human rights, there have recently been several independent moves in consumer countries to encourage sustainable management of those tropical forests from which timber is exported. The idea is to produce a certification system for timber on sale in consumer countries, so that consumers can choose to buy timber which they know has come from a sustainably-managed tropical forest. Such timber will almost certainly be more expensive than timber extracted unsustainably, partly because sustainable management costs money, and partly because suppliers will be able to charge a premium simply because consumers will want to buy sustainably-produced timber. Although there is no official export of natural forest timber from Uganda at present, it is possible that the situation may change in the future. Even if this does not happen, it makes sense to aim to manage forests up to the standard of the certifiers, and so it is worth looking at these certification schemes in some detail.

The scheme gaining most widespread acceptance at the moment is that of the Forest Stewardship Council (FSC), an independent group of conservationists, foresters and timber companies with a secretariat based in Mexico. The FSC is a "certifier of certifiers", in that it gives its seal of approval to other, smaller organisations that are themselves certifying timber trade operations. The Council is still rather new, and its ideas may change in the coming years, but its principles and criteria at the time of writing are given in Box 7.8.

Box 7.7

Guidelines for sustainable forest management (Poore and Sayer, 1991)

1. A strong political commitment at the highest level is indispensable for management to succeed.
2. An agreed forest policy should be supported by appropriate legislation which should, in turn, be in harmony with laws concerning related sectors.
3. There should be a mechanism for regular revision of policy in the light of new circumstances.
4. A national forest inventory should establish the importance of all forests, independent of their ownership status, for the purposes of both conservation and production.
5. There should be flexible provisions for such inventories to be broadened to include information not previously covered, if and when the need and opportunity for such additional information arises.
6. Certain categories of land, whether public or private, need to be kept under permanent forest cover to secure their optimal contribution to national development.
7. The different categories of land to be kept under permanent forest are: land to be protected; land for nature conservation; land for production of timber and other forest products; land intended to fulfil combinations of these objectives.
8. Land destined for conversion to other uses (agriculture, mines etc.), and any land for which the final use is uncertain, should be kept under managed forest until the need for clearing arises.
9. The principles and recommendations for implementation of these guidelines apply equally strictly to national forests and privately-owned or customarily-held forests.
10. There should be a national agency capable of managing the government forest estate, and assisting in the management of private and customarily-held forests, according to the objectives laid down in the national forest policy.
11. Forests set aside for timber production are able to fulfil other important objectives, such as environmental protection and, to a varying extent, conservation of species and ecosystems. These multiple uses should be safeguarded by the application of environmental standards to all forest operations.
12. Proper planning, at national, forest management unit and operational levels reduces economic and environmental costs and is therefore an essential component of long-term sustainable forest management.
13. The forest set aside for timber production should be the subject of a more detailed inventory to allow for planning of forest management and timber harvesting operations. The question of type and quantity of data to be gathered should be the subject of cost-benefit analysis.
14. Management objectives should be set rationally for each forest management unit. Formulation of objectives should allow the forest manager to respond flexibly to present and future variations in physical, biological and socio-economic circumstances, keeping in mind the overall objectives of sustainability.
15. The size of each production forest management unit should preferably be a function of felling cycle, the average harvested volume per hectare and annual timber out-turn target of the operating agency (state forest agency, concessionaire, etc.).
16. The choice of silvicultural concept should be aimed at sustained yield at minimum cost, enabling harvesting now and in the future, while respecting recognised secondary objectives.
17. In order to ensure sustained production of timber from each forest management unit, a reliable method for controlling timber yield should be adopted.
18. A management inventory supported by a detailed map is indispensable to the preparation of working plans for each forest management unit.
19. Working plans should guarantee the respect of environmental standards in field operations.
20. Forest management operations can have important positive or negative environmental consequences, both in the forest itself and outside (transboundary effects). These consequences should be assessed in advance of operations to ensure overall sustainability.
21. Harvesting operations should fit into the silvicultural concept, and may, if they are well planned and executed, help to provide conditions for increased increment and for successful regeneration.
22. Efficiency and sustainability of forest management depend to a large extent on the quality of harvesting operations. Inadequately executed harvesting operations can have far-reaching negative impacts on the environment, such as erosion, pollution, habitat disruption and reduction of biological diversity, and may jeopardise the implementation of the silvicultural concept.

Box 7.7 (continued)

23. Pre-harvest prescriptions are important to minimise logging damage to the residual stand, to increase safety for logging personnel and to attune harvesting with the silvicultural concept.

24. Planning, location, design and construction of roads, bridges, causeways and fords should be done19 Working plans should guarantee the respect of environmental standards in field operations.

25. Extraction frequently involves the use of heavy machinery and, therefore, precautions must be taken to avoid damage to residual vegetation, soils and watercourses.

26. Post-harvest operations are necessary to assess logging damage, the state of forest regeneration, and the need for silvicultural operations to assure the future timber crop.

27. Permanent production forest should be protected from activities that are incompatible with sustainable timber production, such as the encroachment of shifting cultivators often associated with the opening up of the forest.

28. Fire is a serious threat to future productivity and environmental quality of the forest. Increased fire risk during logging, and even more so following logging, demands stringent safety measures.

29. Chemicals, such as those used in silvicultural treatment, constitute risks both in terms of personnel safety and environmental pollution.

30. There should be incentives to support long-term sustainable forest management for all parties involved. Concessionaires should have the long-term viability of their concession provided for (mainly by government controlling access to the forest); local populations should benefit from forest management (see below); government forest departments should receive sufficient revenue to continue their forest management operations.

31. For private or customarily-held forests the basic approach to sustainability is the same as for government forests.

32. The national forest service should provide assistance to customary rights holders and private forest owners to manage their forests sustainably.

33. Timber from forest land to be converted to other uses, and from forests damaged by hurricanes and other disasters, should be optimally utilised. At the same time, disruption of management of the permanent production forest should be avoided.

34. Monitoring and research should provide feedback about the compatibility of forest management operations with the objectives of sustainable timber production and other forest uses.

35. Sustained timber production depends upon an equitable distribution of incentives, costs and benefits, associated with forest management, between the principal participants, namely the forest authority, forest owners, concessionaires and local communities.

36. The success of forest management for sustained timber production depends to a considerable degree on its compatibility with the interests of local populations.

37. Timber permits for areas inhabited by indigenous peoples should take into consideration the conditions recommended by the World Bank and the International Labour Office for work in such areas.

38. Management for timber production can only be sustained in the long-term if it is economically viable (taking full account in the economic value of all costs and benefits from the conservation of the forest and its ecological and environmental influences).

39. A share of the financial benefits accruing from timber harvesting should be considered and used for maintaining the productive capacity of the forest resource.

40. Forest fees and taxes should be considered as incentives to encourage more rational and less wasteful forest utilisation and the establishment of an efficient processing industry, and to discourage logging of forests which are marginal for timber production. They should be and remain directly related to the real cost of forest management. Taxation procedures should be as simple as possible and clear to all parties involved.

41. In order to achieve the main principle of good and sustainable management, forest fees and taxes may need to be revised at relatively short notice, due to circumstances outside the control of loggers and the forest agency (e.g.. fluctuations in international timber markets and currency values). The national forest agency should be granted the authority to carry out such revisions.

42. Continuity of operations is essential for sustainable forest management.

Box 7.8
Forest stewardship principles, as defined by the Forest Stewardship Council (Jackson, 1994)

Principle 1: Compliance with Laws and FSC Principles. Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.
Principle 2: Tenure and Use Rights and Responsibilities. Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
Principle 3: Indigenous Peoples' Rights. The legal and customary rights of indigenous peoples to own, use and manage their lands, territories and resources shall be recognised and respected.
Principle 4: Community Relations and Workers' Rights. Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
Principle 5: Benefits from the Forest. Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
Principle 6: Environmental Impact. Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and integrity of the forest.
Principle 7: Management Plan. A management plan, appropriate to the scale and intensity of the operations, shall be written, implemented and kept up to date. The long-term objectives of management, and the means of achieving it, shall be clearly stated.
Principle 8: Monitoring and Assessment. Monitoring shall be conducted, appropriate to the scale and intensity of forest management, to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts
Principle 9: Maintenance of Natural Forests. Primary forests, well-developed secondary forests and sites of major environmental, social or cultural significance shall be conserved. Such areas shall not be replaced by tree plantations or other land uses.
Principle 10: Plantations. Plantations shall complement, not replace, natural forests. Plantations should reduce pressures on natural forests.

7.6 SUMMARY

Getting management of natural tropical forest right is no easy matter, especially since our ideas of what is "correct" management are going through a period of change in favour of conservation. This chapter has shown some of the actions that can be taken to aid management. They can be summarised as follows:

- Make efforts, from the planning stages onwards, to ensure that all activities are environmentally sustainable.
- Continually assess the environmental impact of all activities and modify them to minimise impacts; use indicators at all levels to aid judgement.
- Maintain and use plans, especially management plans, to direct all activities; use checklists to help preparation of plans.
- Remember that forests serve multiple functions, so consult widely, and involve other people in planning and decision-making.

7.7 FURTHER READING

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