

CHAPTER 7

NATURAL FOREST MANAGEMENT AND CONSERVATION

7.1 Introduction

As indicated earlier, the sustainability of the productive use of a forest is a debatable and controversial issue. As such, it is open to question as to whether such a forest used for production could be conserved in the real sense of the word. It is clear, however, that linkages between institutions are needed to conserve the forests which are or have been badly degraded by external influences.

Sri Lanka's natural forest resources continue to supply part of the timber and fuelwood needs of the nation, along with other goods such as fodder for animals, medicines for man, and many items of food value, and services such as recreation, amenity, aesthetic enjoyment, and academic study. However, because of forest clearance to meet the need for land of a growing population and the fast depletion of the forest resources to meet development needs, the productive use of these forests has certainly not been sustained. As a result, the country has now got to rely on timber imports.

Currently, Sri Lanka is undertaking studies in certain forest areas, to determine whether productive use, not only of timber but also of other goods and services, could be sustained without altering the complex forest structure and the dynamics of forest ecosystems.

In this regard, the approach suggested by the Oxford Conference on the Wise Management of Tropical Forests held in 1992 is commendable (OFI, 1992). By advocating wise management, the conference introduces a concept which existed in Sri Lanka centuries ago when forestry was a part of Sri Lanka's culture. This concept of wise management could serve as an impetus to the country to reintroduce the wise forest management systems that most certainly would have existed in the past. It is appropriate to state here the broad conclusions of the conference, which are basically what Sri Lankan foresters

and forest scientists hope will succeed again in Sri Lanka. They are:

- (i) Wisely-managed forests can and will continue to supply goods on an ecologically-sustainable basis.
- (ii) Appropriate political, social and economic conditions must be in place before wise management, through ecologically-sound silvicultural practices, can succeed.
- (iii) Involvement of local communities in management decisions is vital in circumstances where government institutions are no longer able to manage effectively.

Wise and thoughtful management had, in effect, been practised in times when benevolent and wise monarchs ruled the country. This has led to a strong acceptance today of natural forest conservation by the people of Sri Lanka. In fact, as history has recorded, one of the first wildlife sanctuaries in the world was established in Sri Lanka in the third century BC.

Wise management can therefore be seen as an honest and credible approach to planning forest management systems, and an acceptable approach to determining whether forest sustainability is a practical proposition. By this, the linkages between wise management in the productive use of Sri Lanka's forest resources and the need for conservation of these resources can be determined in order to sustain forest structure and forest quality. The Oxford conclusion on the need for ecological sustainability is significant and very appropriate to the Sri Lankan situation. It also indicates the direction tropical forest ecology should take in Sri Lanka.

7.2 Conservation of natural forests in the early post-Independence period

Small areas of natural forest that were automatically conserved fully were the *aranya* or hermitage forests, and forests in and around archaeological sites. These had been conserved from pre-Independence times. Forests with archaeological sites are also Archaeological Reserves. All are very small forests.

Apart from the formation of National Parks, one of the first attempts at absolute conservation in the post-independence period was the demarcation of 50-acre arboreta under the International Biological Programme (IBP) of UNESCO. The local sub-committee of the IBP headed by the Forest Chief was initially under the National Science Council, but later shifted to the Forest Department. The objective of demarcation was to exclude such areas from timber exploitation or other forms of interference. Nine forest blocks were demarcated.

In 1975, this programme was renamed the Man and Biosphere Programme (MAB), and larger blocks of forest were demarcated, including some forest plantations. Two unique forest ecosystems that were granted international MAB status at that time were the Sinharaja in the lowland wet zone and Hurulu in the dry zone (Sri Bharathie, 1979). Forest areas conserved under the MAB programme numbered forty-seven, covering 119,883 ha and distributed amongst the different agro-ecological-climatic zones (Bandaratilleke, 1990). These forests were either gazetted and proclaimed Forest Reserves or Proposed Forest Reserves.

7.3 Conservation of natural forests in the 1980s

State conservation measures gathered momentum in the 1980s through the Department of Wildlife Conservation in the form of a new Protected Areas Network. Many NGOs and environmentalists backed the Fauna and Flora Protection Ordinance as the best instrument for forest conservation, rather than the Forest Ordinance which provided for selective logging in some Forest Reserves, even though some of those Forest Reserves were actually more important for wildlife conservation than other protected areas (Gunatilleke and Gunatilleke, 1983a).

Therefore, after decades of development activities necessitating the overcutting, denudation and degradation of most of the country's natural forests after 1948, once again, since 1989, a new era of natural forest conservation has dawned in Sri Lanka. This was a long overdue step which could not be taken earlier because of pressures emanating from the State Timber Corporation and vested interests that enjoyed some support through political patronage.

Eventually, the voice of concerned foresters, forest scientists, environmentalists and concerned citizens at large was heard and the logging ban imposed. Action was then taken to assess the conservation value of these natural forests, first in the wet zone and later in all other zones. For this exercise, the Forest Department is assisted by the UNDP and the FAO, through the IUCN.

7.4 Conservation of natural forests in the 1990s

The 1990 logging ban

In 1990, the Government imposed a logging ban on timber from natural forests. This move followed the revelations that the nation's forests had been over-exploited for a long time, together with pressure from rural people, public-spirited citizens, professors and environmentalists, and because of the marked decline in Sri Lanka's forest cover. This was also linked to fears created by the Southern insurgency in 1989 that prevented loggers from entering the forests. There is, as yet, no ban on state logging in forest plantations, but there is agitation from environmentalists and the Forest Department to ban logging in the montane plantations above 5,000 ft, thus going back to a recommendation made by British naturalist Joseph Hooker in 1873 (Nanayakkara, 1987; Sahajanathan, 1987).

The strategy to be adopted is to allow the planted forests above this elevation to develop into a type of mixed forest with simple silvicultural treatment. Sri Lanka thus follows the example set by many South-East Asian countries which have imposed logging bans to conserve natural forest ecosystems, wildlife habitats and genetic resources.

The Accelerated Conservation Review (ACR)

An ACR was first carried out for the wet zone forests. It was a rapid appraisal of the ecological, hydrological and biological status of the greater part of the country's wet zone forests. Based on this study, the Forest Department decided in 1990 to place a total of 13 wet zone forests on the critical list, and place them under a form of conservation management, taking these parameters and those of cultural importance into account.

Conservation Management Plans

Following the ACR was the programme to prepare 13 Conservation Management Plans for these wet zone forests. These are apart from the Conservation Management Plans for two of the country's most important forests, namely the Sinharaja World Heritage Site, and the Knuckles range of forests in the northern part of the central montane zone. Seven plans had been completed by the beginning of 1995, four in the Matara district and three in the Galle district, both in the Southern Province. The preparation of all 13 Management Plans is expected to be completed by the middle of 1995.

The buffer zone principle is being adopted for the conservation of all wet zone forests. This principle was first adopted by the Forest Department for Sinharaja. The factors being taken into account also include the socio-economy of the villages in or near the forests, boundary demarcation and legal status.

One alarming tendency noted is the belief of some overseas consultants and some of their local scientific counterparts that Sri Lanka's forests are home to indigenous forest-dwellers. There is a problem of definition as the main activity of these groups is agriculture. Apart from the Veddhas, the people referred to are in fact farmers living in villages in peripheral areas of forests or in encroachments inside forests. There are also a few villages inside forests, but the people are farmers. Their dependence on forests is limited to some fuelwood collection and possibly the gathering of medicinal plants and collection of honey. Some of their other activities are illegal felling, the collection of fauna and flora for outsiders and some illegal hunting to meet the "needs" of hotels. Much publicity has been given to the preparation of these Conservation Management Plans, especially to strategies and programmes of activities to ensure a supposed "sustainability" in the use of these forests (IUCN, 1994c). However, this is, at present, a difficult concept and could be destructive in practice in the long term. As such, even in the case of these wet zone forests, it may well be better to provide local village folk with a more lucrative income in nearby industries and in agroforestry in buffer zones and outside, rather than encourage continued and increased activities in the forests which would only degrade the forests further. Ideally, human-forest interactions ought to be kept to a minimum.

Possible inter-institutional linkages in a future management scenario for these forests would include linkages between the Forest Department as the Central body supported by the active Sri Lanka Research Agencies, mainly the Universities, the Department of Wildlife Conservation and the Divisional Secretariats which look after the education, health and social welfare of any nearby village people.

The National Conservation Review (NCR)

A National Conservation Review to cover all natural forests, which had been put forward by the Forest Department long ago, finally began in 1991. The study encompasses all natural and near-natural forests in the country, including scrub-cum-grasslands and coastal mangrove ecosystems. It is being carried out by the Forest Department/IUCN, utilising UNDP funds channelled through the FAO. It is part of the Forest Department's "Environmental Management in Forestry Development" project, implemented by the Department's Environmental Management Division. At first, it was confined to the wet zone forests. In 1994, dry zone natural forests were added to the study. Both flora and fauna were covered and the work was scheduled to be completed by March 1996. It will also cover the existing "Protected Areas Network" for wildlife conservation.

Conservation of biodiversity is the main aim of the NCR. The IUCN leaves room for releasing under-stocked areas for other development, which is surprising. It seems advisable not to encourage the release of low-stocked natural forest areas that appear to be of low conservation priority, because with appropriate protection and management they have the potential of becoming high priority forests later. Instead, restocking with indigenous species and adopting simple silvicultural treatment to encourage natural regeneration where possible should be the aim. The country cannot afford to lose any more natural forests, and this is supported by public opinion.

A transect sampling methodology is used in the study and data collected is computerised. Positioning of plots is by a Global Positioning System (GPS). Many endangered species have been found during surveys, indicating the necessity to conserve *in situ*. New species have also been recorded. The limitations of the sampling method and the time available have been

recognised and there is a possibility the biodiversity richness is underestimated.

The number of forests expected to be covered in the low wet zone is thirty-two. The forest areas in the dry zone of the Northern Province and in other "no go" areas are expected to be sampled later.

7.5 Conservation into the next century

Today, the Protected Areas Network under the charge of the Department of Wild Life Conservation is about 14% of the area of the country, which is considered something of a record. This network includes National Parks, Strict Natural Reserves, Nature Reserves, Wild Life Corridors, Intermediate Wild Life Zones and Sanctuaries. The total extent was some 780,920 ha (Bandaratilleke, 1990). This has now been exceeded. This is a significant achievement for Sri Lanka and is in keeping with the country's strong historical traditions and culture of conservation.

A significant development in implementing conservation measures was the re-organisation of the Forest Department to include a new Environmental Management Division (EMD) in 1989 and the continuing policy of increasing the number of Forest Divisions for more intensive forest management and protection. The Forest Department also established close links with the Department of Wild Life Conservation through the EMD to carry out joint conservation action, as for example in the Horton Plains National Park and surrounding forests in the wet montane zone.

The conservation measures have strong support in the country, except where there is pressure on land. Conservation suffers especially at the hands of politicians with an eye on the vote at a future general election: it has been a regular pattern that requests for the release of forest land to settle people build up just before a general election. Some politicians have been openly against forest and wildlife conservation in the belief that all rural people have to be provided with land for their livelihood.

If such beliefs continue, then Sri Lanka's forests will rapidly disappear. It is hoped, though, that they may change through the awareness campaigns being promoted by the Forest Department and the Department of Wild Life Conservation.

Fortunately, seminars, workshops and meetings at grassroots level by both these Departments, the inclusion of the subject of forestry in school curricula on the recommendation of the Forest Department, and the formation of Village Forest Societies (VFS) have most certainly improved people's awareness of the importance of forestry. As a result, forest conservation programmes now tend to be widely accepted.

Studies have shown that if the management of some key Forest Reserves for conservation is not carried forward, many animals may become extinct in the near future. According to one well-known researcher who has worked in Sri Lanka (Erdelen, 1988):

- There should be an immediate stop to the clearing of natural forests, whatever the purpose.
- All areas still under natural forest, or almost natural forest cover, should immediately be strictly and totally protected.
- Effective protection of reserves and other so-called protected areas is essential.

The first recommendation is already in force, at least in theory. Thus, the question of the protection of forests needs to be addressed very urgently as present policing arrangements have not had the desired effect.

Some kind of participatory action is also needed to assist in protection, possibly a kind of "participatory forest police" composed of grassroots volunteers. However, a formal police force cannot really be dispensed with because most illicit timber fellers are armed and dangerous. That said, the present Forest Guard system, operated by the Forest Department, and the Wild Life Guard System, operated by the Department of Wild Life Conservation, is inadequate.

From ecological and ecosystem points of view, there is no doubt that the effects of introducing conservation management of Forest Reserves will be positive, if conservation measures are not upset. Already in some "no go" areas, natural forest cover has increased. Studies on these matters are progressing. With time, the positive effects of conservation on the nation's well-being may be quantified.

Meanwhile, the negative effect of the shortfall in timber production from natural forests is being met by imports. There is also the compensatory effects of new regeneration in the protected and thus undisturbed forests, as well as the new timber forest plantations that are being grown at an expanded rate.

7.6 Forest conservation in action: the case of Sinharaja

Background

The Sinharaja World Heritage site in the south-west wet zone contains portions of primeval forests never exploited for timber. Trees reach heights of over 70 metres with girths of over 3 metres. One hundred per cent canopy closure is quite common in many places. It is the best example of Sri Lanka's tropical humid evergreen forest. The great scientific value of it is now well documented, and has even been described as the last refuge of one of the world's most magnificent ecosystems (McDermott *et al.*, 1990). Briefly, the forest contains at least 184 tree species and 147 species of birds (de Zoysa and Raheem, 1990). Seventy-six tree species are endemic (Gunatilleke and Gunatilleke, 1980), as are many of the bird species. The forest also contains a bewildering array of other forest products (Gunatilleke and Gunatilleke, 1985), ranging from those of food value to those of medicinal value, spices, oils and honey. Bamboos and rattans are prolific.

Its difficult rugged terrain, thick forest and surrounding rivers have kept it inaccessible and thus fairly well protected from both illegal and legal loggers in the past. Elevations of the forest range from 100 metres to 1170 metres. The extent of the forest in 1988 was 8,864 acres to which a further extent was added from the east in 1990, making the total area of the forest a continuous extent of 11,331 ha.

Logging in Sinharaja

There was no road access to Sinharaja until the early 1960s when a road trace was opened up, but the intention at that time was to have a jeep track for exploratory and research purposes and not for the exploitation of timber. The first sod for this road was cut in 1963 from the north west. However, in the 1970s, as the timber stocking in the forest came to be known, the Government, on ill-conceived advice and with Canadian aid, decided to log a portion of it for plywood manufacture. The original jeep track was enlarged to form a costly broad-gauged roadway.

In 1978, because of growing protests from environmentalists and the general public, the Government terminated all logging activities in the forest and the Forest Department regained full control (Gunatilleke and Gunatilleke, 1983b). Prior to the actual termination, logging had already been scaled down, following a report of a Parliamentary Committee (Rajapakse, 1974).

Sinharaja as a World Heritage Site

From 1983 to 1988, the Forest Department pressed for the recognition of Sinharaja as a natural World Heritage site by UNESCO. There was intensive lobbying by the Forest Department and the Sri Lanka ambassador in Paris, which finally succeeded and today the Sinharaja World Heritage site is a world-recognised centre for tropical humid forest research. Many national and foreign universities carry out research in this forest.

International agencies like the World Wide Fund for Nature (WWF), the Norwegian Government, the International Union for Conservation of Nature (IUCN) and the FAO support the Government's efforts at conserving the forest. The University of Peradeniya and the NGO the "March for Conservation" lead the local research efforts in addition to the Forest Department. Simultaneously, with the listing of Sinharaja as a World Heritage site, the Government declared it a National Heritage Wilderness area. The new legislation was called the National Heritage Wilderness Areas Act.

The Norwegian Government, with support from the Sri Lanka Government, provided funds for a revised Management Plan for Sinharaja for the Conservation Management of the forest, which work was contracted to IUCN

(now called the World Conservation Union). It is a five-year management plan which will be reviewed half-way through and continued by Government after the present foreign funding lapses. The underlying direction of the plan is acceptable to foresters and naturalists alike, keeping activities in the forests to a minimum.

As a result of the plan, much scientific work has been done in and around Sinharaja by Sri Lankan and foreign scientists, and now Sinharaja is firmly on the world forest conservation map. The plan was prepared in 1993. The main objective of the plan is to propose strategies and prepare a programme of priorities which would:

"ensure the maximum possible protection of Sinharaja whilst not adversely affecting the livelihood of the people in the surrounding villages" (IUCN, 1994a).

Some of the recommendations are basic, such as the re-demarcation of boundaries, exclusion of old encroached settlements, completion of boundary marking, strengthening research, encouraging publicity, the need for additional staff, and restriction on entry.

Sinharaja and local people

At present, there are 32 village settlements in and around Sinharaja, mostly on the periphery of the forest. The total population of these villages is only about 5,000, although this is much more than the likely 1963 figure of about two thousand. The people in these villages are very poor – some of the poorest in the country. They have been rather neglected by successive regimes, resulting in their being used by unscrupulous businessmen to undertake illegal felling in some accessible areas. They are not forest tribals or forest dwellers as are the Veddhas, and practise agriculture as their main occupation. The forest is also surrounded by eight tea estates, some of which are degraded and uneconomic, where only a few of the village people have seasonal employment. However, in view of the permanent workforce on the tea estates, there is still competition for new jobs on the estates.

It is only since Sinharaja gained prominence that the basic needs of these people are being addressed by the District administration. The Extension

Branch of the Forest Department has enlisted the services of medical personnel on a voluntary basis to help these unfortunate people. The recommendations in the plan also include the translocation of some families if it becomes necessary to do so. Immigration (a result of overcrowding elsewhere in the country) may also need to be addressed. Organising buffer-zone programmes, establishing a Protection Fund, securing the support of community-based organisations to protect the forest, and permitting restricted use of non-wood resources, are other components of the plan.

The plan also recommends a research programme to include a broad socio-economic baseline survey, including institutional aspects, which will determine the linkages that have to be established to conserve the forest, whilst at the same time permitting any possible limited productive use of the forest's resources. As yet, there are no forests in modern Sri Lanka where a management system is in operation where links have been established between conservation and sustainable use of the forest resources. Some small-scale sporadic surveys have been done by the Forest Department but they are not broad-based enough for planning purposes.

The broad-based socio-economic study would be directed to the following areas:

- (i) Links between the peoples of the different villages as far they affect the management of the buffer zone that surrounds the forest.
- (ii) The extent of their dependence on the Sinharaja Conservation Area.
- (iii) Attitudinal studies vis-à-vis the estate-owners and the village people.
- (iv) The process of establishment and operation of community-based organisations.
- (v) The collection of baseline data pertaining to the livelihood of the people.
- (vi) Issues concerning the operation of various concerned agencies.

Once the results of this research survey are known, it should be possible to determine the linkages that have to be established between the village people and the concerned agencies and between the agencies in order to protect the forest, regenerate logged and old cultivated areas in the forest, and ensure, if possible, some form of sustainable or wise use of the forest. The Forest Department had already started on this initiative. Concurrently, the plan

should aim at providing the measures that would also improve the quality of life of the people. One alternative may be to provide the people with a better quality of life elsewhere or nearby on the tea estates or other industries, that would enable them to get better and regular employment and a higher income. It may be better if the degraded, uneconomic tea estates were converted to agroforestry. These will then serve as an additional buffer to Sinharaja where the people could be engaged in profitable agroforestry. This may ultimately be the correct approach rather than trying to persuade these people to continue their present frugal agricultural practices which are just sufficient to ensure survival, with a few added benefits from forest products like honey and palm sugar – bearing in mind that the practice of felling of timber would be strictly prohibited.

It should not be the policy of agencies to try and force, coax or exploit these people to protect Sinharaja. On the other hand, some participatory action would be forthcoming to protect the forest if earning capacity and quality of life were improved in the ways suggested. The approach of the Extension Branch of the Forest Department is happily in this direction. In former times, when Sri Lanka had an established forest culture of its own, the people were healthy, well fed and prosperous. Today, they are just able to eke out an existence on the fringes of the forest.

This broad-based socio-economic study would be started concurrently with other organised studies, such as ecology. It is important that the researchers approach people with an open mind and do not have preconceived ideas. Socio-economic studies that have been started in this way elsewhere have led to problems, as in the first AsDB community forestry project. If the outcome of the survey is positive, then a trial plot could be established to determine whether conservation and some form of sustainable productive use of the forest is possible. Hitherto, participatory action has proved to be a success only in the establishment of agroforestry plantations.

Apart from this FD/IUCN-proposed study, some recent investigations have been done by individual scientists on the socio-economic implications at Sinharaja, including some by staff of the University of Peradeniya. One study discusses the non-wood products and other uses of the forest by nearby villagers. These products include sugar syrup from kithul (*Carryota urens*), rattan (*Calamus* spp), cardamon (*Eletteria cardamomum*), resins (from *Shorea*

spp), gemstones, medicines, and food. Some timber is cut and removed illegally and so is fuelwood. String, rope and thatch are other products. The author of this study advocates a system of participatory management for the forest to ensure its conservation, starting with the buffer zone, and introducing the concept of "extractive reserve" management in the core area of Sinharaja, to enable village people to use forest products from the core areas (McDermott *et al.*, 1990). Currently, however, even the limited use of the forest by these villages degrades the forest resource and it is doubtful whether this kind of participatory management could rectify matters, and it could even make matters worse.

Future direction of management of Sinharaja

The present situation at Sinharaja is that it is well conserved by the Forest Department, although there is some degradation by unsustainable use of a few products by people living in peripheral villages. Whether conservation and productive use are compatible at Sinharaja and what linkages are needed to make them so in a sustainable management system are yet to be determined.

It is also unlikely that all the revenue from this forest, including visitor fees will go as inputs into village development, although some hand-picked villagers could be trained and employed as forest/wildlife guides or instructors to visitors. They could also be taken as salaried staff, hired for forest protection. The number who would benefit would, however, be very small.

7.7 Further case-studies of conservation in action

Conservation of the Knuckles Range

The Knuckles Range of forests in the northern part of the Central province is a series of more or less parallel peaks giving the appearance of a clenched fist when viewed from afar. This forest ecosystem is markedly influenced by topography and varying climatic conditions. Its high peaks are covered with unique natural vegetation types that have been conditioned by strong winds, in some places resulting in dwarfed forests, and its steep, rugged, misty terrain reaches heights of 2,000 metres, making the range one of the most beautiful parts of Sri Lanka. Its unique forest ecosystems and the threat to the forest by

illegal fellings and cultivation of cardamon led the Forest Department to take it up as a high priority conservation area after Sinharaja.

The Forest Department commenced conservation activities in this forest in mid-1987, and sought technical assistance from international agencies to prepare a Conservation Management Plan. The initial stage of this activity was by the Forest Department, while later funding was provided by the Norwegian Government and technical assistance contracted to the IUCN. The Forest Department organised socio-economic surveys, habitat identification, mapping, ecological research and started a programme of awareness generation for nearby communities. Here, the communities do not live near the forest areas because of the very rugged topography, high cold winds and generally difficult climatic conditions. In fact, what remains of the forest is the part that escaped the coffee and tea planters. The communities live in valleys around the forest range. Its sheer inaccessibility has been its saviour. The Government decided in 1988 that all the forest above 3,500ft (1,067 m) would be absolutely protected. Conservation activities are being continued in a follow-up phase with the same agencies involved, and a Conservation Management Plan has been prepared after identifying what should be the Knuckles Conservation Area (IUCN, 1994b).

Cardamon cultivation under partial canopy shade has destroyed most of the forest's natural regeneration in quite a large area. This is because the undergrowth is cleared and the exposed forest soil is scraped or worked before cardamon cultivation. Here too, political will is most important to make this Conservation Management System a success, but there are no signs of it as yet. The people who cultivate cardamon only do so for some rich businessmen from the cities and it would not be difficult to ensure conservation if the right corrective approach is adopted.

Alternative work for the villagers suggested includes agroforestry plots on long-term land-use tenure outside the forest on other state land, mostly scrubland lower down or in the valleys. Thus, the multitude of agroforestry systems in Sri Lanka could be made use of as a magnet to entice people away from these unique forests. Agroforestry should supply more benefits and more income to the people in the long term.

In a few critical areas, people live nearer the forest. They are extremely poor and suffer from malnutrition and iodine deficiency. A recent study recommends voluntary re-location of some of the people who will only stand to benefit by the exercise (Kayirawasam, 1991). As long as people get a better income and better living facilities they will surely move out. Relocation from the Knuckles range of forests would be an easier proposition than relocation from some other forest areas because of the harsher climatic conditions in and around Knuckles.

Knuckles is a high priority conservation area, and in no way would any forester or environmentalist recommend the exploitation of this forest for wood products or for the cultivation of cardamon. The Forest Department is zealously protecting this forest and where cardamon cultivators are evicted, enrichment planting with locally-occurring plants is being undertaken. Local linkages with the surrounding tea estate management, the Forest Department, the Department of Wild Life Conservation and the Divisional Secretariats are needed to ensure successful conservation management, with the Forest Department occupying the central position.

Conservation of Kanneliya-Dediyagala-Nakiadeniya forests

The Kanneliya-Dediyagala-Nakiadeniya (KDN) complex of tropical evergreen humid natural forest ecosystems, 11,100 ha in extent in the south-west wet zone has been given a total conservation status from 1989 by the Forest Department. This group of forests had been leased out to the Plywoods Corporation for many years, and even prior to that it had been exploited for timber by the Forest Department, including the supply of timber during the Second World War. As a result, the forest structure had been adversely altered and in many places the forest has been encroached. Logging was suspended in 1988 after pressure was exerted on the Corporation by the Forest Department. In 1990, the Forest Department took management control of the forest complex again and it is now being rested and subjected to silvicultural improvement. Already blanks are being covered up with natural regeneration, and encroachments are being planted up (Singhakumara, 1994).

A Conservation Management Plan prepared by IUCN (1994 c) recommends the utilisation of the timber potential after a resting period. This was first recommended by the Forest Department. In fact, the first report of the NCR

is clear. It states: *"the forest will take a long time to recover from past logging, even with strict protection"*.

The Kanneliya Forest Reserve part in particular is rich in Dipterocarps, in fact richer in this respect than the Sinharaja World Heritage Site. It is also considered a good candidate for recognition as another natural World Heritage Site on its own merits. The Forest Department was at first going it alone on this project but some bilateral aid is forthcoming from the New Zealand Government for the IUCN work. It is also reported that the IUCN is also investing a small sum of money of its own for sporadic KDN forest conservation activities.

Conservation of mangrove forests

The mangroves are a special case in view of their rapid destruction to near extinction. The total area in the country, estimated in 1986, was only around 10,000 ha (Nanayakkara, 1986a). Satellite imagery interpretation in 1992 reveal an extent of 6,877 ha, but it could be a little more as there are small scattered extents not clearly seen. Conservation measures have to be taken concurrently with the progress of the survey study.

Conservation supporting agriculture

Along with the conservation of natural forests, efforts are being made by the Forest Department to demonstrate to village people and farmers that forests are supportive of their activities to increase productivity in agriculture and other farming systems, that forests improve dry weather supply of water to streams, and that natural forests are not merely a "land bank" to be cut whenever they want to expand their activities.

All these activities are important, but first action is necessary to see:

- that there is no further forest loss;
- that depleted natural forest areas are enriched or reafforested;
- whether productive use of these forest ecosystems could be carried out in a sustained manner.

It takes time, but it is important for future environmental stability for meeting the needs of future generations in the country.

7.8 Conclusions

Whilst sustainable productive use of non-critical natural forest is in theory a valid concept, in Sri Lanka, as in most other developing countries, it is not yet realised. The country is still in the process of establishing the correct linkages with concerned institutions and decision-makers, to sustain conservation and improve species diversity and timber stocking in its overlogged and encroached natural forests after the emergence of the natural forest conservation thrust of the Forest Department in 1989.

The examples quoted, the Sinharaja World Heritage Site, the Knuckles range of forests, the KDN forest complex, the Mangroves, and all the remaining forests coming under the scrutiny of the NCR, form the lungs of Sri Lanka. Immediate action has to be taken to protect them. Experimentation on how to conserve and protect is important and requires discussion, but it is time-consuming. By the time experimentation is over, half the forests may be gone. Hence the need for immediate political will, legislation and state action to conserve these forests for posterity. The IUCN also has a responsibility and an obligation to recommend such action to the Government. Otherwise the forests would have disappeared, leaving behind only a library full of publications of academic interest.