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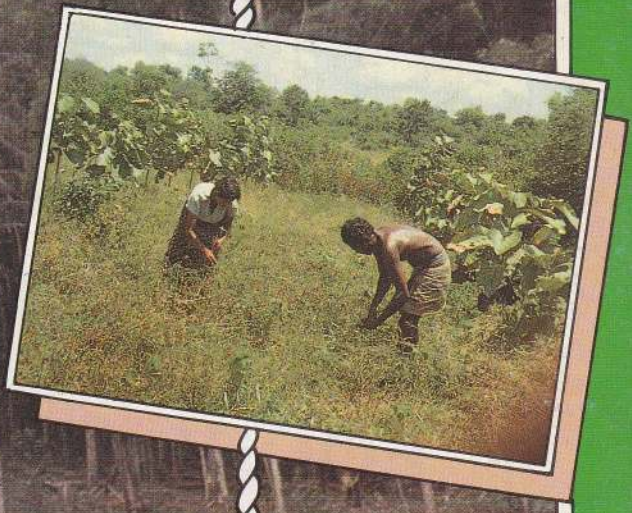
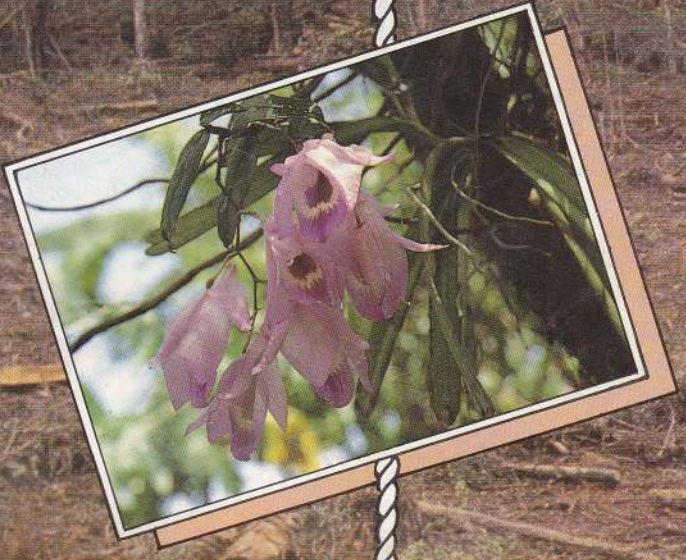
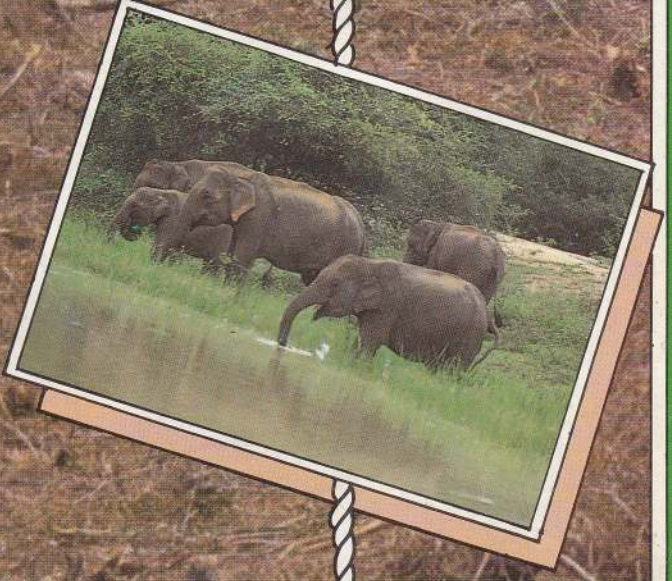


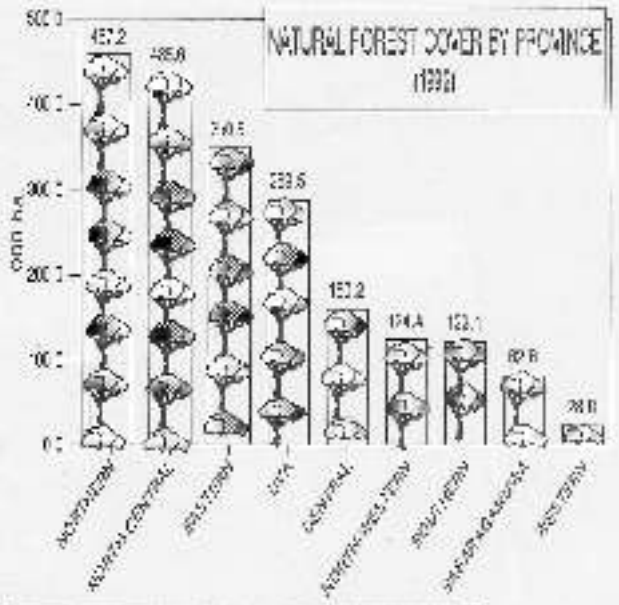


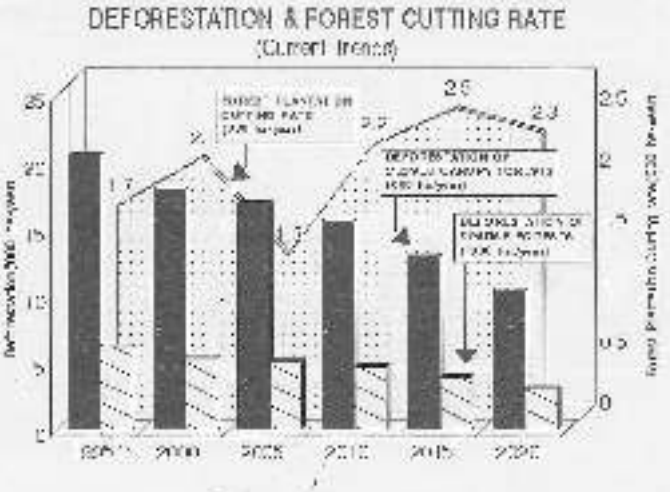


Forestation Vs Deforestation

the burning issues

A People's Bank Publication





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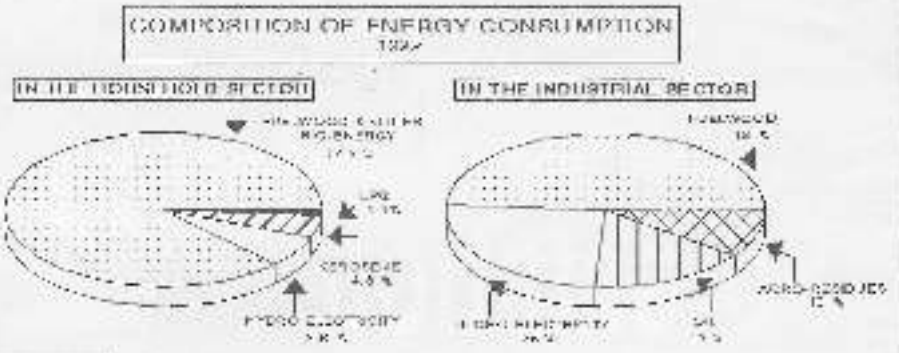

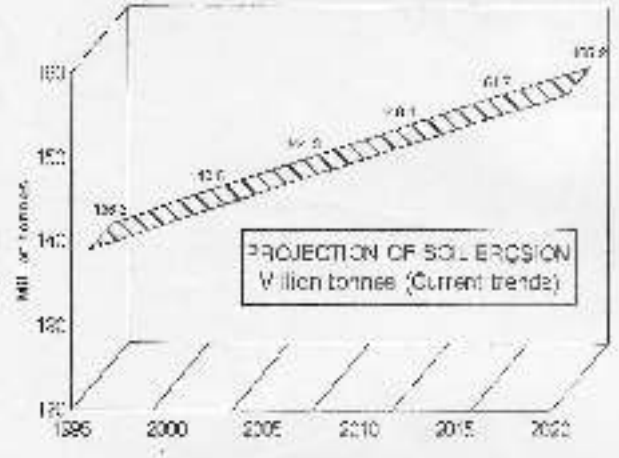

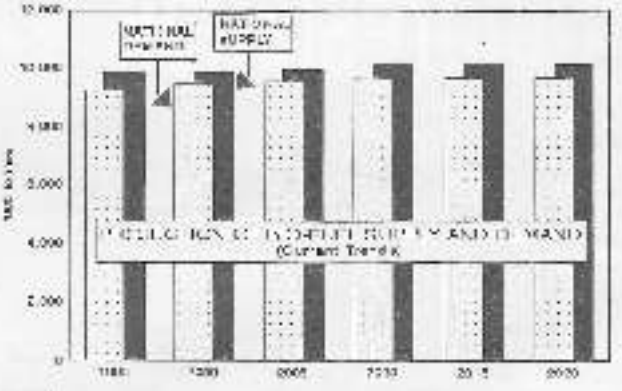

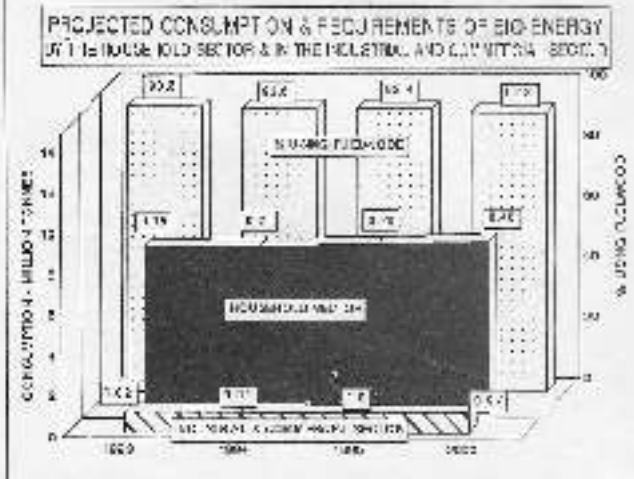

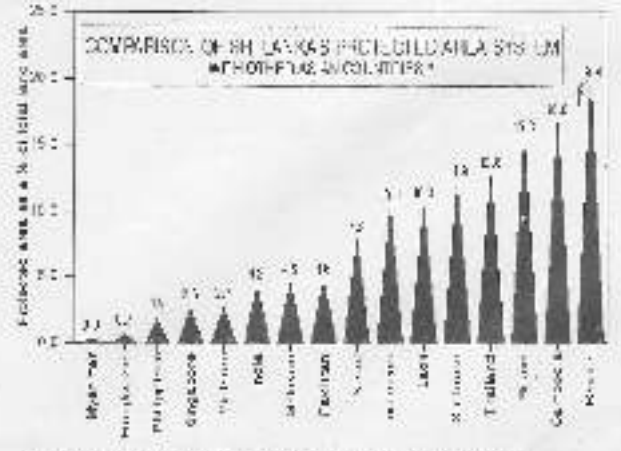

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THE ECONOMIC REVIEW is intended to promote knowledge of and interest in the economy and economic development process by a many sided presentation of views & reportage, facts and debate. THE ECONOMIC REVIEW is a community service project of the People's Bank. Its contents however are the result of editorial considerations only and do not necessarily reflect Bank policies or the official viewpoint. Signed feature articles also are the personal views of the authors and do not represent the Institutions to which they are attached. Similar contributions as well as comments and viewpoints are welcome. The ECONOMIC REVIEW reserves the right to edit all articles submitted. THE ECONOMIC REVIEW is published monthly and is available both on subscription and on direct sale.

Next Issue:
SAPTA and its impact on Sri Lanka

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Forestation Vs Deforestation
the burning issues

The value of forests for maintaining the global and local climatic balance, for protecting soil, for regenerating and regulating water resources, for preserving biodiversity and lastly but not least, as the natural habitat for millions of people the world over, cannot be quantified.

It is thus a matter of grave concern that the bulk of the world's primary temperate forests have been destroyed, giving way to logging and acid rain. As we speak, tropical forests are disappearing at the rate of over 100 acres a minute. If current trends are anything to go by, the global forest cover will have virtually disappeared by the next century. Side effects of this devastation are many: droughts, [illegible] disasters etc.

The consequences would undoubtedly be devastating. Severe ecological imbalances in soil, water and the climate coupled with the destruction of biodiversity and man's natural heritage will have global repercussions, disrupting the lives of forest people and farmers, as well as [illegible] repercussions, as floods, and erosion and water shortages seen in cities far away from the forests. Ironically, with the disappearance of, or disruption to, many valuable forest-based resources, serious economic problems will set in.

Several interwoven aspects make up the anatomy of the forest fabric. Chief among them is the environmental aspect, namely, the destruction of natural forests which must be stopped immediately. There must be a moratorium on all activities that destroy or damage primary and natural forests.

On the social side, it is imperative that the rights of the forest and indigenous people be protected. It is now widely recognised that the forest peoples with legitimate rights on forest areas, that they are key components in the future of biodiversity and cultural diversity. Therefore, any viable solution to the problem of the forests must protect and promote their land, economic and cultural rights while taking into consideration the needs and rights of their national counterparts who were, ultimately, the original forest dwellers.

There is also the economic aspect to be considered. Undoubtedly, several countries may have to strike a balance between the short and medium terms which would be considered a sacrifice, namely to conserve their forests and thus to deprive of temporary economic gains, because by conserving the forests these countries would lose or lose their revenues from the sale of logs, minerals and agricultural produce.

In this context, should not some compensatory mechanisms be established to offset at least some of the sacrifices these countries are called upon to make? If so, what form should they take? Should they be financial compensation for the loss of revenue, perhaps payments to peoples directly affected such as rehabilitation benefits for logging workers, debt relief and aid or grants to countries suffering from forest destruction or other ecologically sound alternatives; or should compensation be paid in kind or perhaps in some form of benefit a country obtains in recognition of its commitment to [illegible]?

Eco-tourism may be considered one means of income generation from forests. However, although its capacity for income generation is indisputable, should not its negative effects also be considered and plans made to mitigate them before a country embarks upon an intensive programme of ecotourism? Conserving forests will undoubtedly have an impact on the volume of production and export of forest-based commodities in the Third World, eg. timber, minerals and agricultural produce. To offset the loss in earnings, should mechanisms be established to ensure that [illegible] prices for these commodities reflect the intrinsic value of scarce forest products that can be made available without negative ecological effects?

Nations throughout the world expend massive sums of money annually in order to safeguard their rapidly dwindling forest resources. The forestry sector in the developing world is one of the most heavily funded, since donors have woken to the fact that the problem now lies at their back door. Large-scale reforestation has also been undertaken in several countries and legislation enacted with conservation in view. Despite all these attempts however, the end results have been far below expectations. The reason lies in the [illegible] but strong power bases opting for such deals. If one were to [illegible] political repercussions have on these issues and valuable forest resources. [illegible] if these power bases are disengaged [illegible] that conservation and the protection of forest resources would have a visible impact on conservation?

We approach the 21st century in the wake of issues like acid rain, deforestation and Global warming, brought about by the depletion of the ozone layer, has worsened as a result of deforestation. The rapid depletion of the forest cover has also contributed to the Greenhouse Effect. Indeed, the importance of forestry has reached such dimensions that the survival of the forests is now linked to the survival of the human race.

Since most of the world's remaining primary forests are in the Third World, and tropical forests are especially valuable for biodiversity conservation, it is therefore clear that a viable solution to the crisis in deforestation now lies with us.

RD

forest management with local community participation

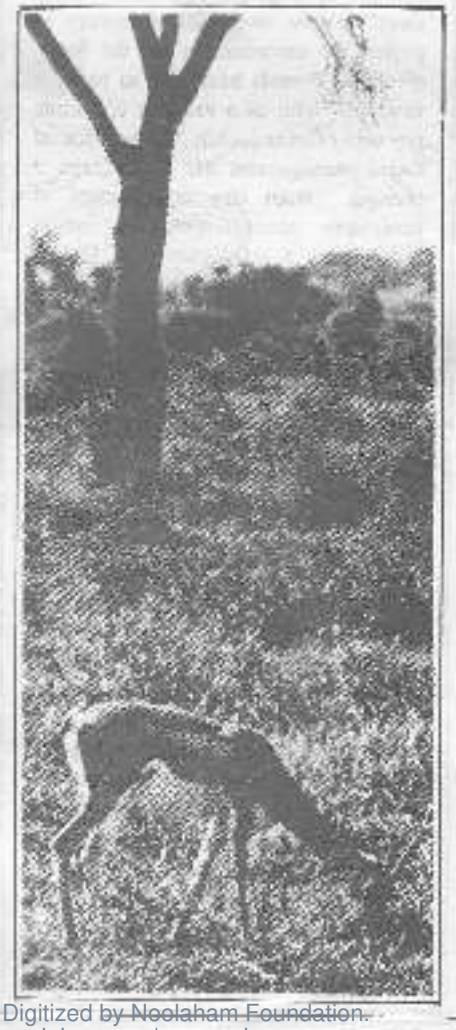
by Dayananda Kariyawasam

Extreme conservation and extreme exploitation of forests alternated at different points in time in the history of Sri Lanka's forests, arriving today at a crucial juncture in the management of resources to meet the growing demands of a burgeoning population.

To gain insight into forest management practices in Sri Lanka, it is necessary to briefly examine some of the major land-use changes and forest policies in Sri Lanka in a historical perspective. During the classical period, the village community lived in harmony with the neighbouring forest environment and had its own privileges and a good deal of self administration, foregoing independence from the Central Government, even in matters of jurisprudence. The former order was disrupted from beginning of the colonial administration - first the Portuguese and Dutch during the 16th century, and later the British who occupied the country until the first half of the 19th century - transformed the island's economy from one of reliance upon subsistence crops, to plantation crops.

The situation changed dramatically during British rule. Firstly, the colonists were attracted to the vast potential source of revenue from the sale of the timber resources. Large extents of forest lands were cleared and most of the valuable hardwoods creamed out and exported. Secondly, the British administration took over all uncultivated lands and made drastic changes in land use. Large-scale land development took place particularly in the upcountry areas. Initially with coffee and subsequently with tea; forests were cleared and converted into tea and rubber which was subsequently introduced to the lowlands. Thirdly, the people were driven from self-sufficiency and subsistence to labour, by the imposition of a tax on grain and the de-legitimising of their property rights. These major changes in land-use patterns and land policies resulted in the extensive denudation of the forests, further aggravated by an expanding population of a landless status.

The first authoritative enunciation of a forest policy for the country was in 1929 when forest management was organised along scientific lines. In Sri Lanka as elsewhere, the ideology of *scientific forestry* during this period was to promote economic growth through forest production. The emphasis was on the identification of management units and the preparation of management plans to manage the forests on a sustained yield basis. Export of timber continued in keeping with British colonial policies. State control or centralised management, with elements of conservation and 'scientific forestry' initiated by British foresters, was continued by Sri Lankan professionals who were trained in the West.



Governments in search of revenue have encouraged rapid timber exploitation in the past. Forestry policies require these agencies to follow sustainable yield logging practices, but the lack of incentives, limited monitoring capacity and corruption have led to over-cutting and the permanent degradation of many forest tracts. However, governments have recently begun to curtail commercial logging in response to the devastation it causes.

It was believed that the policy of promoting forest-based industrialisation would generate more employment, increase government revenue, enhance value-added in processing and establish wood-based industries. The experience of South-East Asia, in particular Malaysia and Indonesia where this policy was followed with some determination, indicates that the economic cost of this policy in these societies far exceeds their financial benefits.

In the meantime, the rural population, particularly the landless, created pressure on forest resources. Their relationship to forests has been one of antagonism. As pawns in the development process, rural peasants find themselves compelled to clear forests unabated. When the British conquered Sri Lanka, the indigenous population was estimated at 800,000 persons and it is reported that the forest cover was 84 per cent of the total land area. When they left a century and a half later however, the population had grown to more than 7 m. and the forest cover has declined to 50 per cent of the total land area.

When reviewing the Sri Lankan

economy as far back as three or four decades, one realises that a large proportion of the rural population sustained itself on the availability of forest produce. In the past small forests were attached to nearly every village, or in some areas, to groups of villages. However, when the population started growing at a faster rate, the forest, which met the requirements of the villagers in respect of fuelwood, small timber, grass, fruits, seeds etc., was the first to be acquired for food production, since food was more important than any other consumable. The poor and landless in the villages converted the forest into marginal agricultural land for the purpose of survival. The poor, who seem to be the main perpetrators of deforestation, have been pushed into this situation by unbalanced economic development which did not consider the social impact and the lack of equity in the distribution of state income.

The most important goal for the next decade will be to improve forest protection and management. Sri Lanka's forests are important because they provide fuel, fodder, food and income to the rural people, as well as timber, environmental services and watershed protection. These forests are being degraded continuously, due to the high pressure on resources. The country's rate of deforestation is the second highest in Asia, exceeded only by Nepal. Forest loss has been more critical in the biologically-rich wet lowlands which currently cover 9 per cent of the land area. Those that remain are in increasingly isolated patches. If Sri Lanka's forests are to be saved, a broader approach with effective management system is needed. Unless forests are seen as having an economic value to individuals, local communities and the nation at large, their degradation will continue. The goal should be to enhance the forests' contribution to the country's economic growth.

Forests require new and more effective management systems, not merely the application of silvicultural treatments to existing structures. For forestry programmes to succeed, the participation of forest dwellers is essential. Forestry is no longer the concern of only technical forestry

specialists. The Forest Department must obtain expertise from other disciplines such as ecology, economics, law and community organisations in order to meet the new demands on forestry to protect the environment and the forest dwellers. Forests have also to be seen in a new light: as a valuable economic resource. Consequently, the practice of forest management has to undergo a change, from tree management to ecosystem management, in which people play a significant part. Unless forests are seen as having an economic value to individuals, local communities and nations at large, and can also be used to promote economic development and alleviate poverty no matter how difficult these goals are, degradation may continue.

The main reason for resource degradation is society's lack of development. Therefore, we need to provide adequate income and employment opportunities by the wise use of these resources. This is the challenge faced by us today, which was not faced by professionals in the past. The task is first to provide for the needs of the people, needs that were earlier met by the forests, and secondly, to increase income and employment generation through the integration of forest management with the local economy.

Our goal should be to determine how knowledge and skill could combine people (labour), nature (land) and technology (capital) to increase the production of socially desired goods, benefits and services and to minimise or control undesired outputs. There is a great opportunity to enhance the forestry sector's contribution to the national economy and an urgent need for new strategies, new approaches and new institutional arrangements to meet these challenges. We are progressing in the development and implementation of more effective procedures and new management capacities for alternative management regimes. Action has already been taken to create a policy environment conducive to a shift from the management practices of the 19th century to newly adopted systems that may better respond to the social and environmental needs of the 21st century.

The National Forest Policy of 1995 has clearly acknowledged the interdependence between communities and forests and underscored the importance of forestry's contribution to the rural economy. In this context, the Forest Department is now progressing towards defining a national system of conserving forests in which bio-diversity is adequately represented, watersheds important for soil conservation and hydrology protected, and economic and social needs met. It is planned to address the conservation and socio-economic needs in an integrated manner through the sustainable utilisation of the products in these conserved forests.

Community management of local forests

The 10 most commonly occurring species in the moist monsoon forest

Local name	Species
Satinwood/Ranawara	*Chloroxylon swietenia*
Milla	*Vitex pinnata*
Velan/Weting	*Pterospermum canescens*
Dumbe	*Syzygium gardneri*
Damblaiya	*Grewia tiliifolia*
Kohuta	*Cassia arborea*
Wira/Vira	*Drypetes sepiaria*
Mora	*Euphoria longana*
Hamba	*Terminalia neolliptica*
Kumbuk	*Macaranga peltata*

Source : Sri Lanka Forestry Sector Master Plan - 1995 Ministry of Agriculture, Land & Forestry

has emerged as the most promising alternative to the state administration of this resource. The experience of India and Nepal suggests that if authorised by the government, communities living in the vicinity would protect the forest if assured of financial benefits in return. Communities that protect the forest resources from encroachers could save the government its expenditure on protection.

Colonial governments made a radical change over a century ago by imposing a state-administered system of forest management. It is now painfully clear that this system does not work; the degradation of forest resources continues. We should consider whether it is the appropriate time to bring back the traditional system of forest management wherein the ownership and management of the forest lies with village communities.

The overall goal is to institute participatory forest management with the local people in order to maintain these forests and enable them to continue contributing towards sustained rural development and to remain as the genetic resource of Sri Lanka. The guiding principles will be to:

- involve local people in the planning and management process;
- accommodate traditional resources-use patterns and land rights;
- direct the benefits of conservation towards local communities;
- integrate management plans with the socio-economic development of communities;
- incorporate all products obtainable from forest land, in management practices.

The premise is that communities living in or near natural forests would protect them if clearly authorised by the government. It has been increasingly recognised that if protected, degraded natural forests in the dry zone would regenerate rapidly and people should be entitled to a share of the benefits that would accrue from management. Ownership would continue to remain with the government but the usufruct would be transferred to the people. Communities will not take over the responsibility of management unless the government provides them with economic returns on their time.

There is ample evidence of collective action in the effective management of natural resources. In a society where trees and other land resources have been traditionally owned and managed by the community and where community mechanisms for such management remain comparatively strong, rural people feel a collective incentive to manage forest resources. The attachment of local people to their land and their affinity for existing ecosystems, may be positive forces in piloting long-term forest management.

Ecodevelopment denotes a combination of community forest management and activities designed to create alternative income in peripheral areas. It provides both incentive for communities to participate in joint forest management and a mechanism for reducing pressure on resources.

The proposed strategy is to protect the resource from unsustainable or otherwise unaccepted pressure resulting from the needs and activities of people living in and around such areas. It is based on the assumption that if alternative natural and social resources are created in peripheral areas, the exploitation of resources will be reduced. There is also the assumption that the involvement of forestry management in creating employment opportunities or in income generation will motivate communities to collaborate in protecting the resource.

Programmes would be based on the development of village-level, site-specific, microplans through a participatory process. The aim of the programme is to provide alternatives to the forest's present status as the source of income and employment for participating villagers.

The use of forests as places of refreshment and relaxation is certainly as old as their use for fuel and shelter. Forest - based tourism - ecotourism - can be a substantial income transfer and could permit the wiser use of resources because of the supplemental income.

The wilderness of the future should be for the education and enjoyment of the public. This means that, rather than seeking to reduce the number of people exposed to the ecological wisdom of parks and wildlands, we should be seeking the means to encourage and increase participation.

We need to be creative and innovative in order to encourage visitors to spend money and to make a profit out of the demand for leisure and recreation. We need to construct productive parks by revitalising established facilities. The crucial elements that would sustain protected areas in future would be the intensive development of attractive areas which would, (a) value and protect the character of important natural and cultural landscapes; (b) provide benefits for both conservation and recreation; and (c) consider not only the social and economic conditions of the local people, but also involve their participation in management.

It is important to link conservation activities with the social and economic development of local communities near and within protected areas. Parks should be considered multiple-use lands. The 19th century vision of parks and reserves is an inappropriate model for the 21st century and will be increasingly difficult to maintain. The most challenging task will be to derive productive jobs from environmental strategies. What is needed is integrated value-added ecosystem management of the forest landscape. In simple terms, this requirement forces us to think not of individual problems but of how they can be combined to provide a solution. We need to achieve our goals of conservation by promoting development and by providing local people with alternative income sources that sustain rather than threaten the flora and fauna in natural habitats.

National Forestry Policy for Sustained Development

by
Thosapala Hewage
(Director, Forestry Sector Development Division, Ministry of Agriculture, Lands & Forestry)

recognising the fact that state agencies alone cannot protect and manage forests effectively, the National Forest Policy was designed to promote the participation of the people

Before discussing how the National Forestry Policy (NFP) could contribute to sustainable development, we need to have a clear definition of the concept of *sustainable development*. From an economic point of view, sustainable development means the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. The goals of economic and social development must be defined in terms of sustainability in all countries.

Sustainable development can also be defined as the management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment, and continued satisfaction of human needs of the present and future generations. Within the perspective of such development, it is essential to conserve land, water, plant and animal genetic resources in a manner that is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

Going by the above definitions, we should now examine whether the National Forestry Policy which has already been accepted by the government, possesses the essential characteristics of sustainable development. The first and foremost characteristic is the need for a long term vision.

We are aware that population increase and the various remedial measures adopted in the recent past to meet the basic needs of the increasing population, have resulted largely in the depletion of the country's natural forest cover. Meanwhile, the absence of a widely accepted and explicit land use and forestry policy as well as an integrated comprehensive long term framework for the implementation of such a policy, was seen as a major constraint faced by the authorities in finding effective and sustainable solutions to the multitude of problems prevailing in the forestry sector. Even though a few piecemeal policy statements had been announced from time to time with a view to solving isolated issues in the forestry sector as and when such issues came up, these policy statements have proved to be either ineffective or unenforceable and had failed to find lasting solutions to major problems. These policy statements in most cases, were based on an unrealistic assessment of the current situation and lacked a long-term vision.

But the NFP acknowledges that the natural forests are heavily depleted and expresses concern for safeguarding the remaining natural forest for posterity in order to conserve bio-diversity, soil and water resources. It emphasises the importance of retaining the present natural forest cover and increasing the overall tree cover.

The second important characteristic is the environmental aspect of sustainable development. Little importance was attached to environmental concerns in past forestry policies. A major shortcoming was the lack of a balance between production and conservation and between commercial and social objectives. The NFP however, seeks to provide greater environmental security in its development

strategies. In the context of both these characteristics, ie. - the long-term vision and environmental safeguards, it would be pertinent to quote the National Forestry Policy objectives,

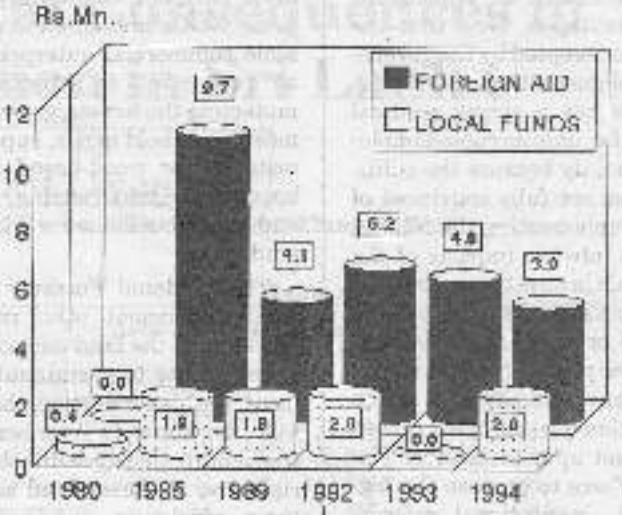
(a) to conserve forests for posterity, with particular regard to biodiversity, soil, water as well as historical, cultural, religious and aesthetic values.

(b) to increase the tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services.

Forestry covers bio physical and environmental components such as land and biological resources (fauna and flora) found in natural forests, forest plantations, areas covered by tree crops and home gardens outside the forests, soil and water supplies and the mitigation of atmospheric pollution and global warming.

The policy on the management of state forest resources states that all state forest resources will be brought under sustainable management both in terms of the continued existence of important ecosystems and the flow of forest products and services. Multiple use forestry is to be promoted and natural forests outside the protected area system should be used sustainably to provide for the ever-increasing demand for bio-energy, wood and non-wood forest products and various services, especially for the benefit of the rural people. The overall objectives of the NFP are intended to give a clear indication of what the forestry sector should look like in the 21st century. Long-term national level planning is needed for achieving these objectives because the forestry sector is characterised by the long growing periods of trees and long gestation periods for investment. NFP provides for a number of strategies that would ensure the fulfilment of these long-felt needs.

The third important characteristic is that the policy must be socially acceptable if it is to contribute to sustainable development. The Sri Lankan people have co-existed with the forests for centuries and have close cultural and sometimes even spiritual ties with them. These values must be recognised and respected.



It was realised that most of the national forestry policy statements introduced in the past, tend to reflect the concerns, aspirations and professional views of Forest Department staff resulting in narrow perspectives, and preoccupation with the agency's function, its concerns and the territory under its control, thus leaving the people far removed from the decision-making process. In most cases, interested stakeholders were not consulted to express their interests, concerns and ideas. Therefore, attempts to conserve and protect the forests have been ineffective due to the lack of participation. Decision-making was not people-centred. Having observed these shortcomings and lapses, a more people-centred and participatory approach was adopted in the process of formulating the National Forestry Policy, which can be described as the outcome of a participatory policy formulating process lasting for almost a year.

The policy recognises that the state agencies alone cannot protect and manage the forests effectively. People's participation in forestry development and conservation are to be promoted.

NFP envisages participation in the implementation of the policy as well. Policy statement relevant to this aspect reads,

For the management and protection of the natural forests and forest plantations, the state will, where appropriate form partnerships with local people, rural communities and other stakeholders and introduce appropriate tenurial arrangements.

Development strategies envisaged by the policy must also be technically appropriate and economically viable if sustainability is to be achieved. Policy statements relevant to these aspects are as follows:

- Degraded forest lands will be rehabilitated as forests for conservation and multiple-use production where it is economically and technically feasible, mainly for the benefit of local people.
- Planned conversion of forests into other land uses can take place only in accordance with procedures defined in legislation and with accepted conservation and scientific norms.

Conditions for Sustainable Development

In this discussion, we should also examine whether the National Forestry Policy fulfills the necessary conditions for sustainable development. A major shortcoming observed in past forestry policy statements is the insufficient implementation of policy intentions or implementation failures, caused mainly by the absence of a political will for their implementation. A strong political commitment is an absolute condition for sustainable development and would greatly contribute towards the better management of forest resources. In the case of the NFP, clear and specific strategies are laid down as to how the political will expressed in the policy statements is to be implemented by administrative and management action. Legislative and institutional reforms are important strategies in translating policy statements into action as they provide the

necessary framework for implementing other strategies. Now that the NFP has been accepted by the government for implementation, there is no doubt that it has a strong political commitment for uninterrupted implementation, mainly because the political authorities are fully convinced of the need for implementing the NFP in view of the adverse impacts of the negative trends in forestry, on the ability of the nation's forests to provide the much-needed products and ecological security for the people. Several meaningful steps have already been taken in this direction-e.g. the government has already set up a 14-member National Task Force to propose the legislative and institutional reforms needed for the implementation of the NFP.

Another condition for sustainable development is the need for a multi-sectoral approach. We are aware that the forestry sector is closely interlinked with several other sectors such as agriculture, energy, wildlife, livestock, industry etc. Taking this factor into account, the NFP provides several strategies to support policy on inter-sectoral linkages, eg. - consistency between the NFP and other policies will be ensured by establishing a multi-sectoral National Forestry Policy Committee which will have representatives from all the relevant ministries, implementating agencies, national forest industries, NGOs and other parties involved in forestry development. Several other strategies have been proposed to maintain inter-sectoral collaboration. A multi-sectoral approach is needed with regard to sociological, environmental and rural development fields too. The proposed National Forestry Policy Committee will co-ordinate activities carried out in each of these fields, to avoid duplication, conflicts and waste of funds.

Involvement of the local people by way of adopting a participatory and partnership development strategy will be another condition for sustainable development. NFP emphasises the need to develop partnerships with local people, communities, NGOs and, other local groups outside the state sector. The policy aims at broadening the institutional framework for management, with clearly defined roles and responsibilities for the various partners. Farmers, community organisations, NGOs and small and medium-scale commercial enterprises should all have a role in activities such as protecting the forests, growing trees to meet household needs, supplying raw material for wood-based industries, harvesting, transporting, processing and distribution of various forest products.

The National Forestry Policy can also complement other related policies such as the land-use policy, if it is to contribute to sustainable development. In this connection, the state will take measures to improve land and tree tenure, clearly define the property rights on all forest land and enforce them efficiently and fairly, paying special attention to land-use arrangements in disputed areas.

What the NFP envisages for the successful implementation of the policy is clearly illustrated by the relevant policy statements quoted below:

Policy on institutional support for forestry development:

* The National Forestry Policy will be kept up-to-date and implemented in a participatory and transparent manner.
* Legislation will be amended or revised as necessary, to support the implementation of the policy.
* The state will provide support to the various resource managers for sustainable forestry development and its institutions will be reoriented and strengthened to enable them to accomplish their role.
* The state will coordinate, carry out and promote research that pays attention to the requirements of beneficiaries and support the implementation of the sectoral policy.
* NGOs and community-based organisations will be supported in their forest-based rural development activities.

Finally, we need to highlight the NFP strategies designed to promote sustainable land use for forestry and it may be relevant to quote the various strategies as stipulated in the policy.

(a) allocation and zoning of state forest land for conservation agroforestry and forest plantation development in order to establish a Permanent Forest Estate.

(b) all forests will be brought under management by allowing for combinations of managers including state agencies, and managers outside the state sector such as local people, user groups, rural communities, NGOs, the estate sector, and local industries. However, natural forests should be managed only by the state agencies together with the local people and communities, possibly assisted by NGOs.

(c) State forest land will be allocated for management in the following categories.

(i) *Class I forests*. These forests should be strictly conserved or preserved to protect bio diversity, soil and water and historical, cultural, religious and aesthetic values. Research is allowed in these areas.

(ii) *Class II forests*. Non-extractive uses (such as scientific research, protection of watersheds and habitats of wildlife and regulated nature-based tourism) should be allowed, as well as the controlled collection of non-wood forest products and dead fuelwood by local people living adjacent to the forest.

(iii) *Class III forests* - for multiple uses. These forests should be managed,
- primarily for the sustainable production of wood for the national interest on the basis of management plans to be developed by the state, and
- for the sustainable production of wood and non-wood forest products for the benefit of adjacent communities.

Class III would also include buffer zones to protect Class I and II forests. The 'FSMP' sub programme on multiple-use forests covers this category.

(iv) *Class IV forests* consist of forest plantations and agroforestry systems on state lands. These lands would be managed for the production of wood and non-wood forest products by the state and non state sectors. Deforested and degraded state lands suitable for plantation forestry and agroforestry development would also be included in this class.

Environmental Consequences of Deforestation in Sri Lanka

by
Sunil Liyanage
Deputy Conservator of Forests (Environment Management)

Sri Lanka was almost entirely covered by natural forests until the invasion of the British. Since that time, the closed canopy of natural forests has dwindled rapidly, from about 80 per cent at the beginning of this century to 24 per cent in 1992. The present forest cover of the country estimated is given in Table 1.

Table 1

Area of natural forest cover in 1992

Forest Type	Area (ha)	% of forest	% of land
Montane forest	8,109	0.39	0.06
Sub-montane	68,818	3.36	1.05
Lowland rain forest	111,506	5.91	2.18
Moist monsoon forest	248,856	11.91	3.72
Dry monsoon forest	1080,881	53.39	16.64
Dry zone riverine forest	22,467	1.10	0.34
Mangrove	12,503	0.61	0.19
Sparse	464,076	22.67	7.05
Total	2047,105	100.00	31.23

Deforestation and degradation of forests is one of the major environmental problems in the country. Deforestation is defined as being the transfer or alienation of forestland for non-forestry purposes. Some deforestation is controlled and has taken place following legal decisions or other official declarations to change land use from forestry to other uses.

The main causes for deforestation are:

(1) shifting cultivation,

(2) forest areas encroached upon in a disorganised manner by lowland village communities, and converted into agriculture fields.

(3) forest lands converted legally or through state support for organised forms of settlement, e.g. permanent agriculture, plantations, transmigration, refugee rehabilitation, etc.

(4) forest lands transferred to other uses to meet the requirements of planned development e.g. water storage reservoirs, hydro-electric schemes, roads, urbanisation, mining etc.

Degradation means that the production potential of the forest area is reduced through some outside factors which could be the result of damage to either the soil or to the growing stock.

Degradation is in most cases a gradual process, with a decrease in biomass, change in species composition or change in soil conditions. It seldom shows up on aerial photos and is difficult to quantify area-wise or even in economic terms. Efforts should be made to classify the different types of degradation and suggest methods to re-

duce damage caused to soil and growing stock.

The main causes for degradation of forest resources are listed below:

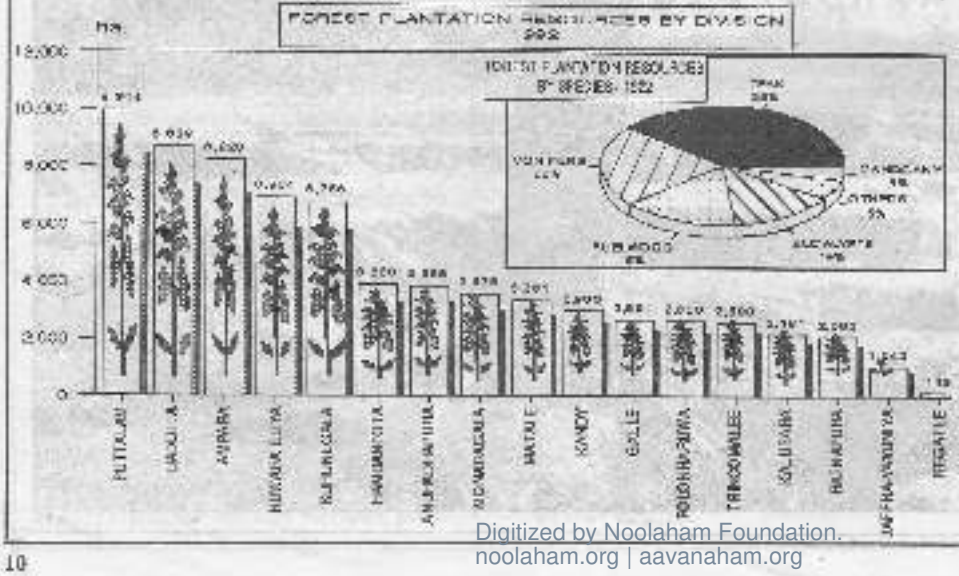
1. Over-exploitation (beyond the limit of natural recovery) and damage to standing trees and regeneration during logging. Damage to the soil (compaction, erosion) when the ground is bared by tractor tracks skid trails, landing etc.
2. Almost half the quantity of wood cut is used for fuel. In areas under high population pressure, excessive harvesting will lead to the degradation of the forest resources and in extreme cases, to soil erosion.
3. Grazing and lopping for animal fodder in forest areas.
4. Forest fires.
5. Insect pests and diseases.
6. Natural disasters (hurricanes, typhoons, floodings).
7. Mining-related damage.
8. Spraying by defoliants etc.

Logging damage cannot be avoided if the forests are to be harvested. However, by selecting methods and equipment and through strict control, damage can be reduced to a level that is acceptable in economic and silvicultural terms. Most of the other causes can also be minimised. In areas that are frequently hit by winds, it may be possible to select logging systems that make the remaining trees more resistant to heavy winds.

Sri Lanka has 30 per cent forest cover at present. Dense closed canopy forest is about 21.8 per cent. When closely examined, the qualitative changes of the forests are visible and this is indicated by the changes in spp composition, structure and the reduction of the valuable spp of the forest.

However, where forest land has been completely converted to other land uses, only the quantitative changes are more visible. This may be the reason that qualitative changes are not considered or given proper priority. Deforestation and degradation are continuing even today due to institutional limitations and other related problems. This is the general pattern all over the island. In the light of the increasing demands placed on forestry products and services, the diminishing capacity of forests to meet the various needs of the people has become a major issue.

It is assumed that, prior to taking decisions on clearing forest lands for development programmes, consideration has been given at both the local and national levels about the environmental and other effects of the conversion of forest land. This does not mean that all government-sponsored conversion schemes should be considered the final solution for land use. Critical analysis should always be carried out after some time, taking into account socio-economic and other aspects. If such evaluation shows that forestry would be a better alternative for land use in some areas, steps should be taken for the re-conversion to forestry.



In the conversion to forestry use however, this aspect is not properly considered in the many development programmes undertaken.

The web of factors contributing to deforestation and degradation in Sri Lanka are extensive and complex. Deforestation is a result of many factors which are either inter-connected or act separately. The most important causes for deforestation and degradation are explained below.

Poverty

The most important factor is the poverty in the rural areas that is always linked with landlessness and inappropriate land use patterns. The majority of the rural population depends on the agriculture sector, either settled agriculture practices in paddy fields and the uplands or in shifting cultivation.

However, the low unit area production in rural agriculture and the increasing cost of fertilizer and pesticides further deepen the poverty level.

Agriculture

Large-scale agricultural development programmes such as Mahaweli, Kirindi Oya, Udawalawe have had a major impact on natural forests. Chena cultivation is considered one of the main reasons for deforestation but its real contribution to deforestation is less than usual estimations. Food production has been increased by the expansion of the agricultural area. The unit area of agricultural production other than paddy, tea and a few other crops has not increased to significant levels. It is also interesting to mention that more than 70 per cent of the population is involved in the agriculture sector.

Non-sustainable forest uses

The main reason for the qualitative changes of the forests are illicit fellings and excessive extraction from the natural forests. This excessive extraction of commercially important woody species has changed the species composition and structure in many wet zone forest areas, particularly in the Kanneliya-Dediyagala-Nakiyadeniya forest complex in the Southern province.

Population growth

Population growth has also had some impact on deforestation. In a predominantly agricultural economy like Sri Lanka, the impact of population expansion on the forestry sector is significant, but is not as severe as the migration of rural communities to more urban areas and the shifting of employment patterns from the agricultural sector to non-agricultural sectors. Population expansion mainly occurred in the urban areas. Urbanisation and migration to urban areas occurred rapidly in the past and these continue even at present at a significant rate. This reduces population pressure in the rural areas, where most of the remaining forest areas exist.

Increasing demand for forest products

The depletion of forest resources is also closely linked to the high demand for forest products. Economic growth and development programmes, particularly in rural areas, have resulted in higher demand for housing and business construction, which has automatically increased the demand for forest products. The lack of alternatives for non timber based furniture and construction materials and the poorly developed plywood industry are the main causes for higher dependancy on timber of the furniture and construction industries.

Inappropriate land use practices

The more significant cause for continued deforestation is the absence or lack of proper land use plans on a regional basis. This is an obvious fact when considering existing land use patterns in many regions. It is clear that most of the land under agriculture, particularly in the wet zone in the up-country region, would not be under agriculture if proper land use practices had been adopted at the beginning of this century.

The most serious consequences of deforestation and degradation of forests are:

(a) Erosion of bio-diversity in the forests and the loss of valuable genetic resources.

(b) Irregular water flows and the drying up of natural springs and the the reduction in the base flow of streams.

(c) Shortened life spans of irrigation channels and reservoirs.

(d) Soil erosion and associated loss of soil fertility which reduces agricultural productivity.

(e) Increased scarcity of wood which results in rapid price increases in wood and wood-based products.

(f) Scarcity of fuelwood in rural and urban areas.

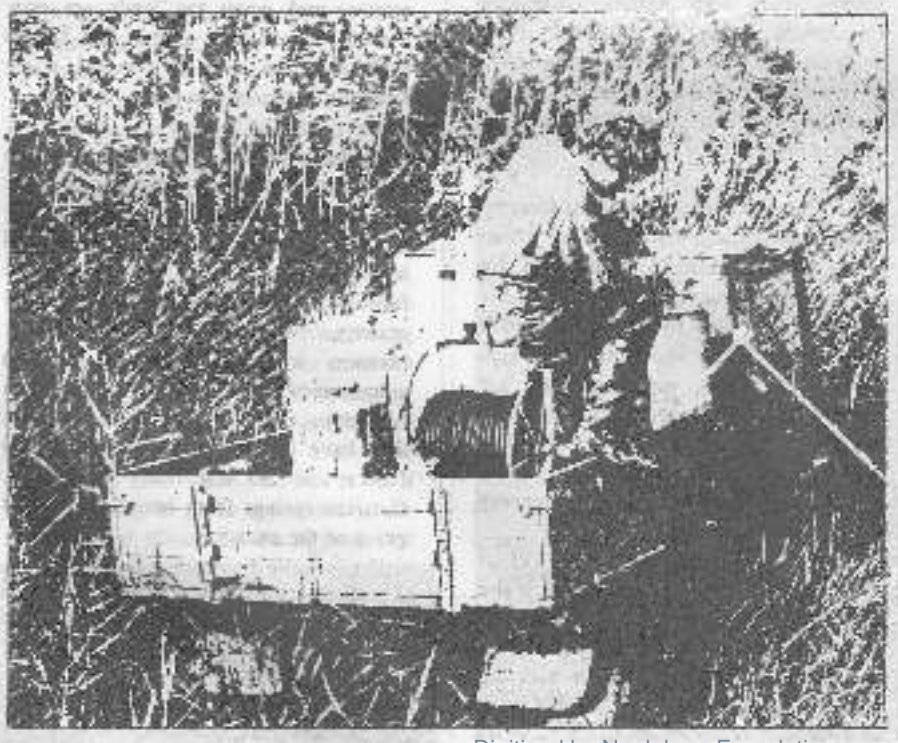
(g) Contribution to Green House gas emission and climate changes.

(h) Qualitative changes in the forest structure/composition which decrease the value of the forest.

As a result of deforestation, forest area per capita has declined from about 1.3 ha. in 1900 to less than 0.1 ha. in 1992. The remaining natural forests are placed under increasing pressure due to agricultural development programmes and the growing population.

With this, competition for cultivable land is likely to continue unless suitable measures are taken immediately.

Deforestation can have both local and national consequences. Locally, the climate may become more extreme, soils may suffer physical and chemical deterioration and hydrological balances may be perturbed. Massive deforestation may alter the local and regional atmospheric water balance, which could affect weather patterns. There is particular concern over the loss of bio diversity. The total number of species in the tropical moist forest is not known. Even in Sri Lanka, only a few studies have been carried out in this field and existing knowledge is not sufficient to come to any valid conclusions. The pattern of species likely to be extinct depend on the amount and the spatial arrangements of forests which are altered or destroyed. A better understanding of the processes of deforestation and degradation is very important in the conversion of forest lands to non-forest land uses or even the designation of forest areas for conservation purposes.



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Face to Face

Legislation to protect forest fauna and flora

the Economic Review in conversation with Jagath Gunawardena

Q: ***At present, deforestation seems to have reached very high proportions in Sri Lanka. What is the legislation which has been enacted to ensure the protection of forests and the promotion of eco-friendly activities?***

A: Several ordinances have been enacted over time, to protect forests. The Forest Ordinance of 1917, declares forests to be reserves, administered under the Forest Dept. An equal number of forests are also protected under the Fauna and Flora Protective Ordinance. Smaller tracts of forest fall under the State Lands Ordinance which empowers government agents and divisional secretaries with forestry administration. The most recent ordinance, the National Heritage Wilderness Areas Act of 1988, covers the administration of the Sinharaja Forest only.

Under Section 5 of the Intermeddlers with Suitors Ordinance, it is an offence to interfere with any suitor who has any matter with a court of law. Such an offence can be punished with a fine of upto Rs 100.

Stringent measures have been taken to safeguard teak plantations - for instance, the necessity of obtaining permission from either the Forest Dept. or the GA before teak plantations can be felled, and under Section 22 BB (3) of the National Environmental Act, an Environment Impact Assessment Report must be made within a 30 day period in the event of felling exceeding 1 ha., in forest area.

As part of their duty as law enforcers, the police, too, are empowered to stop all offenses under any of these acts.

Q: ***These stringent laws seem to have had little effect on mitigating or eliminating the denuding of forests, poaching and other practices detrimental to the sustained development of the forests. How do you explain this?***

A: Legal support is inadequate. Laws are being slackened rather than tightened to safeguard the forests. Earlier this year, a cabinet decision was taken to reduce the mandatory period for the filing of the Environment Impact Assessment Report from 30 to 14 days. Subsequently however, a memo has been put to revoke this decision to 30 days.

Even the fine of Rs 100 imposed on offenders under Section 5 of the Intermeddlers with Suitors Ordinance (mentioned earlier) is extremely low, since this ordinance was enacted in 1894, over a century earlier. It is insufficient to deter anybody from committing such an offence now.

There are very few incentives for forestry officials to enforce the law. Very often, state forestry units are impeded by inadequate personnel and facilities for enforcement. The flying squad which used to perpetrate spot raids has been dismantled. Illicit timber fellers are usually supported by powerful mudalalis backed by corrupt politicians who have vested interests in timber felling. Dry zone teak plantations especially, witness the most amount of illicit felling.

Coupled with illicit timber felling is the felling of mangroves and wetlands. All these practices have contributed towards excessive deforestation, began with the arrival of the British.

In ancient times, before the construction of a tank, the king decreed that the surroundings of the proposed tank be undisturbed for a lengthy period, because even the ancients understood the necessity of maintaining the ecological balance.

But, with the arrival of the British, a systematic and carefully planned strategy was evolved to destroy most of the tanks, with the aim of breaking the dependency of the people on subsistence agriculture and making them a servile race. As a result, many of the tanks in the North Central province were destroyed. Mr Sooriya Gunasekera, former Snr. Asst. Secy., Min. of Culture, also mentions this phenomenon in his writings.

It is essential to rejuvenate the catchment areas. Highlands are the hub of our country. The British colonialists converted our most fertile lands to tea estates, and many tea lands are now barren because after a time, tea cannot grow on these lands due to the water retention in tea estates being very low.

It is also a matter of concern that cash crops are now being introduced at the advice of the World Bank. Paddy may not be a lucrative crop at the commercial level, but it provides subsistence to the farmers and is an essential crop for the country. Most of the World Bank planners including their Sri Lankan counterparts, are not realistic when developing the Sri Lankan model because they have not lived and worked in Sri Lanka and are not really concerned. Concern springs from knowledge and a grasp of the situation.

Jagath Gunawardena is a lawyer and an environmentalist. He is professionally qualified in agriculture. His current interests include ornithology and marine biology.

RJR

Reforestation with exotics vs indigenous species

separating fact from fiction

by A.S. Widanapathirana

Monitoring and Evaluation Specialist, Participatory Forestry Project, Forestry Dept.

contrary to popular opinion, reforestation with exotics leads to the regeneration of degraded lands, rejuvenation of indigenous species and is of benefit to man and society

The criticism begun in the 1980s, by Sri Lankan conservation groups and certain NGOs, about the planting of exotic tree species such as pines for reforestation purposes, continues to date. Extensive coverage has been given to the subject in the national and international press, where the authorities have been blamed for planting exotic species. This criticism has been made in many other parts of the world as well.

The critics' main claim is that the natural vegetation has been replaced with artificial and monoculture forest plantations, thereby causing ecological problems. It is to be noted that many of the articles that appeared in the print media have not been based on actual facts and scientific data. Occasionally however, experienced foresters have explained the actual situation of reforestation using exotic species as well as related issues, a function which the authorities themselves have neglected to perform. Since the questions raised by the public have not been fully answered due to whatever reasons, there is a tendency to believe that exotic species of trees are unsuitable for reforestation. It is a shortcoming in press opposition to the planting of pinus and eucalyptus, that the views of the farmers adjoining these planted forests have not been adequately considered, for it is the farmer who will be the first to see the benefits or disadvantages of growing exotic trees.

It is in this context that this commentary seeks to clarify some of the issues raised by members of the general public. This article is based on the review of available scientific literature as well as on discussions with farmers in several parts of the country.

Why cannot indigenous species be planted on degraded land?

At the outset it should be acknowledged that the best solution would be to plant indigenous species on degraded lands. This basic premise is based on the principle that the indigenous species have, over several centuries, adapted to the local ecological environment through a process of natural selection.

Any species introduced, be it plant or animal, is prone to new diseases, pests and other problems. Therefore, reforestation using indigenous species is not likely to give rise to any pests or disease or to alter the microclimate of the area in which they are planted. Secondly, indigenous species have

Pinus Plantation

several uses for the local people and their cultivation is hence beneficial to them. This follows that a natural cover of forests is the best form, but whether it is always possible to establish a natural cover in areas where it has been lost is the question that has to be answered. Due to the severe land degradation taking place, the natural cover has been lost, which makes the re-establishment of vegetation a more difficult exercise.

By exotic species we mean those which have been introduced to this country from elsewhere. Examples of exotics often used for reforestation are: pinus eucalyptus, teak (Tectona grandis), mahogany (Swietenia macrophylla), casurina, ipil-ipil (Leusinia spp.), alstonia, para-mara (Santania saman), gliricidia (Gliricidia sepium), acacia. Most of these species were introduced to the country in the late 19th century. We must also not forget the fact that exotic plants are also used for large-scale cultivation purposes, two such plants being tea and rubber.

Are these exotic species unsuitable for Sri Lanka?

Almost all tree species introduced have, over the years, adapted to a certain degree to the agro-ecological characteristics of the country and their growth performance has been found to be satisfactory. Some species such as gliricidia, mahogany and teak are so widely spread that many believe they are non exotic. Nobody has raised any issues, whether ecological or otherwise, with regard to the three exotics mentioned above. Therefore, it is to be noted that there is no truth in the statement that all exotics are bad for reforestation in this country.

The Forest Department has used mainly degraded soils and patna lands for reforestation with pinus and eucalyptus.

As at end-1992, 839,000 ha. of land was planted with exotic species such as pine, eucalyptus, mahogany, conifers, etc. Pinus has been used for reforestation of patna land, whereas eucalyptus is used for reforestation of abandoned tea lands. Both these lands are inhabited by grass and fern species. It is to be noted that some of the grasses dominating these patna and abandoned tea lands are also exotic species such as iluk (Imperata cylindrica) and mana (Symbupogan spp.).

Why this furore over exotics?

It is claimed by NGOs and ecologists that exotics such as pinus and eucalyptus have caused many ecological problems, among them being, (a) water scarcity and drought; (b) resultnot poor under-growth; (c) provision of poor habitats for wildlife; and (d) destruction of the ecology of patna lands. They also command that pinus and eucalyptus promote fire hazards, as the thick mat of needle-shaped leaves do not decay fast. It is also alleged that exotic species promote soil erosion and their fast growth habit exhausts the fertility of already degraded patna soil. It is to be stressed that the above allegations have not been scientifically proved.

Many of the above drawbacks have been reported in the case of eucalyptus and pinus. In fact, there are no adverse reports with regard to species such as mahogany, teak, gliricidia and acacia which are also exotic species. Therefore, the claim that exotics in general are bad cannot hold true.

The facts

In reality, no experimental evidence exists to show that planting pinus leads to water scarcity and drought. Carefully conducted research indicates that pinus plantations have increased the infiltration of water, reduced run off, increased base flow and reduced silt load. These experiments indicate that the loss of soil in pinus plantations is six times less than in abandoned tea and patna lands. Another view held by the public is that the needle-shaped leaves of pinus do not decay fast, resulting in increased soil erosion. It is true that the leaves do not decompose fast, but there is no truth that such leaves when not decomposed cause an increase in soil erosion. In fact, a cover over the soil surface results in reduced soil erosion, as the direct contact of rain drops over soil particles is eliminated. Moreover, the cover of pinus leaves helps to slow down the speed at which water runs over the surface, thus reducing soil movement.

Although there is no experimental evidence to support this in Sri Lanka, farmers in areas near eucalyptus plantations indicate that the cultivation of this species does reduce soil moisture. However, this species has other advantages.

The second reported problem is that of decreased under-growth. It is said that pinus and eucalyptus do not promote any under-growth and that these forests are artificial. This, however, is untrue. Eucalyptus plantations in Badulla, Habarana, Kurunegala, Nuwara Eliya have produced prolific under-growth, consisting of natural species such as grass, kenda, ferns, gediniba. In the case of pinus, the under-growth depends on the location of the plantation. In the Wet Zone, all pinus plantations have a thick under-growth consisting of local species of trees and grass. The problem is in the up-country Dry Zone where under-growth is low or absent. The under-growth here is so sparse that people cut grass from the eucalyptus plantations for feeding their cattle. In the up country Wet Zone districts once again, there is prolific under-growth.

The allegation about wildlife is also baseless. People in the Badulla area have reported that after planting eucalyptus in patna lands, giant squirrels, monkeys, mongoose, etc. have reappeared. There is also increased birds activity and nesting grounds have been made in the eucalyptus trees and pinus plantations. There are several other types of wildlife in these plantations too.

The next contention is that pinus and eucalyptus plantations do not benefit the local people. This is a misconception. According to the locals in Badulla, Nuwara Eliya and the Pattipola areas, both pinus and eucalyptus plantations provide them with several benefits. Eucalyptus is the only tree available for poles and round timber in many up-country areas and is also used for sawn timber, fetching a very good market price. Farmers who had planted eucalyptus under the Forest Department's Community Forestry Project (CFP) in the late 1980s are able to sell a pole at the present market value of Rs 1,000. In another 10 years, the market value per tree could increase to well over Rs 30,000/-. A farmer who has 400 trees will therefore become a millionaire in a few years. Farmers stated that eucalyptus is the only timber available for their house construction and for village structures. Donation of

poles for fellow farmers and for the construction of common amenities such as temple houses, society halls etc. has promoted inter-farmer cooperation and good will which cannot be quantified in monetary terms. The wind speed is still high in tree-less terrains in the area and every year, at least 3 to 4 houses in each village are destroyed by the wind. The species is also used for railway sleepers. In terms of timber quality, it is considered equivalent to imported Campas timber. It is estimated that 4 percent of the total timber supply of the country during 1991 and 1995 was met by pinus. This will increase to 7 per cent as more and more plantations will mature between 1996 and 2000. Leaves of the red gum are used for extracting oil, and people in areas like Ohiya and Pattipola supplement their income through the cutting and sale of eucalyptus leaves for oil extraction. Pinus provides poles and is also used as sawn timber. In addition, it is used for panelling work, light furniture manufacture and other light wood work. Pinus trees can be tapped to obtain a resin which is in high demand. Already there are about 30 pinus plantations being tapped and over 1,500 people are employed in the resin tapping of these plantations. Data to show the income support to the local people from pinus tapping is not presently available.

A study by John Clegg and Company in 1993 shows that it provided an income of Rs 1,800 per tapper per month at that time. Resin tapping is not time-specific and can be adjusted to the time suitable to the local people. The study also indicates that the majority (about 75 per cent) of resin tappers are females. The people in the above mentioned areas also indicated that if not for the planting of eucalyptus, there would not have been any other type of timber to meet their day-to-day requirements. A large number of people cut grass grown naturally under eucalyptus plantations for cattle feeding, another benefit to the local people. Pinus and eucalyptus also create employment opportunities for the local people - in planting, timber harvesting and transportation. Exact figures cannot be worked out due to the lack of data. John Clegg and Co. estimated that 2,500 full-time jobs can be created by harvesting existing matured pinus plantations. Because of the future increase in timber harvests from existing plantations, it is likely to bring more revenue to the government by way of royalties and a reduction in the vast amounts of money spent for the import of timber and other wood products. Among other benefits of eucalyptus and pinus identified by the local people are the supply of firewood, the slowing down of wind speed and a reduction in aridity and soil loss due to erosion.

Ecologists claim that the planting of Eucalyptus and pinus leads to the destruction of the ecology of patna lands. Their argument is that a patna itself is in a ecological equilibrium and that its destruction leads to an ecological disaster. How many of us know that these patna lands are burned at least once a year during the dry season. After burning, the vegetation is completely lost and soil erosion continues to take place until re-growth appears after 2 to 3 months. In the case of kekilla, no soil erosion occurs, but burning is disastrous due to ecological reasons.

Interviews conducted by the author, with 85 farmers from the Anuradhapura, Badulla, Moneragla and Ratnapura districts indicate a reduction in annual dry-season fires as a result of planting eucalyptus and teak on patna land. The main reason for the reduction in fire hazard is that the local people protect the land since they own the trees. They have evolved several strategies to prevent fire from spreading to their plantations. As disclosed by the farmers, patna lands which were subjected to burning at least twice a year before eucalyptus and teak were planted, did not take fire after reforestation, thereby resulting in significant reductions in fire hazard. The interviews also indicate that these two species do not promote soil erosion.

Scientific investigations have revealed that there is no evidence that the growth of exotics leads to a reduction in the soil fertility of the patna land. In fact, one of the greatest advantages of pinus is that it improves the soil of degraded sites. Research in Sri Lanka and other countries indicates a significant improvement in soil characteristics such as increased soil porosity, organic matter, Nitrogen content and cation exchange capacity after planting pinus. It is an eye-opener for those who claim that pinus is unsuitable, to know that indigenous species can be successfully established on degraded lands 5 to 10 years after planting pinus. The Forest Department has successfully established rattan and other indigenous species of trees under pinus plantations in Kalutara, Ratnapura (Sinharaja and Rakwana), Kandy and Badulla districts. The growth performance of indigenous species is excellent in those sites. In fact, planting pinus could be the first step towards re-establishing the lost

Underplanting of rattan in a pinus plantation

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Sri Lanka's Timber Industry in the Doldrums

by Dr Hiran Amarasekera

bad image coupled with a dearth of raw materials, low capacity for employment generation and restrictive legislation, have struck a near-fatal blow to this once flourishing sector

A major problem which faced Sri Lanka's forest based industries in the past, was the inadequacy of raw materials. Natural forests are once again the main source of timber in the country, but now their timber has reduced considerably. Further, in order to control the felling of natural forests, the government has imposed a ban on logging and has also regulated the transportation of timber. This has also had an impact on the forest based industries. Investors in large-scale wood-based industries and genuine rural-based carpenters are the most affected by these laws, because people who illicitly fell timber with the assistance of powerful patron can obtain their timber by whatever means. Therefore, the competitive nature of forest-based industries has lessened and employment generation has also reduced in the forestry sector. For instance, saw milling, which is vital for the construction industry, has reduced considerably. The furniture industry is also badly effected.

Rubberwood is now used as a substitute for the manufacture of furniture, toys, curios and other wood-based products, since there is no restriction on the transportation and felling of rubberwood as well as no restrictions on investment. Rubberwood is also used for the manufacture of parquet flooring. Foreign investors now prefer to invest in rubberwood for their export-oriented industries because they don't have to resort to bureaucratic hassles in order to obtain it, as in the case of other timbers. However, there is the question of availability of rubberwood in the long term. The use of rubberwood indicates the inability of the forestry sector to provide timber for the wood industries of Sri Lanka. It is estimated that about 70 per cent of timber now originates from non forest land.

The plywood industry has also suffered. Government-oriented ply wood mills were closed down because environmentalists believe that the natural forests were being denuded by felling timber for plywood. The government owned plywood industries are now no more. Production of plywood is only done by the private sector. The plywood industry too, depends on rubberwood - for peeling. However, one of the main problems faced by the plywood industry is that the diameter of rubberwood is becoming increasingly less because clonal varieties are now used rather than the seed varieties used formerly. Because of this, some private plywood industries import half the required quantity of rubberwood in the form of winning logs from South Africa and Indonesia.

The industry has also acquired a bad image because of internal pressure: these include arrests by police, dearth of raw materials, excessive pressure by environmental lobbying and environmental legislation etc. Therefore, most industrialists are of the opinion that it is cheaper and less complicated to import from abroad. The government has also removed the duty on timber imports. Hence, the house building industry depends mostly on imported timber.

In the case of the paper industry, technology employed here for recycling the chemicals and the timber resource are insufficient to produce pulp, so again, pulp is imported from abroad. There is a move to manufacture paper from pinus. This however, is not cost effective because the process to extract fibre from pinus is more costly than extraction from other timbers. The paper industry in Sri Lanka is now in the doldrums, primarily because of the lack of raw materials and its propensity to produce pollutants. Because of the inability to recycle much of the effluence, the government paper factory pollutes adjoining waterways. This is mainly due to a shortfall in technology. The developed world is able to use environment-friendly technology which they now apply, having reached the optimum level of pollution, whereas developing countries have just commenced the first stage. Due to the pollution factor, the pulping component of the paper industry has come to a

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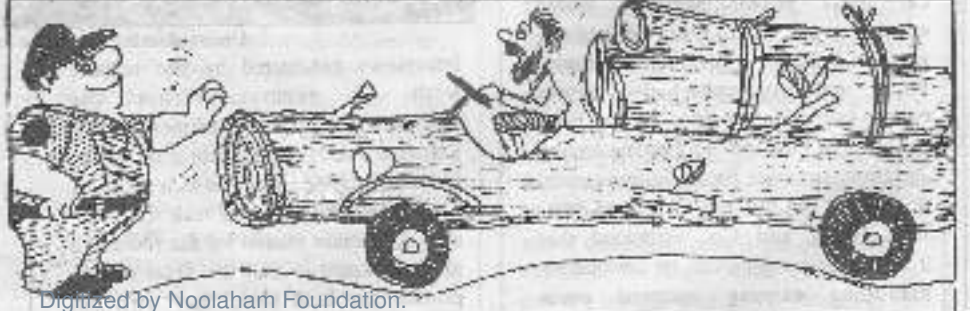

Key players in the race for survival

Human/elephant conflicts at Handapanagala

recommendations for minimising them

by
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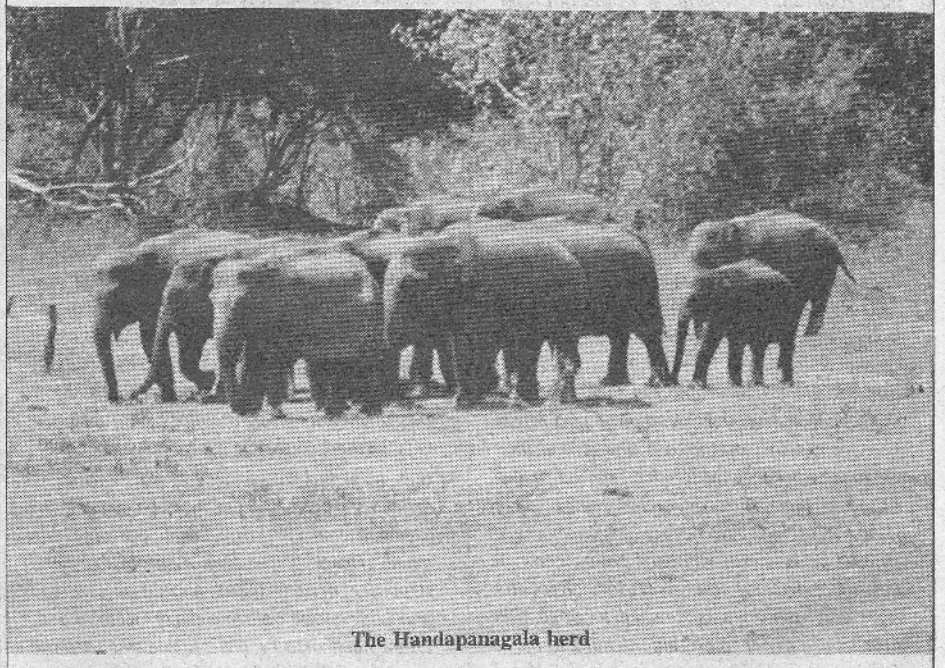
In the past, before the Pelwatte Sugar Industry (PSI) was established, people and animals lived in harmony in this area. At that time, enough space for both animals and settlers was available and elephants were not confined to the Handapanagala area but were migrating to other areas such as Yala, Gal Oya, Uda Walawe, Lahugala etc, where all areas were linked with natural jungle routes. Today, due to the loss of normal migratory routes, large numbers of animals were isolated in a smaller area, especially in areas where the conflict is at a maximum due to the high density of elephants per unit of area. This becomes worse during the dry season, due to the drying-off of all small water holes in the area. Thus, the Handapanagala tank becomes the only water resource available during this season. Socio-economic information suggests that the farmers in this area are marginal farmers fighting hard to meet their daily needs. Most of these farmers have given up the traditional farming crops which gave better returns, due to prevailing elephant problems. Farmers in this area try to cultivate crops which are disliked by the elephants even though they yield a lower income when compared with the crops cultivated in the past. Most of the farmers are cultivating tobacco, especially in the worst effected areas like Neluwagala and Pubudugama, in order to protect these areas from elephants.

This has created severe problems due to the excessive use of fertiliser and pesticides. On the one hand, the net return of a tobacco farmer has become minimal, compared with other traditional crops planted before, and on the other, it has given rise to health problems among the cultivators. Due to these reasons, most of the traditional farmers have given up their traditional farming life and have tried to seek employment in the Pelwatte Sugar Industry or elsewhere as government servants or daily labourers. Most of the families in this area are *Janasavi* recipients. However, the day by day conflict between man and elephant in this area is increasing to a level that a quick solution must be found to end this conflict. This is becoming more evident from the fact that the villagers are resorting to more sophisticated means of destroying this common enemy by poisoning. During the period 1991 to 1994, 11 animals were found dead in the study area, five in Pubudugama village and another two in the Neluwagala village, all in the high conflict zone. Almost all the animals in this area are with at least 5 to 6 gun shot wounds on their bodies. Therefore, it is the responsibility of the authorities concerned to find an immediate solution to this problem which originated from their own shortcomings in not making a proper assessment of the social and environmental conditions in this area prior to introducing the human element.

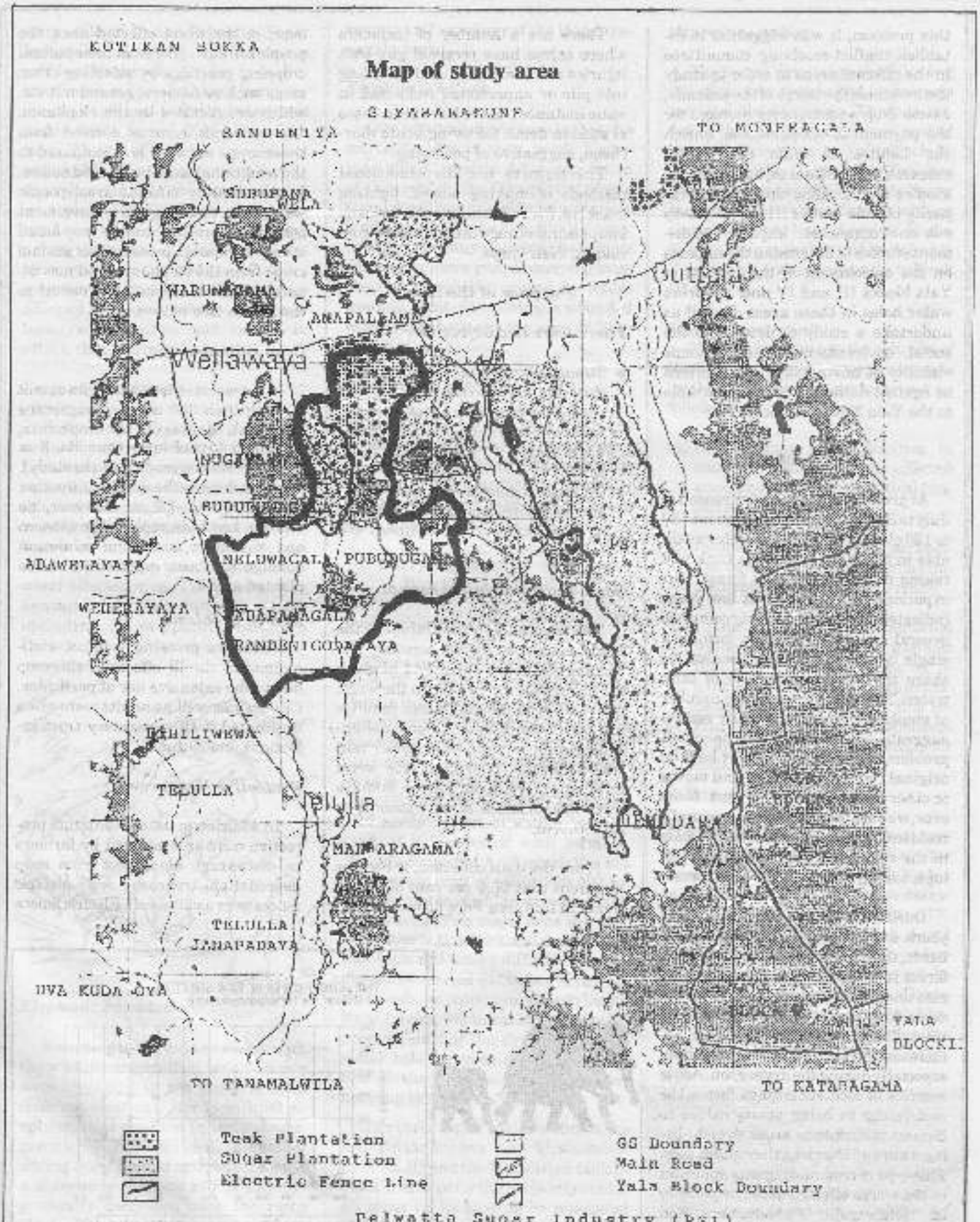


The Handapanagala herd

Based on this study, the solution has been found in two phases. One is short term, requiring immediate action, and the other requires long term action to find a lasting practical solution. The short-term solution recommended was based on people's current social requirements. Most of the villagers now depend on the Pelwatte Sugar Industry, many as out-growers or direct labourers. Most of the farmers have changed their traditional living patterns. In the short-term, the key recommendations made were to capture and translocate some of the male animals in order to reduce the conflict, translocate Neluwagala setters to a better settlement area and readjust Pelwatte Sugar Industry boundaries to provide more space for the remaining herd by opening a corridor linking Handapanagala to the Yala national park, formulating a realistic insurance scheme for the payment of compensation and repairing and constructing water holes in Yala blocks III, IV and II.

As a long term lasting solution to

Map of study area



this problem, it was suggested to establish conflict-resolving committees in the affected areas in order to study the movement patterns of the animals, assess crop and property damage for the payment of compensation, enrich the habitat in Yala, establish a research unit in the area, and carry out studies to determine the carrying capacity of Yala blocks III and IV, carry out environmental impact assessment studies to determine the impacts on the enrichment of the habitat of Yala blocks III and IV and construct water holes in these areas as well as undertake a study to determine the social, environmental and economic viability of having sugar plantations as against national parks comparable to the Yala National Park.

Introduction:

At present, during the dry season of July to September, there are about 120 to 150 elephants using the water available in the Handapanagala tank and taking refuge in the teak forest. Our experience during the last few years indicates that these animals comprise several clans and families forming a single herd during the dry season, to share the common resource of tank water. The absence of a large number of elephants during the rainy season suggests that since water is not a problem, this large herd goes back to original clans and families and moves to other areas in search of food. However, we acknowledge the presence of a resident herd of about 30 to 40 animals in the vicinity of the Neluwagala village, taking refuge in the teak forest.

During the dry season over the past years, due to the over-grazing by large herds, the carrying capacity of the teak forest is over-exceeded. This forest is also under threat since there is severe de-barking and even the up-rooting of trees. This may be the reason for the increased incidence of crop raiding, especially during the dry season. Acute scarcity of food sometimes forces the matriarchs to bring young calves to human settlements areas despite being aware of the risks they might face. This type of crop raiding was apparent in the worse effected areas, especially in Neluwagala, Pubudugama and Wadinahelayaya, part of the Buduruwagala village.

There are a number of incidents where calves have received gun-shot injuries and some have died by falling into pits or unprotected wells and in some instances, there have been cases of sudden death following acute diarrhoea, suggestive of poisoning.

The farmers use the traditional methods of making noises, lighting crackers, fire, and the use of hurricane lamps to discourage the elephants from raiding their crops.

Purpose of the Study

There were two objectives:

* *To suggest remedial measures to reduce the human / elephant conflict so that elephants are not subjected to harassment by villagers and humans not at risk.*

* *To suggest long-term conservation strategies to be adopted in this area, so that conflicts can be reduced to a minimum.*

Socio-economic background:

The total human population in the study area was 20,700 persons. The number of families were 5,741, of which 2,173 families were living in the worst effected areas. Most of these families are poor farmer families and the annual income of more than 95 per cent was below Rs. 50,000. In the worst effected area, almost all the families were beneficiaries of food stamps or *Janasaviya.*

From the data collected, it became apparent that 66.6 per cent of people living in this area were farmers. However, in the worst effected area, the people are deviating from their normal cropping practices by selecting other crops such as tobacco, ground nut etc. which are disliked by the elephants. The economic returns derived from these crops are very low compared to the traditional crops cultivated before. In the severely affected area, people were keen to engage in employment other than farming because they found it very difficult to protect their normal crops from the elephants, and new tobacco cultivation was detrimental to the health (see below).

Crop Damage:

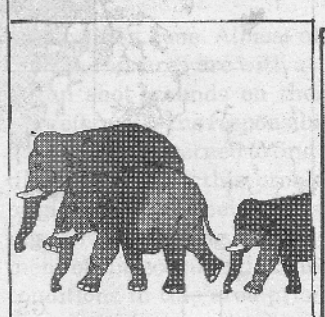
In the worst effected area, an extent of more than 380 acres of sugarcane had been damaged by elephants, causing a loss of more than Rs. 8 m during 1993 (one year before the study). Damage done to the maize cultivation was nearly Rs. 1.2 m. However, no damage has been reported in tobacco and kurakkan areas and minimum damage has been reported in chillie planted areas.

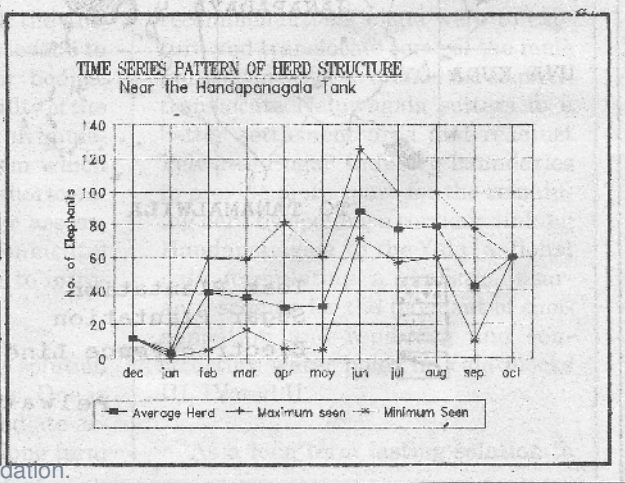
Health problems:

Villagers growing tobacco complained of the ill effects of this crop due to the extensive use of pesticides. Children as well as adults were often confronted with respiratory tract infections and asthma.

Protective Measures:

In addition to the conventional protective measures adopted by farmers to discourage elephants from crop depredation, trenches and electric fences were used as well. Electric fences





were utilised by the Pelwatte Sugar Industries. However, this became a problem for the villagers because electric fences made elephants move towards the villages or farm gardens and paddy fields rather than away from them. The use of trenches was also not practicable, due to heavy rains during the wet season. In the worst effected area, most of the farmers were lighting crackers, lighting fires and making noises to prevent elephants from entering their cropping areas. However with time, these animals became conditioned to these methods and sometimes, even became bold enough to attack these farmers.

Property Damage:

Some form of damage has been caused by the elephants to almost all houses or property in this area. In most cases, the rear portions of the houses (kitchens) where grain is usually stored was the most vulnerable area. In most instances, the rogues were males and were identified by the villages. In the worst effected area, 125 houses were damaged during the two year period, including 20 temporary huts. In Pubudugama village alone, 20 houses were damaged.

Elephant Population:

According to the data available with the wildlife ranger office, several herds were identified in the study area in different locations. Herds with 90 elephants was reported in the Pubudugama area. The herd rises in number during July, August and September to a maximum of about 120 to 140 and gradually decreases once the rains start. When water is not a problem, only a few animals - about 20 to 40 - remain in the vicinity of the Handapanagala tank.

Elephants killed:

Our personal experience is that the mortality rate is very much higher than official records. After completion of this report, the "Thanidalaya" was found dead from gun-shot injuries near 'Valliammana' in the Yala Block V area. In addition, many elephants have been detected by game guards carrying huge abscesses, possibly caused by bullet wounds. Most of the animals wounded were males between the ages of 20 to 40 years.

Elephants identified:

During the survey, four elephants have been identified by descriptions given by the villagers. They were responsible for most of the property damage and manslaughter. All were male loners.

Carrying capacity of Yala Blocks III, IV and V.

Water resource:

There are nine big tanks in Yala block IV, of which the biggest is the Pahala Suwadan Ara. All these tanks depend on rain water, except for 'Ehela Suwadan Ara', which has a natural catchment. The water-holding capacity of this tank was estimated at about 400,000 m^3 (cubic meters). This tank also needs urgent attention because most of it is covered with salvinia. "Pahala Suwadan Ara" which has the highest capacity of about 800,000 m^3 could be made the biggest water tank in this area. Two major oyas are running close to this tank and the filling of this tank will not be difficult. A study should be carried out before repairing this tank, to ascertain the advisability of having big tanks in this area. At present, during the dry season, this water hole becomes muddy from debris of the branches of trees overhanging the bund.

The three other major water tanks are 'Telekolawewa' and 'Urukuwewa' in Block III and the Malwariya tank in Block V. Except for the Malwariya tank, all other tanks have to be renovated before getting more animals, especially elephants, to these blocks.

Migratory paths:

These were determined by following the migratory paths used by animals over the last few years. There is evidence that the animals have passed through Demodara to Yala Block V, then to Blocks III and IV. This has been disturbed by the Pelwatte Sugar Industry by blocking this path with an electrified fence line. However, Kuda-Oya Handapanagala could be linked to Yala Block V and subsequently, to Block III and IV.

Major Constraints:

Major constraints to the solution of the following as per the proposals made in the study can be summarised as follows:

(a) Unwillingness of authorities to translocate settlers in the affected area, probably due to political considerations.

(b) Incapacity of government authorities directly responsible for the implementation of proposals made.

(c) Undue interference by interested self-seeking organisations who fear that they might lose whatever financial support they receive in connection with activities in this region - foreign financial assistance in sympathy of these animals for instance.

Foliage:

Although visual assessment suggests that there is enough foliage for elephants, a study needs to be initiated to determine immediately the carrying capacities of Yala blocks III and IV. Both blocks III and IV have a closed canopy forest which affect the undergrowth of the area. This may not be suitable for elephant habitat. Therefore, careful planning is essential before embarking on a project for the enrichment of the habitat in these areas.

About the Writer

[illegible]

Ecotourism voyage of discovery or journey to extinction?

ecotourism has disturbed the habitat to an extent that several endemic species are endangered

says Jagath Gunawardena

Tourists who visit Sri Lanka can be sub-divided into three categories, namely

a) those who visit the country to enjoy themselves
b) those who have a special area of interest but carry out this interest only to boost their egos
c) people who genuinely care about the environment.

Their impact differs according to the category they belong to.

Quantity-wise, the first type is most predominant. Earnings-wise, too, they are the biggest spenders. The second category are a mix of those who are big spenders and those more frugal. These are people who disturb the habitat, collecting specimens of flora and fauna indiscriminately for their personal hobbies to promote individual interests or for commercial purposes. Many scientists are themselves some of the worst offenders under this category. It is a fact that knowledge does not necessarily translate into good behaviour. Both the first and second categories have an adverse impact on the habitat, the first, by collecting souvenirs of fauna and flora, while the second collect in the guise of specimens. The impact of the second category may be lesser than the first because their numbers are smaller. The third category comprises those who are really interested in the environment and in conservation, but this category is small, quantity-wise, and few are big spenders.

When large numbers of people visit habitats, they disturb the fauna and flora. The seclusion and peace required for breeding disappears. Animals tend to alter their patterns of behaviour, becoming either more aggressive or less so - to the point of domestication. The more timid may even abandon their habitat in favour of more secluded areas. When disturbed in breeding, birds may abandon their nests and even their young: this is especially true in the case of ground-nesting birds.

The elephants at Yala for instance, are heavily disturbed by the dense tourist traffic. The monkeys at Dambulla have also become very aggressive as they often come in contact with people who feed them. Littering by tourists has had several adverse impacts on the habitat. For instance, the samburs of Horton Plains feed on the polythene bags left by visitors, resulting in many casualties. Littering also attracts unwanted animals. For instance, littering has created a chain reaction at Horton Plains first attracting a rapidly expanding crow population, which has in turn, brought with it the koel. The koel, when opportunity permits, lays its eggs in the nest of the blue magpie, an endemic species.

The myna too has proliferated in the area. The myna, an aggressive bird which lays eggs in the bowls of trees has continued to do so in its new habitat, taking over the nests of endemic species. There are other examples of deviant behaviour of animals, such as the torque monkey in many parts of the country. All this deviant behaviour poses a threat at the primary level, to endemic species.

The trampling underfoot of flora may result in the killing off or altering of vegetation. Soil could either loosen or become more compacted and plants used to that particular soil may find it difficult to grow.

Gilimale Forest Reserve, situated in the Bambaragoluwa GA's jurisdiction, is one of Sri Lanka's best wilderness areas, a prime habitat for endemic species. A USAID project suggested that this forest reserve be opened to ecotourism. If this suggestion is carried through, it will sound the death knell for several endemic species which do not possess a shock absorbing capacity. Similarly, ecotourism is endangering endemic species in Yala, Bundala and Uda Walawe. Many hotels are being set up near wildlife sanctuaries. Permission has been given to purchase land in the Galways Sanctuary, which had been set up in the Nuwara Eliye district in the 1870's. Many new sanctuaries have been declared in recent decades, but these sanctuaries must be maintained.

Plans are on the boards to construct 18 hole golf courses in several parts of the country. Approx. 13.5 m kg of insecticides and pesticide will be used to maintain a golf course of these dimensions, which will do untold damage to the fauna and flora. That same extent of land will sustain 35 acres of paddy.

Many western countries have rigid laws to ensure the protection of their fauna and flora. For instance, in the UK, it is an offence to even use a recorded bird call to attract a bird of that species. However, very often, those who follow the rules and regulations in their own country change their behaviour when they visit another.

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Promoting Ecotourism in the South East Dry Zone of Sri Lanka

by
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There is increased interest in an alternative form of tourism that has apparently emerged in response to the growing dissatisfaction with mass tourism and its associated negative impact on host nations (Fennel & Smale, 1992). This new phenomena which has been broadly termed ecotourism or 'alternative tourism' has evolved as a popular counter-response to the emphasis on consumerism and the exploitation associated with mass tourism, especially in developing nations (Cohen, 1987).

In recent literature, a number of related terms have also appeared, which include such terms as: 'nature-oriented tourism', 'green tourism', 'adventure tourism', 'scientific tourism' and 'rural tourism'. The Ecotourism Society (1991) defines the term as, 'responsible travel that conserves natural environments and sustains the well-being of the people'. This definition recognises the importance of tourism activities in the context of the natural resources on which tourism is based. A broader definition has been provided by Butler (1991), 'ecotourism is travelling to largely undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestation'. Filion, Foley, Jacquemot (1994) has used a more simple definition, 'ecotourism is travel to enjoy and appreciate nature'.

In the Sri Lankan context, tourism is largely oriented towards mass tourism in selected attractive sites. Although there is a growing market for tourism in Sri Lanka, in most cases, tourism activities have not been able to ensure alternative sites that are properly managed in order to maintain sustainable tourism. For example, tourist visits to the Hikkaduwa coastal area has had an adverse impact on the marine sanctuary, where damages to the coral reef, sea water pollution, proliferation of litter, poaching of rare fish and stripping of the reef of corals for commercial purposes, have occurred (CHMP, 1994). Sigiriya is another example. The number of tourist visits to Sigiriya has far exceeded the carrying capacity of the existing facilities, which has brought about the deterioration of the stone steps and archaeological artifacts.

With increasing tourist arrivals to enjoy nature, wild life, historical, cultural and religious sites and the coastal areas of Sri Lanka, the erosion of such sites will also increase. Site-specific strategies are one way of managing

increased arrivals in a sustainable manner. The other option is the diversion of tourists to unexplored tourist sites. Sri Lanka offers a wide variety of natural vegetation, wild life, bird life, marine resources, natural forests and hidden historical sites which provide potential for tourism and could reduce pressure on existing attractive sites.

The South East Dry Zone (SEDZ) is considered the birth place of one of the ancient civilizations of the country (MPPI, 1985). There is historical evidence of human settlements, large irrigation systems, ancient paintings and monasteries that existed in the SEDZ [illegible] which suggest that this area had been a well-developed region in Sri Lanka (WTO/UNDP, 1993a). Even today, SEDZ is well endowed with large natural forests, rivers, wild-life, and other natural vegetation, providing potential for making use of such resources for tourism. It should be recognised that tourism should not be another calamity to befall natural areas and local communities. Any strategy aimed at making use of the resources for development in the area should ensure that proper attention is paid to the conservation aspects while being tailored to meet the requirements of development strategies. If not, the balance between human activities and the continuity of the existence of natural forests, wildlife and other attractions will be lost, and thereby the sustainability of tourism activity will not be assured. (Fennel & Smale, 1992).

This paper assesses the potential for ecotourism as a means of generating revenue to enhance conservation efforts in the SEDZ. It is based on the work carried out by the author as part of a broader study on natural area conservation in the SEDZ under UNDP sponsorship, for the Regional Development Division of the Ministry of Policy Planning and Implementation.

Surveys were carried out during the month of September 1995 at Kataragama, Situlpauwa, Kirinda, Tissa, Yala, Bundala and Udawalawe.

Tourist Traffic in the SEDZ

Foreign tourists

The main attractions for foreign tourists visiting the SEDZ are related to natural areas which include natural forests, wildlife, birds and other environmental resources. Tourism activity within the SEDZ is confined mainly to safaris to Yala and Bundala to observe wildlife.

The duration of stay of foreign tourists in this area is limited to a maximum of two nights at either Tissa or hotels at Yala. Surveys reveal that most of the tourists are from western countries.

As in other areas of Sri Lanka, seasonality is a significant factor determining the volume of tourists visiting the SEDZ. The season falls during the months of December to April during which most of the hotels and accommodation units operate at about 80 per cent of their capacity. During other months, hotel occupancy drops to about 20 per cent.

Domestic tourists

A survey on domestic tourists revealed that the tourism activities of more than 80 per cent of domestic tourists visiting the SEDZ were oriented towards religious and cultural sites. The places of interest to them were Kataragama (Maha Devala, Kiri Vehera, Vadesiti Kanda), Sella Kataragama, Kirinda, Tissa, Situlpauwa, Maligawila, Yala and Bundala. Kataragama has become the destination of domestic tourist groups. According to the survey, more than 50 per cent of domestic tourists have visited Kataragama 10 times or more. Some respondents have indicated that they have visited Kataragama 25 times or more. About 20 per cent of tourists visiting Kataragama take the opportunity to visit the Yala National Park, Kirinda, Maligawila and Situlpauwa. But these sites play a secondary role in their itinery when compared with Kataragama. The average period of stay of any tour group in Kataragama is two nights.

Middle-income and high-income domestic tour groups prefer to visit Yala and Bundala to watch wild life as a recreational activity. According to the information provided by the park authorities at the Yala National Park, 95 per cent of tourists coming to the park bungalows are domestic tourists of middle-income and high-income groups. The remaining 5 per cent are foreign tourists, in most cases accompanied by Sri Lankan counterparts.

Visits to other cultural, historical and religious sites are occasional. There

is an emerging demand to visit other sites such as Maligawila, Situlpauwa and Buduruwagala. Tissamaharama has become a centre from where tour to visit Yala National Park, Kataragama, Bundala etc. are organised.

Impact of Tourism

Impact on specific sites

Impact is caused by two groups, namely visitors and the tourism business sector. The following adverse implications on specific sites have been identified:

Over-visitation

Although this occurs only during peak seasons, it goes beyond the carrying capacity of the site, causing harmful effects to the site itself as well as to surrounding areas, for example, the environmental pollution caused by crowds of people visiting Kataragama during the peak season. Since there are no proper facilities to dispose of garbage and waste material, littering throughout the sites is a common feature during peak seasons. It is observed that soap and other consumables used in bathing, cleaning and washing in the Menik Ganga at the Kataragama Devala area cause water pollution, which affects the wild life and fish population down-stream. A similar example of over-visitation at Block I of Yala National Park has caused disturbances to the wild animals.

Disturbances at hermitage sites

Large crowds visiting hermitage sites have become a problem to the maintenance of the peaceful environment required for meditation. Two examples of such sites are the Nimalawa and Buduruwagallena hermitage sites. When these sites become increasingly popular, particularly among Buddhist devotees, the area becomes a busy place, with crowded lorries, buses and vans disturbing the monks meditating in the jungles.

Violation of the sanctity of sites

Places like Sithulpauwa and Buduruwagala are subjected to visits from different types of people. The behaviour of such crowds disturbs the sanctity of these sites, which is contrary to the purpose of the devotees visiting the area.

Impact on natural areas and wildlife

The main impact on the wildlife in these natural areas is caused by large crowds travelling by vehicles. It is observed that between 50 to 200 jeeps with foreign and local crowds enter the Yala National Park each day. The resultant noise and dust creates unsuitable habitats for wild animals.

Another effect that tourism has had and of which villagers complain, is that animals, particularly elephants become too familiar with humans. Consequently, when such elephants raid cultivations it is difficult to drive them away.

Observations revealed that tree branches, particularly *kohomba*, are removed to decorate vehicles travelled in by domestic tourist groups. This practice is increasing, and can lead to the damage of local vegetation if tree branches are removed continuously and unnecessarily.

The survey also revealed that animal meat is served to tourists in guest houses and restaurants. Deer and wild boar in particular are killed for flesh. Although there is no evidence to prove any hunting by the tourists themselves, they indirectly encourage the killing of animals by eating their flesh.

As stated earlier, littering has had a strong adverse impact on natural ar-

eas. Plastic cans, polythene bags, chocolate wrappers are seen along tourist routes and at places where tourists have stayed.

Due to poor law enforcement and monitoring by the relevant authorities, tourist establishments have harmful effects on the natural areas. For instance, an allegation was made by residents of Tissa, that one large hotel disposes waste water and garbage to the adjoining Tissa lake.

Impact on the local community

Several local tourists visiting the sacred city of Kataragama and other holy places imbibe hard liquor, which is prohibited within sacred areas. The survey revealed that in certain instances, local residents have objected to such practices and this has led to quarrels. Despite the fact that local communities benefit from the visits of outsiders to their area, such behaviour creates situations where local people eye tourism with suspicion. According to the Kataragama Police Station, several residents have complained of such incidents.

Socio-cultural impact

The usual allegation against the development of tourism is that it affects the traditional socio-culture of the local people (King, Pizam & Milman, 1993). Since the SEDZ is not considered a place for long stay, the socio-cultural impact on the local community is minimal. But attempts to encourage visitors to stay longer in this area will have repercussions on local culture. For example, Tangalle, located on the boundary of the SEDZ, is already subjected to drug trafficking, homosexuality etc.

While tourism generates a considerable amount of income to tour operators and hotels, villagers do not benefit very much by the presence of tourists. For example, in the Bundala area, a potential market has been identified for rest-stops or cafes, where locally-made cloth and crafts could be sold. But the market is believed to be small and few people have the capital to test it. Curd is sold along the road-side at Bundala and Hambantota, but the demand comes mainly from local pilgrims to Kataragama, not from foreign visitors (CEA, 1993). Field investigations reveal that hardly any attempt has been made to sell site-specific handicrafts or souvenirs at these sites.

Promotion of Ecotourism

The promotion of ecotourism with minimal harmful effects to natural areas by taking into account the many aspects of conservation requires attention to be paid to the following:

Unplanned development of tourism:-

The Tourism Master Plan (WTO/UNDP, 1988) provides an indication that the tourist industry in this region should be based on wildlife and cultural sites which offer a high-quality product. But no specific recommendations are made in the Master Plan in respect of the maintenance of a balance between the development of tourism and the conservation of natural areas in this region.

In the context of the development of ecotourism in the SEDZ, Master Plan guidelines do not provide the necessary foundation to ensure that further development of tourism will not have harmful effects on natural areas. If only the development of a quality tourism product is addressed, it will certainly undermine conservation efforts and neglect adverse implications. Therefore, proposals should be based on offering a quality ecotourism product while at the same time facilitating conservation efforts.

Although tourism is an important sector in the overall economic development of the country, in the development context of the SEDZ, ecotourism should be viewed not only as a means of generating revenue to the tourism business sector but also as a means of financing conservation efforts. It is important that the tourist business sector should well understand the fact that the tourist industry should pay for the use of natural areas as a key attraction for their tourists (WTO/UNEP, 1992). Budowski (1976) has noted that the tourist industry should financially support conservation organisations as an investment in furthering its own interests in natural areas as an attraction for tourists.

However, since the duration of stay by both foreign and local tourists in the area is significantly low, their expenditure within the area is also low. Therefore, although the number of tourists visiting the area is significantly high, the financial impact of these visits on the local economy is very low. While focusing on attracting high-spending foreign and domestic tourists, steps should also be taken to increase the duration of their stay within the region.

Various sites in the area have unique features. Each site is surrounded by a natural habitat and local community with differentiated features and problems. For example, Buduruwagala and Situlpauwa are religious places. Situlpauwa is located in the Yala National Park and Buduruwagala is situated near a traditional village. Therefore, site-specific proposals are important, rather than mere general guidelines.

Tourist activities presently taking place in the SEDZ are based on a few specific sites such as Kataragama, Tissamaharama, Yala and Bundala. There is great potential for promoting ecotourism among diverse foreign and domestic tourists. Promotion of ecotourism in the SEDZ will reduce pressure on present popular sites, create opportunities to generate revenues out of which a park can be invested in conservation efforts, and enhance the income-generating activities of local residents. Therefore, a regional-level tourism development plan should be prepared with due consideration being given to linking tourism with conservation efforts which would ensure sustainable tourism in the SEDZ.

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decisive stage that may necessitate the closing down of that aspect of the industry.

Carpentry is carried out on a small scale and is rural based. This industry too has been affected. Most of the timber felled in rural areas does not go to the local carpenters but is instead utilised by powerful *mudalalis* who devised means to obtain the required permits from the government officers. In this context, it is ironic that even a tree on one's own premises cannot be felled without a permit. Although it is understandable that trees grown in state forests should not be felled without a permit, it is inconceivable that permits are imposed for felling on one's personal property. This situation has been brought about because the government officials are unable to look after the forests under their purview. If a protective enforcement is practiced, there is no need to protect other people's property.

With the rapid expansion of the construction sector and export-oriented wood products industries, it is essential to have clear strategies to provide timber to those industries. It is also essential to develop these industries in order to expand the income generating ability of the forestry sector. Otherwise, the government will be compelled to depend increasingly on foreign aid. It is vital that more investments should be

pumped into the forest products industries sector in order to create more youth employment.

As Sri Lanka is a country with relatively less natural resources, it can achieve timber sustainability to feed into forest industries only by growing trees.

Hence, what is needed is the growth of more trees on state and private lands, especially those species with a high growth rate such as teak, mahogany, ginisapu, lunumidelle etc. To encourage timber growing on a commercial scale, the government should introduce more outward-oriented forestry legislation, review the existing unnecessary environmental procedures on felling, and provide incentives to tree growers. Otherwise, the present level of forest destruction will continue to operate, resulting in severe balance of payment deficits caused by the increasingly high amounts of forest products being imported annually. The loss of employment in the sector as well as its inability to generate new employment are also matters of grave concern.

About the writer

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Careful study must be made before allowing tourists to freely wander in natural habitats. Poaching and collecting of trophies should be prohibited.

The tourists trade has also spawned a demand for jewellery and handicrafts made of turtle shell, elephant hair etc. Such items should be seized and the suppliers and marketers prosecuted, but the Dept. of Wildlife Conservation and other associated departments are too shortstaffed to carry out systematic raids. The commercial sale of butterflies, moths etc. should also be stopped immediately. Presently, the Wildlife Department is so short staffed that it is the same officer who seizes these contraband items and also prosecutes the offenders, a situation the law does not allow.

CITES (Convention in the International Trade of Endangered Species) is not very effective in lobbying for halting the trading of endemic species. The Sri Lankan Flora and Fauna Ordinance is more to the point. The law is there, but if it is often not enforced, it becomes a useless piece of legislature, as well as a joke.

Eco tourists create a social problem too. The argument that ecotourism generates income for the host country does not hold much water. Most of the money they bring in, namely the gross earnings from ecotourism, is channelled out of the country as leakage in the form of goods imported into Sri Lanka to cater to the comfort and requirements of these tourists.

Number and type of visitors to the more popular protected areas in 1993

Protected area	Foreign visitors	National visitors		Total visitors	% National visitors
		Adults	Children		
FD:					
Sinharaja NHWA	923	13,273		14,196	93.5
Udawattakele S**	2,952	8,411	325	11,688	74.7
DWLC:					
Horton Plains NP	6,389	30,079	3,025	39,493	83.8
Ruhuna NP	43,223	130,944	19,932	194,099	77.7
Udawalawe NP	5,103	5,019	430	10,552	51.6

Viability of Livestock Production in Forest Systems

by
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Natural forests have played an important role in human life since the pre-historic era. Primitive man depended heavily on the forest for food and shelter. Modern domesticated livestock were derived from their ancestors from the forest systems, ie. cattle from the principenius, buffalo from Bubalus arnee, sheep from Ovis orientalis and goats from Capra aegagrus. Domestication of livestock started between 9000 and 7500 B.C. in the upper woody mountain regions of the Tigris and Euphrates in ancient Iraq, where arable cropping was not possible and grasslands were in abundance. Therefore, plenty of historical evidence is available in support of the close association of humans with the forestry systems for livestock development.

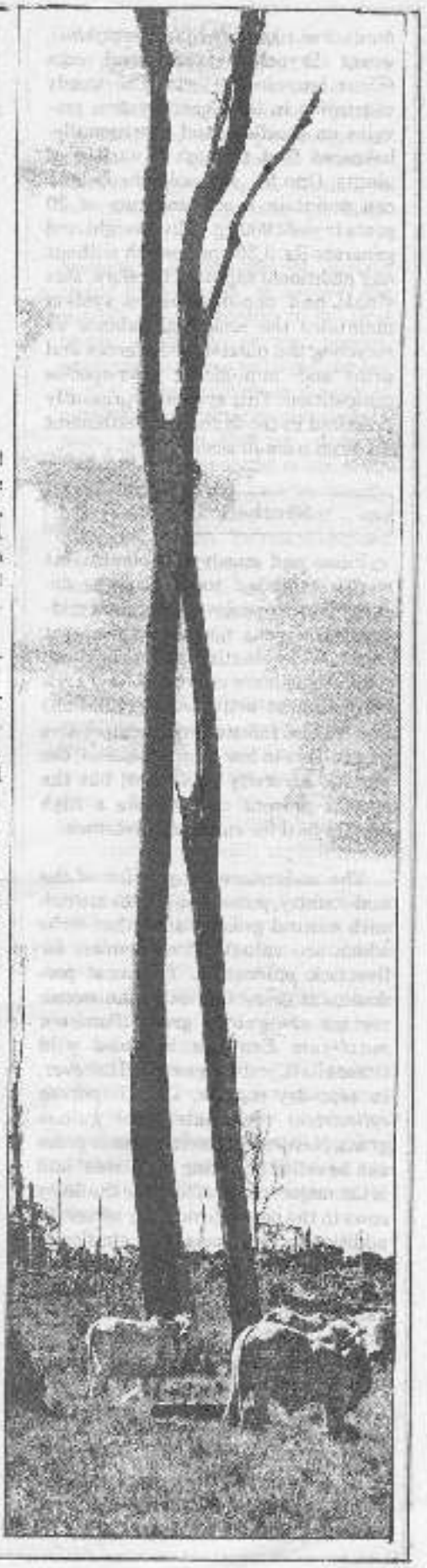
During this period, sustainability was maintained by keeping the livestock in one place so that resources extracted by livestock from the system in the form of feed was partially recycled to the system in the form of faeces and dung in order to maintain the resource balance. This balance was first disturbed when the population pressure of humans and their domesticated livestock increased and migration commenced as nomadic farmers. This was further aggravated by civilisation and the development of new technologies, coupled with gradual industrialisation to satisfy human needs. In the recent past, forest resources have been extensively extracted but very little was returned to the system.

Today, profitable livestock production from forestry systems is possible, with minimum effect on the ecological balance and sustainability. By the present definition of a forestry system, this term cannot be confined to natural forest alone. It is also important to include synthetic forests, perennial monocultural plantations and agro-forestry systems.

Dry Zone Scrub Woody Forests

This forest type is the climax vegetation of the plains of the dry zone, covering 66 per cent of the total land mass. The vegetation comprises short natural grasses and forbs and bushy type woody perennials. Therefore, the forest canopy is open and inferior in height, with a very low vertical stratification. The common plant species present and used as fodder are: heen kurumba (*Carissa spinarum*), eramini (*Zizephus sp.*) acacia sp., undiya (*Dichrostachys cinerea*), kuratiya (*Phyllanthus reticulatus*) and kaliya (*Gynandropsis enterpinata*). The height does not exceed more than 2 to 3 metres and can be directly browsed on by goats. Due to this fact, goats are considered the most suitable species under this system. Undergrowth is rich, with many types of natural grasses and nutritionally high forbs such as, panitham (*Cassia thora*), kurulhabu (*Achyranthes aspera*), mimosa (*Mimosa pudica*), aguna (*Urena lobata*) etc.

Tall trees randomly emerging above the short vertical canopy can provide high-quality tree fodder but need to be lopped and fed. Trees of this nature are maila (*Hoathinia reconvexa*), katukeliya (*Bridelia retusa*), kohomba (*Azadirachta indica*), guha (*Manilkara*



hexandra), kone *(Adina cordifolia)*, weera *(Drypetes sepiaria)* and nuga *(Ficus bengalensis)* etc. The woody vegetation in this forest system provides an excellent and nutritionally-balanced feed through a variety of plants. One ha. of woody shrub land can maintain a stocking rate of 20 goats to yield 900 kg. of live weight and generate Rs. 3,350 per month without any additional inputs. Therefore, this viable and non-destructive system maintains the ecological balance by recycling the nutrients via faeces and urine and minimising inter-species competition. This system is presently practiced in the Mahaweli settlement areas on a small scale.

Synthetic Forests

Pinus and eucalyptus plantations were established to develop the degraded areas and wastelands in mid-country regions and other semi-wet zones. Wide planting spaces in these plantations leave enormous land area (with limited active solar radiation) unused and infested with competitive weeds. Due to low solar radiation, the floristic diversity is narrow, but the species present can provide a high quality feed for ruminant livestock.

The understorey vegetation of the mid-country, pinus plantations are rich with natural grasses and other forbs which are valuable food sources for livestock production. The most predominant grass species in the wetter regions are guinea grass *(Panicum maximum Eco-type 'A')* and wild citronella *(Cymbopogon sp.)*. However, in semi-dry regions, illuk *(Imparata cylindrica)* dominates over guinea grass. Naturally growing guinea grass can be called the "king of grasses" and is the major source of feed for the dairy cows in the small farm dairy sector. In addition to this grass, wild sunflower *(Tithonia diversifolia)* also contribute a major part of the bulk feed for dairy cattle in the mid-country. Goat production has been tried out on an experimental basis to evaluate the potential, with fascinating results and minimum damage to the ecosystem under pinus or eucalyptus.

Many attempts have also been made to replace pinus (a controversial tree among ecologist, environmentalist and hydrologist) with other fast-growing trees such as gliricidia *(Gliricidia sepium)*, albizzia *(Perisorianthus fulcateri*al), erabadu *(Erythrina sp.)*, calliandra *(Calliandra calotyhrsus)*, and acacia sp., Jak *(Artocarpus hetrophyllus)* etc. All these species can tolerate acid soils in the mid-country and also provide excellent fodder for livestock feeding. Many attempts have also been made to replace natural pastures with these synthetic forest systems, using high-yielding introduced species to improve the quality fodder biomass production and thereby increase the stocking rates to optimise income per unit of land. Under eucalyptus, rhodes grass *(Chloris guyana)* as a mono-culture associated with desmodium *(Desmodium uncinatum)* and stylo *(Stylosanthus hamata)* produced an annual dry matter yield of 9,500, 11,000 and 9,000 kg. per ha. respectively. In pinus plantations, paspalum *(Paspalum plicatulam)*, both alone and in association with centro *(Centrosema pubescens)*, and guinea grass in association with centro, produce an annual dry matter yield of 8,000, 8,500 and 11,000 kg. ha. respectively. This level of dry matter is sufficient to maintain 30 goats or 3 dairy cows with calves, However, very little attempt has been made to fully exploit potential resources in a sustainable manner.

Monocultural Plantations

Plantation agriculture (rubber and coconut) can be considered commerical or plantation forests, a system similar to other evergreen perennial forests. Due to their wide planting space, a large extent of land is available and often underutilised. In rubber plantations, under-planting of other crops are very seldom and dense weedy vegetation is common. This creates high competition for the main crop and also hinders other field operations. However, the potential of this weedy biomass to generate income is little understood. But in many Asian countries such as Malaysia and Thailand, this is used as valuable feed for grazing livestock, and during certain seasons, livestock generates more income than the main crop. Puro *(Pueraria phasaeloides)*, commonly known as 'bu-mae' or 'pohora wel' is grown as a cover crop in rubber plantations. Puro with natural grasses will provide excellent feed for milking cows, producing 3 to 4 litres of milk per day without any concentrates. Biomass production can be improved for higher stocking rate and high milk output by introducing improved varieties of grasses and fodder. Some experimental data is available to support the fact that in mature plantations, (0-25 per cent light), brachiria *(brachiaria brizantha)*, paspalum *(Paspalum plicatulam)* and guinea grass *(Panicum maximum)* produced an annual dry matter yield of 1,200 to 3,500 kg. per ha. and in young plantations, (50-75 per cent light), 8,400 to 9,500 kg. per ha. However, the potential in this system too was not very well investigated.

In coconut plantations less than 20 per cent of the land area is utilised for intercropping. Large extents of lands are still freely available for utilisation. These lands are severely infested with many natural weeds, sometimes noxious types which hinder management activities. However, livestock production, mainly cattle and buffalo in the coconut triangle, are purely dependant on these weeds, either under the free grazed or tethered management system.

Grazing livestock remove weeds periodically and alleviate the burden on the main crop by lowering competition. This will reduce weeding cost and in return, the cost of production. They also recycle the nutrients trapped in the weeds by recycling them via faeces and urine. One of the major weeds found in coconut lands in the dry and dry intermediate zone is illuk *(Imperata cylindrica)*, and very valuable fodder if utilised at the proper stage. Many have experienced that periodic grazing could eliminated this highly competitive weed. Natural forages under coconut can produce an annual dry matter yield of 1,000 to 2,000 kg. per ha. per year. However, this has a very low biomass yield and can accommodate only a low stocking rate.

To improve the carrying capacity in coconut lands, improved grasses and fodder have been tested successfully. Many fodder and pasture grasses such as guinea 'A', napier hybrids such as NB 21, Clone-13, Panama and Bana have been recommended with the proper management system to avoid

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indigenous species of trees on degraded lands. Evidence also indicates a higher level of natural regeneration of local species such as kenda (Macaranga peltata), bedi-del, (Artocarpus nobilis), buta-domba (Syzygium operculatum) under pinus in patna lands.

Why cannot indigenous species be used in reforestation?

Indigenous species are those which are endemic to this country and form its natural forests. As indicated above, they are the right choice for reforestation work. But the fact remains that it is next to impossible to establish them on degraded patna lands, namely in areas where exotics have been planted. The Forest Department has conducted several experiments and the pilot planting of degraded lands with indigenous species, but growth is found to be so poor that even after 10 years of planting, they have not established themselves. As reported by a former Conservator of Forests, the Forest Department has made available land and capital funds to ecologists to prove that indigenous trees could be satisfactorily established on degraded lands. Unfortunately, nobody seems to have accepted the challenge. As revealed by the forest experiments and now proved under pilot planting as well, pinus is a good species to rejuvenate the soil and bring degraded land back to its original status, to enable indigenous species to be re-established.

What is often reported are the views and opinions of ecologists and others on pinus and eucalyptus planting, but it is also important to listen to the problems of the farmer himself, as it is he who lives adjoining these plantations. Farmers' views clearly indicate a large number of benefits attributed to pinus and eucalyptus planting. According to them, eucalyptus is a potential money spinner. Farmers in the areas mentioned above, planted indigenous species among eucalyptus in the 1980s. The growth, according to them, is very poor, and the casualty rate has been very high.

Future action is vital in several areas in order to both reduce the harmful effects of exotic plantations and to also promote their benefit among the local people. Firstly, an effective programme to convert the large extents of degraded and unproductive lands in districts such as Nuwara Eliya, Badulla, Ratnapura, Hambantota, Anuradhapura, Polonnaruwa, Moneragala, to fertile and productive resources, should be worked out. Several patna lands could be left in their natural state in each of the agro-ecological areas, for future comparisons. This programme will have to include planting already proven pioneer species such as gliricidia, pinus, alstonia, to start with. Wherever possible, indigenous species should also be included in these planting operations.

Secondly, a programme of research should be conducted to discover and quantify possible benefits to the local people, such as income support, employment creation and improvements in their living standards as a result of establishing and managing plantations of pinus, eucalyptus, teak, etc. Research should also be conducted to assess the environmentally and socially friendly aspects of planting pinus and eucalyptus. Thirdly, the results obtained through pilot planting as well as research referred to above, should be made available to the people, for study and comparison.

Finally, the programme of thinning-out already established pinus and eucalyptus plantations and introducing indigenous species according to the agro-ecological zones developed by the Forest Department in the 1980s, should be accelerated and speedily implemented.

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competition with the main crop. These species are capable of producing 12,000 to 15,000 kg. of dry matter annually. Gliricidia is also planted as support for pepper in-between coconut lines. This also provides a valuable supplementary feed through lopping, especially during the dry spells. Many other leguminous shrub species such as calliandra, erabadu, katumurunga (*Sesbania grandiflora*) ipilipil (*Leucaena leucocephala*) etc. can be grown as hedgerows between the coconut lines, not only to provide fodder but also to supply green manure for coconut palms which can replace large proportion of expensive artificial fertilizers, thereby reducing the cost of production. Many reported that integrating livestock with a tree fodder hedgerow system has improved coconut yield and the overall combined income per unit of land.

Agroforestry Systems

'Sloping Agricultural Land Technology' (SALT), was introduced to mid and up country sloppy lands to minimise erosion and upgrade soil fertility. To fulfil this task, leguminous tree/shrub species such as calliandra, gliricidia, desmodium (*Desmodium rensonii*) and flemingia (*Flemingia macrophylla*) were successfully introduced. Some non-leguminous species, mulberry (*Morus alba*) and wild sunflower were tested and found to be satisfactory. The green biomass produced for green manure by these shrub/tree species is in excess, and the second concept was developed to introduce a livestock component to the SALT system to utilise this excess biomass and generate additional income from a unit of land of the system. This new concept is known as 'Simple Agro-Livestock Technology or 'SALT II'. In SALT II, livestock are recommended to manage under stall-fed conditions and goats were identified as the ideal species under small farm holdings. This system of livestock production is very successful in the Philippines where the system originated, but in Sri Lanka, it is at the infant stage. Some pilot studies have shown its high potential in small holder vegetable and other cash crop farms in the mid-country region, where lands are subjected to continuous erosion and fragmentation.

Finally, the potential of livestock production in forestry systems is very high but little is known at present. Therefore, much work is still required to identify the most appropriate systems, with different livestock combinations.

About the Writer

Dr. A. N. D. Perera is an Assistant Professor in the Department of Animal Science, Faculty of Agriculture, University of Peradeniya. He is actively involved in many national programmes on livestock-based farming systems with special reference to the small holder sector.

Funding for Forestry

The Sri Lankan government has been the main responsible agency for providing forestry sector funds for development activities prior to the 1980s. However, due to the pressure from the several issues that emerged in the sector, external assistance was deemed necessity.

In the 1980s, the United States Association for International Development (USAID) and the Food and Agricultural Organization (FAO) provided assistance for watershed management. During the same period, the Norwegian Agency for Development Cooperation (NORAD) provided assistance for a conservation project which covered Sinharaja and the Knuckles range.

The IDA of the World Bank (WB) and the Finnish International Development Agency (FINNIDA) were instrumental in providing assistance for the Forest Resources Development Project (FRDP), which set the pace for the development phase of the country's forest resources. Again, during the late 1980s the WB, FINNIDA, the British Overseas Development Project (ODA), and the United Nations Development Programme\Food and Agriculture Organization (UNDP\FAO) jointly extended their support towards the Forestry Sector Development Project (FSDP). In addition, the Asian Development Bank (ADB) and the Australian International Development Assistance Bureau (ADB) provided invaluable assistance towards participatory forestry in the country.

The assistance provided was both technical and financial and covered a wide range of activities. The majority of assistance was by way of grants. Environmental conservation, forestry education and training, plantation establishment and maintenance, forest management, forestry planning, institutional strengthening, legislative and institutional reforms in the forestry sector were some of the areas for which assistance was provided.

It should be noted that, despite the assistance was provided by external sources, the general trend has been that the successive governments of this country also contributed between thirty to forty per cent of the total cost of the projects concerned. It is More than ninety per cent of all financial assistance provided for the forestry sector of this country has been given to the Forest Department, since it is the major implementing agency of forestry activities. It is anticipated that future trends in forestry would encourage a participatory approach in all forestry development activities, with increased responsibilities assigned to the stakeholders in forestry, thus minimising the need for financial assistance for forestry sector activities.

Financial and human investments in protected areas in Sri Lanka and other selected countries

Country	Agency	Budget US$/km²	No. of staff 100/km²
Australia	Australian Nature Conservation Agency	584	<0.1
	Victoria National Parks Service	735	0.9
	South Australia National Parks Service	13	0.2
Bahamas	Bahamas National Trust	9	0.9
Bhutan	Nature Conservation Section	NA	0.1
France	Direction de la nature et des paysages	1,213	4
India	Wildlife Wing, Himachal Pradesh	288	NA
	Wildlife Wing, Sikkim	308	10
Indonesia	PHPA	NA	2.2
Kenya	Kenya Wildlife Service	NA	9.4
Malawi	Department of National Parks and Wildlife	36	3.0
Malaysia	State Department of Forestry, Sabah	NA	4.6
	National Parks and Wildlife Branch, Sarawak	1,159	NA
Nepal	Department of National Parks and Wildlife Conservation	83	5.2

Estimated budget and expenditure of the FD Environmental Management Division and of the DWLC in 1993 and 1994, Rs:

Budget line	Estimate 1993	Expenditure 1993	Estimate 1994
FD Environment Management Division:			
Forestry Sector Development Project			
- consolidated fund	1,500,000	1,499,000	1,300,000
- IDA	0	0	180,000
- UNDP	14,765,410	6,471,570	12,000,000
- Other	0	0	6,000,000
Protected areas management	2,300,000	2,177,160	2,000,000
Sinharaja	3,867,690	2,293,350	8,940,000
Knuckles	(included above)	(included above)	7,400,000
Mangroves	2,257,460	1,297,000	3,967,500
Total EMD	**24,690,560**	**14,738,080**	**41,787,500**
(share of external aid)	(93.9%)	(89.8%)	(96.9%)
Total FD budget	346,800,000	0	363,950,000
Share of EMD of total budget	7.1%		11.5%
DWLC:			
Recurrent expenditure	40,533,000	40,524,000	47,645,000
Capital expenditure			
- consolidated fund	14,700,000	11,296,949	80,000,000
- GEF/UNDP	42,686,000	3,355,927	
Total DWLC budget	97,919,000	55,176,876	127,645,000
(share of external aid)	(43.6%)	(6.1%)	(29%)

Forest Management at the Crossroads

private sector management of forests was introduced partly to improve the saleability of the FSMP to a donor community infatuated with the idea of indiscriminate privatisation

by
Dr. Hemesiri Kotagama

The Forestry Sector Master Plan (FSMP, 1995) is the nationally accepted document that would guide forest management to contribute to the sustainable development of Sri Lanka. Its preparation was a well organised process, involving dialogues with many stakeholders of forests, the rural masses, forest industrialists, scientists, non-government organisations etc. FSMP (1995) is a comprehensive document that has considered the many issues of sustainable forest management and the many interests of stakeholders of forests to achieve the efficient and fair management of forests. Simply put, FSMP (1995) is a good plan. Yet, as is the nature of any plan, further improvements are possible.

The FSMP (1995) has brought Sri Lankan forest management to the crossroads in terms of changes in the;

* objectives of forest management and
* institutional structure of forest management.

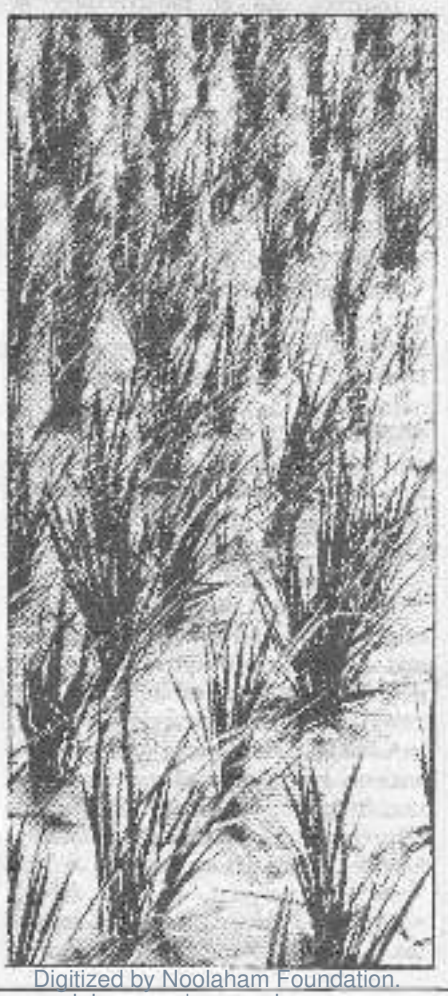
Firstly, the Forestry Plan of 1986 was heavily criticised for its bias towards the production objectives of forest management. The FSMP (1995) has rectified the above by explicitly and emphatically addressing the conservation objectives of forest management, such as the conservation of bio-diversity, soils, water as well as protecting historical, cultural, religious and aesthetic values (FMPN, 1995).

Secondly, in the past, forest management in Sri Lanka has been the exclusive responsibility of state and public institutions. The FSMP (1995) has proposed to involve the private sector in forest management as a private-public sector partnership.

This review very briefly examines: (a) whether the above changes in forest management were required, and (b) whether the FSMP has identified adequate strategies to foster such changes.

Change of Forest Management Objectives: Quantity to Quality

The fact that the natural forest-cover in Sri Lanka declined from about 80 per cent of the ground area to nearly 20 percent within a century and the belief that this 20 per cent too would be lost soon, has been the rationale to strengthen forest management. Undoubtedly, the decline of forest extent was mainly due to development activities that required the clearing of forest lands (Watugedakumbura and Kotagama, 1994). During the colonial period, vast extents of forests were cleared for plantation crops and subsequently since independence, the forests were cleared for irrigated paddy cultivation. Besides these vast scale clearance of forests, the peasants have been continuously clearing forests for chena/shifting cultivations. The objective of forest management in the past has been largely to curtail the latter type of deforestation. Thus, forest management strategies had been more focused on policing the forests from illegal encroachments in order to curtail the reduction of forest extent and quantity.



The relationship between development and the decline in forest extent has been empirically examined by Panayotou (1992) based on the data of more than thirty developing countries. This study has concluded that development (measured in terms of per capita income) and the rate of deforestation are related in an inverted U curve. This implies that with development, the rate of deforestation increases upto a certain level and subsequently decreases.

The relationship between development (measured in terms of *per capita* income) and the rate of deforestation in Sri Lanka was examined by Watugedakumbura and Kotagama (1994) based on data between 1960 and 1989. This study confirmed the finding of Panayotou (1992) in terms of Sri Lankan experiences. In Sri Lanka, like in many other countries, the rate of deforestation has increased with development and achieved a peak of 4.5 per cent. Currently, the rate of deforestation is following a downward trend. The FSMP (1995) too confirms the above findings. Thus, the stabilisation of the decline in forest extent is now being managed through the development process itself. The specific reasons for this process have not been investigated. In general, improved technologies are created with development, agricultural productivity

rises, non-agricultural employment increases and income grows gradually, thereby reducing the destructive dependence on forests.

The fact that the rate of deforestation is on the decline implies that forest management objectives could change, from managing the quantity of forests to managing their quality. Managing the quality of forest refers to managing forests to conserve bio-diversity, watershed benefits etc. The FSMP (1995) has given substantial emphasis to bio-diversity and watershed conservation in forest management. Thus, the FSMP (1995) has shown the right direction at the right time, for the future forest management of Sri Lanka. But has the FSMP (1995) proposed adequate strategies to conserve bio-diversity ?

Sri Lanka possesses very high biodiversity within a small land area

Adequacy of Strategies to Conserve Bio-diversity

Bio-diversity refers to the variety of biological beings (plants and animals) on earth. Sri Lanka possesses very high bio-diversity within a small land area, when compared with other Asian countries (BAP, 1995). It is important to realise that bio-diversity is a resource that could be used to produce commodities that could satisfy human beings and thus contribute to economic development.

Human use of bio-diversity could be either personal or non-personal. In the personal use, individuals gain satisfaction by meeting individualistic/selfish desires. In its non-personal use, bio-diversity is not used by individuals. Instead, individuals derive satisfaction from the realisation that it will be available for use by some other individual, particularly the next generation.

Personal use of bio-diversity could take three forms, viz; direct use, indirect use, and option use. Direct use refers to the direct consumption of products of bio-diversity, either destructively or non-destructively. Examples of the destructive use of bio-diversity are the harvest of non-timber forest products such as food, fibre, medicines etc. from forests. The non-destructive use of bio-diversity is exemplified by the enjoyment of the diverse aspects of nature, the use of bio-diversity for education, photography, eco-tourism etc.

Indirect use of bio-diversity is through the maintenance of ecological functions, for example, the maintenance of food chains, regulation of pests in cultivated crops through natural predators. Further habitat conservation of bio-diversity could indirectly contribute to the preservation of watersheds.

The option use of bio-diversity refers to the satisfaction gained through opting to conserve diversity with the hope that it could be used directly or indirectly in the future. Conserved bio-diversity could probably be used as a source of genetic material in crop or livestock improvement or in extracting chemicals for pharmaceutical purposes.

Non-personal use of bio-diversity could take two forms, viz; bequest use and existence use. Bequest use is where people gain satisfaction from the knowledge that bio-diversity exists to be used by future generations. Existence use is where people gain satisfaction from the knowledge that bio-diversity exists for its own sake, namely, for the sake of the ecosystem.

Which of these values are important to a nation's society would depend on its stage of development and the cultural association with environmental conservation. Generally, poor developing countries would value more the direct uses that give immediate benefits, whilst affluent developed countries would value the existence use of bio-diversity. It would be expected that the FSMP (1995) will have proposed strategies for the sustainable use of bio-diversity such that conserved bio-diversity contributes to economic development.

The sustainable use of bio-diversity involves the operation of a cycle of inter-linked activities. These activities are identified in Figure 1. As portrayed in Figure 1, bio-diversity could be sustainably conserved only if contributors to the conservation are adequately compensated (equivalent to foregone opportunity costs) and the compensation is equitably shared.

For the sustainable conservation of bio-diversity, it is initially required that society, through intellectual deliberation and awareness creation, understands what bio-diversity is and why it should be conserved. The outcome would be that of society being convinced that bio-diversity has an economic value in its use and therefore needs to be sustainably used. The activities thereafter ought to the pragmatic.

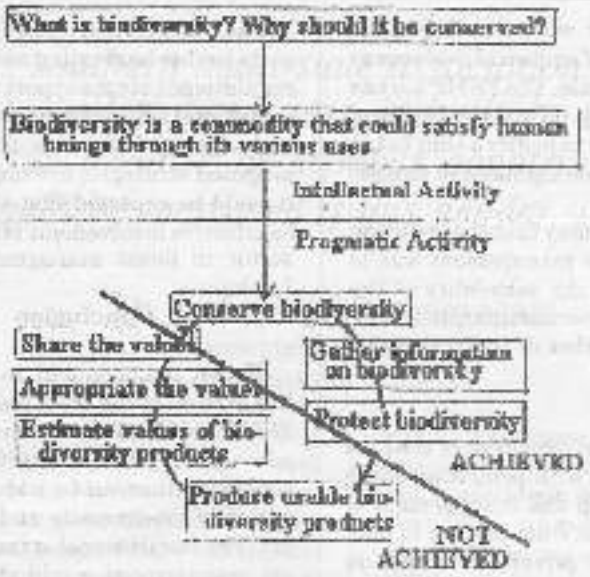


Figure 1: STRATEGY CYCLE FOR THE SUSTAINED USE OF BIODIVERSITY

Information on existing bio-diversity is required first. This information could be collected through research/sample surveys of fauna and flora. On collection of this information, decisions could be made on the optimal extent of localities etc. to be conserved for bio-diversity. The production of some bio-diversity uses such as the genetic improvement of agricultural production possibilities would require the application of bio-technology. Next, the values of the products need to be known. Since markets do not value some of the bio-diversity uses, (indirect use, option use, bequest use, existence use) values may have to be estimated. These values have then to be appropriated. The appropriated values have to be finally shared among the custodians and contributors to generate the use values of bio-diversity (please refer Ratnayaka (1996) for detailed explanations on above).

The sustainable use of bio-diversity requires:

(1) Completion of the cycle of activities.
(2) Equitable sharing of bio-diversity since its uses are larger than the costs of bio-diversity conservation.

Strategies should be implemented to ensure that the cycle is effectively complete. However at present, what has been at least moderately achieved is the formal gathering of bio-diversity information and the development and implementation of some strategies for the conservation of mostly natural habitat. Strategies for bio-diversity utilisation have not been addressed in FSMP (1995) when compared with timber and non-timber product utilisation. This is a major shortcoming of the FSMP (1995).

Change of Forest Management Institutions: Public to Private

Currently, about 72 per cent of the forests in the world are publicly owned and managed, excluding USA, where only 28 per cent of forests are publicly owned (Tietenberg, 1988). In Sri Lanka at present, according to Forest Ordinance No. 16 of 1907, 'forests are all land at the disposal of the state'. The protection and management of forests is the sole responsibility of the state. Public forest management in developing countries dates back to the 19th century (Hewage, 1996). Despite the long tradition of public forest management world-wide, there is currently a move to involve the private sector in forest management. This is justified on the grounds of alleged inefficient public management, even though there is apparently no credible proof. The same is true in the case of Sri Lanka and the FSMP.

Often, the main cause of deforestation has been government-sponsored acts for agricultural development purposes for which public forest management was not responsible. There is no proof that the public management of forests in Sri Lanka has been inefficient. This arouses suspicions as to why the private sector should be promoted to manage forests in Sri Lanka.

Private sector management refers herein to the management of forests by rural people or by large investors. The reasons for requiring the involvement of rural people and large investors are different, obviously. This paper focuses on the large investor-based private sector.

The principal rationale for private sector management lies in the inefficiencies of public sector management. Yet, this rationale is only a necessary, not a sufficient condition for management policy formulation. For such a change to be confidently accepted, an *implementation analysis* needs to be done. In an *implementation analysis* inadequacies of public management are compared with the potential inadequacies of private management and *vice versa* (Wolf, undated). Such an analysis has not been done in the FSMP, although it has advocated the involvement of the private sector in forest management.

Some general (non empirical) reasons for this omission have been listed by Hewage (1995), viz.

(a) lack of clear, widely-accepted policy directions and the legal framework for providing directions for the institutional development and operation of institutions.
(b) lack of political and public support.
(c) multiplicity of agencies responsible for forestry sector development.
(d) inadequate funds due to low revenue generation and budget allocations. Both in the industrialised and developing countries, the public sector institutions in the forestry sector, are being scaled down and budget freezes introduced.
(e) staffing is often inadequate in terms of quality in relation to need.
(f) forestry agencies often lack incentives to change. These agencies based data suffer from negative develop-

ments in the forestry sector but on the other hand, they do not benefit from changes either.

A similar list of general reasons as to why the private sector is inefficient in forest management could also be provided (Titenberg, 1988).

(1) the investment, technology and knowledge of forest management involves large economies of scale. The question arises as to whether Sri Lanka has indigenous private capital surpluses investible in forestry, technology and entrepreneurship. If not, it is unsure whether Sri Lankans would accept foreign capital investment in large-scale forestry. Past experience shows that Sri Lankans have accepted foreign capital investment in industry, and rather less and reluctantly, in land and agriculture.

(2) forestry is a long-term investment. The tenure of land, investment incentives, price expectations and other incentives are not set to promote private investment and reduce the uncertainties of forestry markets.

(3) cultivation and harvesting decisions of forestry are dependent on the interest rates in the economy. Currently, the interest rates are increasing. Increasing interest rates would discourage investment in forestry and lead to shorter harvesting cycles, resulting in the environmental damage of bio-diversity and watershed; quick-growing species would be preferred over slow-growing indigenous species threatening the conservation of bio-diversity.

(4) private entrepreneurs will consider only the values of the marketable aspects of the forest in their decision making. Therefore, non-market aspects of bio-diversity, watershed conservation etc, will be undetermined.

It is evident that both public and private sector management is liable to fail. Perhaps rectifying the weaknesses of the public sector through investment and other means could improve public sector management, precluding the need to change to private sector management of forests. It is futile to proceed further with this argument due to the lack of empirical evidence to support either case. The FSMP too has not convincingly proved the failure of the public sector to justify a shift to the private sector management of forests.

It is clear to many that the inclusion of private sector management was to partly improve the saleability of the FSMP to the donor community infatuated with the idea of indiscriminate privatisation.

The historical experiences that Sri Lanka has had, with pendulum shifts in the ownership and management of plantation crops, from private to public and back to private, is a case in support of a cautious approach. Forests are not strictly comparable with plantation crops. Forests are unique and any damage done is irreversible. Given the ambiguity of the rationale to involve the private sector in forest management, it is commendable that the FSMP (1995) has adopted a very cautious approach.

Adequacy of Strategy for Private Sector Forest Management

The FSMP has classified forest and its management into seven types. (NTF, 1995) of which private forest plantations and their management is only one. Private forest plantation will only be allowed in areas that are not critically important in terms of bio-diversity and watershed conservation. The state would hold the major responsibility of managing forests to provide public utilities for conserving bio-diversity and watershed protection etc. There is therefore an eminent threat to sustainable forest management through a partnership between the public and private sectors, even if the private sector fails. The FSMP (1995) allows for the possibility of pilot testing the abilities of the private sector in managing the forests.

The recently concluded efforts of NTF (1996) on the "Legislative and Institutional Reforms in the Forestry Sector" have proposed credible reforms that would support private sector forest management. NTF (1996) has proposed adequate strategies to provide security of land tenure (transferable and inheritable), financial support and market facilitation (de-regulation of some timber harvesting and transport regulations), state support through research and advice, insurance schemes to hedge against risks etc. If these proposed strategies are implemented, it could be expected that there would be effective involvement of the private sector in forest management in Sri Lanka.

Conclusion

Forest management in Sri Lanka has arrived at the cross roads with the FSMP (1995). The objective of forest management has changed from sole timber production to include conservation of bio-diversity and watershed etc. The institutional structure of forest management would change from solely public sector to public-private sector participation.

The change towards conservation of bio-diversity is well founded on scientific/empirical analysis. However, strategies to conserve bio-diversity are not adequately dealt with within the FSMP (1995). The FSMP proposes only the conservation of bio-diversity and not its use. Unless used for human needs, bio-diversity cannot be effectively conserved. Hopefully, the Bio-diversity Action Plan which is under preparation would fill this vacuum by proposing strategies to use bio-diversity.

The change towards private sector management of forests is not founded on scientific/empirical analysis. However, cautious strategies in building public-private sector participation in forest management have been proposed. In an overall census, the FSMP is a commendable document that could guide sustainable management of forests in Sri Lanka.

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GENDER IMPLICATIONS OF SAARC

this southern multi-state association of developing countries perpetuates the gender asymmetry in-built in the political, economic and socio-cultural fabric of member countries: the quality of life of the people cannot be improved if this gender asymmetry is not speedily rectified

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SAARC, which encompasses Sri Lanka, India, Pakistan, Bangladesh, Nepal, Bhutan and the Maldives has as its major objective the promotion and stimulation of regional co-operation, which includes intra-regional trade, bio-technology, environment, tourism, audio-visual exchange and the enhancement of the quality of life of the people, as well as the alleviation of poverty.

SAARC has come a long way since its conception of regional co-operation which received region wide acceptance in 1980. There is now a great deal of communality within the region. As defined by Sri Lanka's Foreign Minister, 'geographically, SAARC is a clearly definable region. Historically and culturally the countries in the region share a similar heritage and 'though each country is at a different stage of development, many of the development needs and strategies have common elements'.

Although the peace, stability, amity, progress and welfare of the people of South Asia have been underscored as being fundamental components of the objectives of co-operation, at the Male (Maldives) Summit in 1990, the Indian Prime Minister drew the attention of all participants to the limited co-operation practiced within the region upto then, which had, consequently, failed to meet the day to day needs and aspirations of the people.

The efficacy of regional co-operation is often measured on the scale of tangible benefits bestowed on the people at large. This is quite often determined by the visible success attained in core areas of economic and political co-operation. Economic and sectoral co-operation within this region should ultimately deliver economic benefits to the countries and people in the region, but in many cases, such co-operation may benefit some countries and some interest groups within a country.

It was mainly after the SAARC Summit meeting held in 1988, that greater attention was given to core economic and related areas of co-operation. These included development planning, trade in manufactures and services, joint ventures and regional projects, energy, environment, disasters, ecology, basic needs and human resource development. Even at this juncture, none of the above-mentioned areas of co-operation either implicitly nor explicitly referred to the considerations of the gender dimension to the issue. In this context therefore, it will be argued that expanding production and co-operation and enhancing the quality of life of the people organised patriarchally around nuclear families, would tend not only to perpetuate, but also to aggravate the gender asymmetry already built into the patriarchal system. A word -in parenthesis- would be pertinent here as to why gender issues must be spoken of in SAARC.

The SAARC region is one in which gender asymmetry is particularly acute and pernicious because of the traditions and fundamentalist religions and cultures of member countries. SAARC however, has as its basic and ultimate aim the improvement of the quality of life of the people: the quality of life of about 50 per cent of the people cannot be raised or improved meaningfully if this gender asymmetry is not rectified. The areas of co-operation identified thus far have hardly spelt out the gender dimensions of the relevant programmes. It therefore becomes appropriate here to refer to the attitudinal values ascribed to gender in development issues.

There is a clear distinction among the three attitudinal values ascribed to women. The first is the benign, albeit, condescending and patronising, welfare attitude. This is the attitude encapsulated in the concept of ameliorating the conditions of women, in other words, which gives equal access to the benefits of a comfortable life and other privileges having no bearing on the status of women in society and on socio-political organisation.

The second attitude referred to is that of regarding women as being part of the resources utilisable in political struggle or economic development. This attitude is compatible with partly releasing women from their bondage to perform family chores. Such a release would make them

available to political movements and assembly line economic production and the shop floor, or even give them access to the Board Room. Even this attitude does nothing to augment the status of women.

The third and only meaningful attitude is the attitude of empowerment. This attitude mandates that women be empowered, just like males, to assume roles in governance, government investment and production as well as in the family, to decide the roles that they will assume, the roles of independent, unrestrained individuals taking their own independent decisions, unfettered by any shackles, whether overt or covert.

The thrust of the central argument in this study is that SAARC does not subscribe to this attitude of empowerment because of the socio-cultural heritage and political imperatives of the region as well as that of their constituent units. The socio-cultural heritage of the countries of the region springs from the basic fact that the social and political organisation has from inception been centred around the patriarchal nuclear family.

In the developed world too, the socio-cultural heritage has sprung from the fact of the socio-political organisation being based on the patriarchal nuclear family. This is evidenced by several aspects of the contemporary western political socio-cultural and economic life. But the point sought to be made here is that the socio-cultural and political fabric in the West has experienced changes sufficient to make a qualitative difference in the empowerment of women. In the South Asia region however, the hold of the patriarchal nuclear family-based heritage is strong enough to have a stranglehold on attitudes, to the extent that would be considered sacrilegious to advocate empowerment.

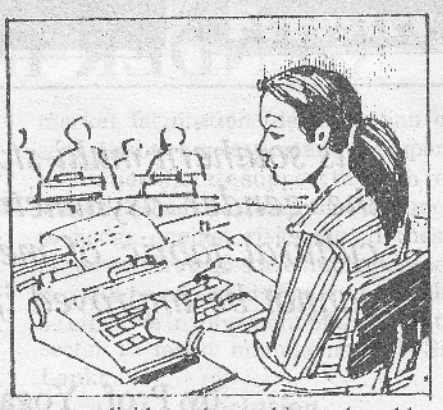
The fact that the South Asian region has produced the first women leaders of state like Sirimavo Bandaranaike, Indira Gandhi, Benazir Bhutto and Begum Kaleeda, does not invalidate this argument: These women avowed to perpetuate the patriarchal socio-cultural fabric.

The governments, or rather the governing parties have to profess to uphold traditional socio-cultural norms and values. Irrespective of the gender of the individual who represents the government as its head, the establishment which props up the government is male dominated and as such this imperative of having to profess, foster, protect and promote the norms and values decreed by male dominated societies and social regimes suit them eminently.

Take for instance, poverty alleviation, a key concern of the SAARC. Poverty alleviation is in effect a composite programme which includes immediate income, institutional, financial and consultancy service support for self employment, the creation of income generating jobs and access to such jobs.

In all these programmes, the unit of reckoning is the male headed nuclear family (see CGSSAP study 1994). That the poor are a very vulnerable group is granted. It is also granted that this vulnerable group should be targeted for special selective relief and support measures to cushion them from the effects of structural adjustments in the economy which occur or are induced as a concomitant to economic development.

What is disconcerting, nay distressing, is that the most vulnerable group are not reckoned with. Women constitute about the most vulnerable section of the poor. The study on Employment Generation and Poverty Alleviation in South Asia prepared by the Co-ordinating Group for Studies on South Asian Perspectives, on which the subsequent decision was made, expresses no concern, neither implicitly



nor explicitly, about this vulnerable group, namely, women. All poverty alleviation programmes are designed thus far to alleviate the poverty of family units mainly headed and controlled by men.

In the case of environmental conservation and protection programmes the role of women as users, victims and managers of the environment is not recognised nor are studies sponsored. Therefore, as in poverty alleviation agenda, in environmental programmes too, the women are virtually non-existent and such instances betray the spirit of the SAARC *vis-a-vis* women.

The 'Plan of Action for Women' prepared by the Technical Committee on Women in Development, inaugurated in Islamabad in the late 1980s, spells out separately, with no direct reference to the areas of co-operation identified by the SAARC countries, strategies required to improve the socio-economic conditions of women in the region. This approach requires review. The situation of women in the SAARC region, both socially and economically, will improve only when the gender implications of such an association are understood and suitable policies drawn and incorporated right from the initial stages of planning and study in all the areas of co-operation identified.

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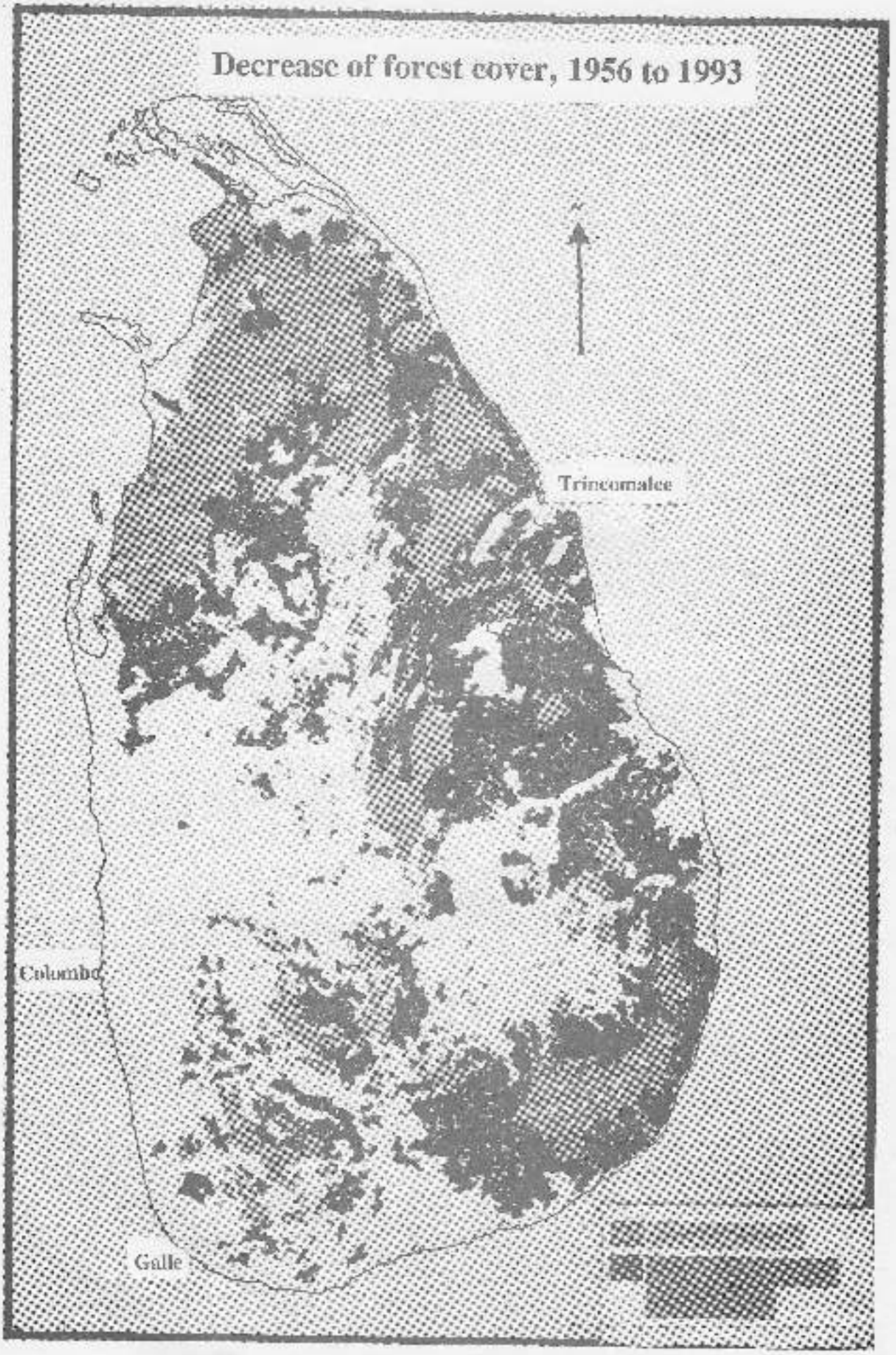

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