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# SHARED CONTROL OF NATURAL RESOURCES (SCOR)

**PLANTING TREES ALONG ROADS, STREAM  
AND CANAL RESERVATIONS AND  
IN WATERSHED AREAS  
IN SRI LANKA  
PRESENT STATUS AND ISSUES  
FOR CONSIDERATION**

**International Irrigation Management Institute (IIMI)  
Sri Lanka Country Programme  
107, Havelock Road, Colombo 5, Sri Lanka**

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SCOR seeks to increase the users' share of control of natural resources in selected watersheds through partnerships between the state and users that contribute to greater production while conserving the natural resources base. SCOR will promote integrated planning for the use of land and water resources in two pilot watersheds with spread effects to other areas. The SCOR project is a collaborative effort of the Government of Sri Lanka, the United States Agency for International Development (USAID) and the IIMI.

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PRESENT STATUS AND ISSUES FOR CONSIDERATION

C.M. Wijayaratna,

Head, Sri Lanka Field Operations, International  
Irrigation Management Institute. 107, Havelock Road,  
Colombo 5, Sri Lanka.

Anura S. Widanapathirana,

Monitoring and Evaluation Consultant, Participatory  
Forestry Project, Forest Department, Sri Lanka.

Telephone: 94-01-508001 (7 lines)

### ABSTRACT

This paper examines the present status of planting trees along the roads, stream and canal reservations and in upper watershed areas in Sri Lanka. It raises issues which may have to be considered in establishing tree cover in such locations. The paper suggests that tree cover is the best form of land use for these locations. Drawing from past lessons and from the experience gained in a project being executed in Sri Lanka, it finally raises some issues which need to be considered in establishing tree cover in the streams and road reservations and in watershed areas.

## 1. INTRODUCTION

According to the latest information available at the Sri Lanka Forest Department (FD), the dense forest cover in the island as at 1992 is just a 20% of the land area<sup>1</sup>. Over the last three decades, the forest cover has dwindled by over 50 percent. If this trend continues, the remaining few natural forests will be subject to very severe stress in the near future.

Mainly as a result of the decline in the country's forest cover especially in watershed areas, several consequences have already taken place. Among them, the increase in flash floods and reduction in dry season stream flows, drying of streams located in hilly areas, increase in soil erosion and even land slides, siltation of low-lying areas including the reservoirs and paddy fields, accelerated leaching of plant nutrients from agricultural lands and an increase in the rate of pollution of water bodies resulting from the increased accumulation of nutrients are more important. The growth of algae in reservoirs, including the Kothmale, Victoria and Randenigala located in the hill country, and the problems caused thereby have been highlighted by Fleming (1991) and de Alwis (1993). According to them, one main reason for the accelerated algae growth is the poor management of surrounding agricultural lands and the inadequacy of (in many instances the absence of) tree cover in the watershed area to act as a buffer between the foreshore of the reservoirs and the rest. Additionally,

the demand for timber and fuelwood is met by felling trees grown naturally along the streams and in the watershed areas due to their easy accessibility to the people.

This paper presents a qualitative assessment of the problem and the collection of quantifiable data on the subject should be a priority for both future planning as well as to establishing benchmark studies against which future developments can be compared.

Planting trees along the reservations of paths, roads, streams, channels and in watershed areas is very important due to several reasons. First, many of these areas do not have land tenure problems since such lands are held by the state. Second, these lands are not used for any productive purposes at present; most of them do not have any tree cover since what existed there before had been removed for timber and fuelwood needs or for the expansion of cultivation. The removal of naturally grown trees is done either illegally or by the owners of such lands since some of them are owned by the people through generations. Third, due to the lack of tree cover particularly in upper watershed areas, flash floods during the rainy season and drying up of streams in the dry season have caused serious problems not only environmental ramifications but also a range of socio-cultural problems. From the land use point of view, planting trees in these locations is the most suitable choice. In fact, the recommendation of the Third Land Commission with regard to the use of land in reservations such as

roads, streams, river banks, irrigation channel reservations, etc. is to put them under forest cover (Sessional Paper 1990). This will help stabilize stream banks and reservations of irrigation channels, reduce soil loss from the adjacent cultivable lands and prevent erosion of water course banks by flood or/and run off water.

Tree planting along roads and paths can be considered as an informal method of timber and fuelwood production as well. The magnitude of contribution to fuelwood and timber production from this type of land use can be calculated as follows.

The total length of public roads maintained by the consolidated government fund was 25,952.5 km as at 1990 while the length of railway tracks as at 1989 was 1,453 km (adding up to 27,405.5 km (Statistical Abstract, 1991). If a single row of trees spaced at 3-meter intervals on either side of the above public roads network is established, the number of trees that will result from such a strategy works out to 18,270,333. If other types of roads including those maintained by the local authorities are considered, the number of trees that can be established will be much higher. The total length of roads managed by local authorities is not available in order to calculate the figure.

If trees are established along other types of reservations

such as streams, rivers and in watershed areas in addition to the road reservations, its contribution to the total vegetal cover of the country is expected to be substantial.

## 2. PRESENT STATUS

This section discusses the present status of the reservations of roads, paths, streams as well as the watershed areas in the country and then evaluates the experiences in planting and maintaining trees in these locations in the past. The discussion concentrates on the types of trees planted, existing arrangements for the establishment and management of these locations and the main benefits accruing from such plantings.

### 2.1 Road-side plantings

Any road or path is expected to have an area set apart as a reservation. The width of such reservations as stipulated by the relevant Act<sup>2</sup> is as follows:

- \* Any public highway should have 33 ft. on either side from the center of the road as the road reservation
  
- \* Any public foot path should have 10 ft. on either side from the center of the path as the reservation.

It is generally accepted that the road reservations belong to the state or the local government authority. Both from the road maintenance point of view as well as for environmental reasons, such areas should be maintained as reservations. The state has delegated the authority for their management to autonomous bodies such as the Road Development Authority in the case of main trunk roads and the local bodies with regard to smaller roads and foot paths.

Planting trees in the reservation of main roads utilizing hired labour has been practiced some 30-40 years ago. These "avenue plantings" now in mature state are found along many streets in and around Colombo, in other important towns and along main highways linking the towns etc. The earliest planted trees are uprooted at times of road widening which provide timber for furniture manufacture and fuelwood. The trees planted some 30-40 years ago belong to the single species of Albizia lebbbeck (Mara in Sinhala). During the subsequent period, road-side plantings have been completely stopped until it was restarted by the FD in the 1980s. As a result, trees in the age group of 10-30 years cannot be observed while long young avenues of several hundreds of kilometers are also seen in the countryside at present.

Road-side plantings by other agencies such as Non-governmental organizations (NGOs), Mahaweli Authority, Provincial Councils, Integrated Rural Development Projects (IRDPs), Road Development

Authority and community-based organizations are only of recent origin. Starting from the 1980s, they have planted trees along long stretches of trunk roads and other types of roads. Some of these plantings have coincided with events such as the National Tree Planting Day, World Environment day etc. Maintenance of these planted areas remains a major problem faced by the agencies.

Compared to the earlier period, the recent plantings consist of a mixture of tree species such as Tabebuia rosea, Azadirachta indica (Margosa), Cassia fistula, Filicium decipien (Pihimbiya in Sinhala), Albizia lebbeck, Swietenia macrophylla (Mahogany), Tamarindus indica (Tamarind), Acacia auriculaeformia, etc. It should be pointed out that the road-side plantings are confined to highways and other important main roads leaving out several thousand kilometers of minor roads and paths maintained by the local authorities.

The main problems in the establishment of road-side plantings faced by the FD, as the premier agency responsible for forestry development and other agencies are the poor survival of trees and problems involved in protection. The low level of survival is mainly due to droughts while stray cattle is also a serious menace as far as their protection is concerned. In order to alleviate the survival problem due to inadequate rainfall, planting is normally done to coincide with the monsoons and by avoiding areas with erratic rainfall patterns. Although protection against cattle

damage remains to be a main problem, some NGOs have evolved innovative systems whereby tree care and protection has been entrusted to local groups with satisfactory results.

On the other hand, the method of planting adopted by the NGOs has been different from the traditional method adopted by the agencies utilizing hired labour. NGOs have mobilized the local communities for both planting and maintenance. The result as expected is a higher degree of success as seen along several highways and road stretches in the country. They have also been able to protect the avenues against cattle damage as described earlier. In such cases, the communities have taken an active interest and even developed a sense of belonging to the planted areas. Since the ownership of planted reservations remains with the government, they were subsequently handed over to the relevant state authority. Thereafter, the involvement of local communities was absent and the maintenance of the plantings seems to be a problem.

Several benefits can be derived from road-side plantings. Timber for furniture and for fuelwood and the shade provided by the canopies of the trees to the pedestrians can be considered as the major benefits. In drier areas in particular, road plantings provide an aesthetic value too. Trees of the special Albizia lebbbeck provide a substantial quantity of timber for furniture manufacture. Almost the total supply of this variety of timber for

furniture manufacture comes from road-side plantings established some 50-60 years ago. There are no specific data to show the contribution of road-side trees to the furniture industry and as a source of fuelwood. The contribution of roadside trees to the process of absorbing atmospheric carbon and the resultant purification of the air, particularly in urban areas, can be expected to be high as these trees are very large now and have developed massive canopies. These have not been quantified as yet. Similarly the contribution of road-side trees to the reduction of aridity and the arrestation of the problem of soil erosion though it seems to be straight forward, needs to be quantified.

The main disadvantage of roadside plantings is the possible damage to people and their property as a result of uprooting of trees and/or snapping the branches due to the combined action of strong wind and rain. This is a common problem along the streets within the Colombo city in particular, after a heavy downpour. This type of damage can be prevented by adopting such measures as polarding branches and by selective removal of large trees as done in other countries such as in France. These practices are not being carried out systematically as yet in this country.

## **2.2 Stream and River Reservations**

Streams and rivers are a common scene in Sri Lanka's landscape. These water courses may or may not have water all-year

round depending on their location in regard to the agro-ecological region of the country. The streams in the wet zone<sup>3</sup> have water throughout the year while those in the dry zone<sup>4</sup> usually contain water only in the rainy months. The Land Development Ordinance of 1970 together with its amendment of 1981 and the regulations under this law provide the necessary legislative support for the establishment and maintenance of tree belts along stream and river banks.

This Ordinance and Act stipulate the following minimum requirements with regard to the width of reservations:

- \* Rivers with a width of less than 15 ft.-- One chain width from the bank of each side as the reservation
- \* Rivers with 15-50 ft. width-- Two chains from the bank of either side of the river
- \* Rivers with a width of over 50 ft.-- Three chains width from the bank of either side of the river

The responsibility for their protection is vested with the Divisional Secretaries<sup>5</sup>. Over the years, many of these reservations have been encroached<sup>6</sup> by the people for cultivation or for the construction of dwelling units. In the districts of the Southern Province of the country (such as Matara and Galle), the natural

tree cover in almost all the stream reservations have been stripped off by the people for planting tea<sup>7</sup>. In many instances, tea plantations extended right down to the bank of the water course. Although well managed tea cover provides good protection against the beating action of rain drops, such cover hardly obtains in actual practice. For instance, a survey carried out in one of the areas heavily cultivated with tea in the Nilwala watershed indicates that about 50% of the tea lands have a cover which can be considered as satisfactory. Lack of land cover under tea is a serious environmental problem in the two districts mentioned earlier.

The ownership of many stream reservations is vested in the government unless there is a private claimant. However, in many cases the reservations have not been demarcated which makes it impossible for monitoring the tree cover in such reservations. Person whose land is located adjoining such areas continue to cultivate on the reservation as well using improper soil conservation measures and crop planting practices. Such cases are common along many rivers in the dry, wet and intermediate zones. The state nor the local government agencies so far have been able to protect the reservations fully through the institutional system including the legislation. One reason which has made it impossible to institute legal procedures to protect them is that the reservations have not been demarcated.

The need for the establishment of trees along streams and rivers has been emphasized in several recent policy documents. The Land Commission Report (1987) recommends that river banks and stream reservations should be marked out and the establishment of trees be given high priority. The National Environmental Action Plan (1991) recommends the preparation of an inventory of all reservations as prescribed by law and the development of tree belts in these reservations. Few years ago, a project was implemented by the government the objective of which was to establish tree cover in the reservations of important rivers. There are several pilot projects already undertaken by the agencies as well as some NGOs. However, it has not been possible to implement these programmes on a national basis due to legal, socio-economic and institutional problems.

### **2.3 Irrigation Channel Reservations**

The Irrigation Department (ID) and the Mahaweli Authority (MA) are responsible for the management of irrigation channel reservations. By design, every channel has a reservation set apart on either side of the water course. The width of the reservation depends on the type of the channel. The accepted land use pattern in the reservations is a tree cover which acts as a buffer between the channel and the surrounding area so that siltation and entry of pollutants, foreign matter etc. into the channel is prevented. Planting of trees along irrigation channels will also result in

reinforcing the banks so that damage which likely be caused by flood and run-off could be prevented. For the purpose of effective maintenance of irrigation channel reservations, the Land Development Act provides the necessary legislation as shown below:

- \* Irrigation canals with a base width of 10 ft. or more--49.5 ft. as the reservation on both sides,
- \* Irrigation canals with a base width of 5-10 ft.--26.4 ft. as the reservation on both sides,
- \* Irrigation canals with a base width less than 5 ft.--9.9 ft. as the reservation on both sides.

The present situation is that many of these reservations have been encroached mainly by members of the second generation of families for cultivation or for the construction of their dwelling units. There is no forest cover in a majority of irrigation channel reservations in the country. The reservations which have not been encroached do not have trees either since what existed before has already been stripped off by the people. The banks of main canals in several major irrigation schemes of the country do not have protective tree covers which are therefore subject to erosion. Except for a few programmes undertaken by NGOs, there have not been any programmes of planting trees along reservations.

## 2.4 Watershed Areas

Watershed areas include the upper sections where streams and rivers begin and the catchment areas of reservoirs both large and small. There are 113 river basins and about 25,000 operational reservoirs within the country. Ideally, the upper parts of the river basins should be covered with natural forest in order to facilitate the regulation of the dry season flow and to avoid flash floods. This in fact is stipulated in the Crown Lands Ordinance of 1981. The policy guideline with regard to watershed areas reservations is that points where streams, rivers and water courses begin should be set apart as reservations. However, due to the expansion of cultivation, inadequacy of institutional mechanisms and other reasons, it has not been possible to maintain the forest cover in watershed areas as mentioned earlier. These factors have resulted in the depletion of the natural tree cover in the upper watershed areas in several river basins of the country. For instance, the upper watershed areas of important rivers such as Nilwala Ganga, Ging Ganga, Kalu Ganga, Kelani Ganga, etc. have degraded forest cover or many areas under the scrub vegetation. Setting fire to the scrub vegetation causes further destruction of the available cover.

The lack of protective tree cover in watershed areas has influenced changes in the river flow regimes. In some cases, there is evidence that some riverlets have already run dry and the dry

season flow in several others has been reduced greatly. The exact number of streams which have dried due to the above-mentioned problems has not yet been investigated.

With regard to reservoirs and tanks, the majority does not have forest cover in the catchment area. The existing tree cover is subject to very severe stress both due to illicit logging, inappropriate cultivation practices and seasonal fires. The major reservoirs in the hill country area such as Castlreigh, Mauossakelle, Kothmale, Victoria etc. do not have sufficient forest cover in the foreshore. They are surrounded by tea lands from which soil erosion in high order takes place. In the case of irrigation tanks both in the dry and wet zones, the catchment areas do not have forest cover. These areas predominantly consist of cultivated lands, settlements and degraded lands. Soil erosion resulting from human activities in both settled and degraded areas of catchments is a serious problem. This has resulted in siltation of tanks, reservoirs and streams throughout the country.

The foregoing discussion shows that the reservations along roads, channels, streams as well as in upper watershed areas are either bare or do not have protective tree cover. The minor roads do not have trees along either side. The vegetation in most of the reservation areas as mentioned earlier has been replaced either by expanded agriculture and/or human settlements. This is a serious problem affecting the resource base in the reservations and the

down stream areas as well as the management of the natural resource base of the country in general.

It is in this context that solutions must be worked out to protect the stream, river and channel reservations and watershed areas. The catchment areas of reservoirs and tanks must also be protected. The form of protection proposed should be suitable to the areas, easy to establish and maintain, preferably by the local people and in a manner beneficial to the people. Considering these requirements, the most suitable form of protection, from the technical and institutional viewpoints, is to establish tree cover. A tree cover not only provides the needed protection for the resources but also produces a series of benefits to the people in the areas. A new project titled "Shared Control of Natural Resources" (SCOR) launched in Sri Lanka last year makes use of both protection and production dimensions to encourage tree planting in reservations and in watershed areas (IIMI, 1992). The initial results are found to be satisfactory. A discussion on this project and the initial findings are presented below.

## 2.5 Tree Planting Using Innovative Strategies under SCOR

The new experiences that surfaced in establishing tree cover in reservation areas of roads and streams utilizing innovative strategies under the Shared Control of Natural Resources (SCOR) Project are of particular concern here. This project is unique in

that it facilitates production, planting and maintenance of trees in the reservations of roads and streams by the local people alone. It is also innovative in the sense that the purpose of establishment of tree cover under the SCOR Project, unlike in almost all the previous projects undertaken, is not only for protection but also for production. It is believed that production in addition to protection of the resources base is a sufficient incentive for the people to plant trees in reservations. Other incentives which are being worked out on an experimental scale are the granting of usufructuary rights to the people to make use of fruits, leaves and other products from the planted trees.

The SCOR Project is implemented by the Government of Sri Lanka with the participation of two main agencies namely, the Ministry of Forestry and irrigation and the Ministry of Lands. The Project is sponsored by the United States Agency for International Development (USAID) with technical assistance provided by the International Irrigation Management Institute (IIMI). The Project is being carried out on a pilot basis in two watersheds namely, Nilwala Ganga in the wet zone and Huruluwewa in the dry zone.

Recognizing this problem of the absence of tree cover in reservations and the attendant environmental problems, the SCOR Project has mobilized large numbers of local people for tree planting. Already, several kilometer lengths of stream reservation areas, watershed areas in several smaller tanks and the starting

point of a main river have been planted with appropriate species of trees by the people in close association with the relevant agencies. The participation of the people and the agencies has been very active. The plants established already were removed from natural forests or from the home gardens.

Action has now been taken to establish community groups to establish nurseries and to use the plants raised in reforestation work within the area of production itself. The group was given a seed grant. Negotiations are under way with the Banks to provide loans to these groups in future. At present, about ten community-owned and managed nurseries have been organized, both in Nilwala and Huruluwewa watershed areas, with a capacity of about 50,000 plants. Species raised are those beneficial to the people such as timber and fruit types. Planting using the seedlings raised in the nurseries is being planned now.

Initial results indicate that the local people are quite responsive and have displayed a high level of enthusiasm in raising, planting and in maintaining the planted areas.

### 3. ISSUES

In order to encourage the establishment and maintenance of tree cover, several issues are important for consideration. This

section presents the important issues influencing the establishment and maintenance of trees in the reservations of roads, streams and channels, and in upper watershed areas. The issues raised range from technical to managerial and socio-cultural and even political aspects. They are based on the results of various projects undertaken by the agencies and the NGOs during the last several years. The experiences gained under the SCOR Project are also useful in this connection.

The main issues that require consideration can be arranged under three broad areas namely technical, institutional and socio-economic. The technical issues are those concerned with the method of establishment, type of species and the planting materials selected, methods of maintenance etc. The institutional issues are the arrangements for land and tree tenure, organization for planting and maintenance, legal aspects, creation of awareness, training and educational needs, and the provision of other physical inputs. The socio-economic issues raised are the benefits accruing to the people as a result of changing the present land use pattern in these areas. These are described below.

### 3.1 Technical issues

The important technical issues in the establishment and the maintenance of tree cover in streams, roads and in watershed areas are: raising seedlings, method of establishment and type of tree

species suitable. All the past programmes have made use of the seedlings raised in a centrally-managed nursery either owned by the FD or the MASL or those managed by the NGOs. This method has proven to be technically sound as evident from past experiences since the several thousands of trees already planted have made use of seedlings produced by the agency-managed nursery technology. However, seedlings raised in such a nursery are available only to the immediate vicinity. Therefore, a better option is to raise seedlings in a nursery managed by local communities. The FD has started a system of private nurseries in several parts of the country and the initial results seem to be satisfactory.

Since the seedlings raised in these nurseries have been utilized for reforestation work in general, it is now necessary to examine the feasibility of using seedlings raised in a village nursery for planting in reservations within the village. This requires experimentation and pilot testing, some of which has already been started under the SCOR Project.

Experiences with direct sowing of seeds and planting seedlings removed from natural forests on watershed areas and in reservations are not available. The FD has begun to encourage the latter recently and the results are not yet known. As discussed earlier, the second strategy is being tested under the SCOR Project in the two pilot watersheds.

On the basis of available experiences, planting seedlings along road and channel reservations, public places and in watershed areas appears to be technically feasible. However, there are a few technical issues such as the use of seeds and seedlings removed from natural forests as planting materials in reforestation work which need to be tested.

With regard to the varieties of trees, the present experiences are confined to timber species. As mentioned above, it appears that the response of the people for planting trees having multiple uses has not been tested as yet. In the Dry Zone areas, the promising species are Azadirachta indica, Banhinia racemosa, Cordia domestica, Schleichera oleosa, Steraulia foetida, Syzygium cumini, Tamarindus indica and Terminalia arjuna. Trees for planting in the Wet Zone are Azadirachta indica, Swietenia mahagony, Tabebuia rosea, Albizzia molucana. Experience with planting fruit trees both in the Dry and Wet Zones does not exist yet which is being pilot-tested under SCOR.

### 3.2 Institutional issues

The available experiences indicate that the primary reason which makes tree planting less attractive among the rural people may be considered as an institutional problem. This problem has several aspects such as organization, awareness, training and peoples mobilization, tree and land tenure and the incentive-

structure. A brief discussion on these issues is presented below.

### 3.2.1 Organization

The first requirement to encourage planting and maintenance work by the local people is the need to organize them to undertake basic tasks. In many past projects, the basic organizational input came from the agency itself. The problem here is that once the organizational aspect was withdrawn, the people alone found it difficult to continue with planting and maintenance work. The alternative which has been tested in the management of natural resources, such as irrigation, is the formation of user groups which will undertake the responsibility for planning and implementation work. These organizations have proved their capability to manage public resources with very satisfactory results. Drawing from experiences, primarily in irrigation sector, the strategy is being tested now under the SCOR Project. However, it is necessary to demonstrate to them that such management will also lead to an increase in production in addition to the conservation benefits. In this area, there have not yet been experiences sufficient to motivate the people. It is likely that this may be feasible since the FOs have a long-term interest in the irrigation and other infrastructures.

### **3.2.2 Awareness education and training**

Increased awareness, training and education play an important role in motivating the people to establish trees. The experiences under the SCOR Project clearly suggest that by bringing about motivation and awareness alone many people have started to plant trees. It is necessary to link the motivated and trained people with an appropriate organization in order to sustain the planted areas.

### **3.2.3 Land and Tree tenure**

The lands in reservations of roads, irrigation channels, streams and in upper catchment areas belong to the government or the local government bodies. Under the prevailing law, planting perennial trees is not permitted in stream and channel reservations. On the other hand, it is argued that people might not be motivated to invest on tree planting in such areas where the usufructory land tenure rights are not in their favour which may give rise to other implications such as ownership of the land, rights to harvest timber etc. Since there are no pilot experiments to draw from, it is necessary to test several strategies such as those being adopted under the SCOR Project.

As stated earlier, the reservations in streams, channel and catchment areas of reservoirs have not been demarcated which makes

it impossible to monitor encroachments on them. In this case, it is necessary to survey and demarcate such lands before planting trees. In some exceptional cases, it may be necessary to eject the people as their presence could accelerate the process of degradation of the resource. This course of action leads to several problems such as finding alternative land for the replaced. It is also necessary to monitor them after evacuation as delays might lead to further encroachments by them.

#### **3.2.4 Socio-economic Issues**

The most important socio-economic issue for sustained tree planting efforts on lands which may be known as "common property" resources is the incentive structure. This may take the form of direct subsidies (either in cash or in kind) or tangible financial benefits to the grower. Although subsidies may influence the people to plant trees, such incentives may not be able to motivate them for planting and aftercare of planted areas on a sustained basis. On the other hand, if people are given the necessary training, facilities and other incentives to raise and plant trees of species which would yield them financial benefits over the long run, this alone would motivate them to plant and manage tree lots in the areas of their choice. It is only through such an approach that the people can be made to invest on tree planting and aftercare in a sustainable manner. Other socio-economic issues are the selection of species of trees which are important for the local people by way

of food, beverage, medicine and fuelwood, local availability of seeds and planting materials, their knowledge and perceptions on tree growing practices and the presence of local customs which recognize planting of trees and their nurture.

#### 4. CONCLUSIONS

This paper has examined the feasibility of planting trees along the reservations of roads, streams, irrigation channels and in upper catchment areas in Sri Lanka. The main findings are that, except along roads, many other reservation areas are unused for tree planting at present. The watershed areas of many streams, rivers and reservoirs do not have adequate tree cover so much so that the soil is exposed. The paper emphasizes the state of degradation of the upper watershed areas, erosion of river and stream banks and irrigation channels due to poor protective tree cover, and the gradual disappearance of natural forests from stream reservations. It highlights the scope for planting trees in reservations, public places and in watershed areas for protection and production. The improvements in resource protection and production, which offer an aesthetic value and the availability of shade, etc. resulting from tree planting are noted.

The paper highlights three main issues namely, technical, institutional, and socio-economic connected with tree planting. It

recognizes the gaps in knowledge, lack of efforts towards building awareness and in training, the absence of appropriate organization and the need for the provision of incentives to the users to motivate them to invest on trees. The presence of appropriate forms of land and tree tenure may also be important. It finally concludes that the land use pattern in reservations and in watershed areas should be improved by planting perennial species of trees which would not only provide protection but would also be useful to the local people. The knowledge as well as the organizational and tenure gaps will be the focus of the SCOR Project where several pilot tests and actual field adoption are being undertaken on an experimental basis.

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End notes

1. Sri Lanka forestry map sponsored by the Government and the British Overseas Development Administration.
2. The regulations under the Lands Development Act specify these provisions.
3. Area receiving an annual rainfall of more than 1000 mm is considered as the dry zone. About 35% of the country's area falls within the wet zone.
4. This zone receives an annual rainfall of less than 1000 mm. In terms of the area, it represents 65% of the country's area.

5. The executive officer in-charge of all administrative and executive functions at the sub-national level. This title was formerly known as the assistant government agent.

6. The Water Resource Board in one of its surveys in 1969 found that only about 17% of such reservations have been spared in one administrative division of the Badulla district, Sri Lanka.

7. Observations made by author in his extensive field work in this part of the country.