Plantation Forestry in Sri Lanka: Challenges and Constraints

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Introduction

At the beginning of the last century, Sri Lanka was a rich country in closed canopy natural forests which covered about 80% of the total land area. However, it has been dwindled up to just over 20% at present which has significanlty increased the awareness of the relevant authorities and the general public. Since the forests are organized assemblages of trees, other plants and animals, in complex association with each other and their physical environment, reduction of forest cover has directly and indirectly influenced on other sub-sectors such as agriculture, wood industry, wildlife etc.

The importance of the forest cover in the aspect of its contribution to the national economy was not clearly identified. In 1993, it has been calculated as 1.4% of the gross domestic product. Employment in the sector was estimated at about 170,000. However, since the use of forests for wood and non-wood products (both goods and services) at village or regional level was difficult to estimate and therefore the true contribution to the economy can however be much greater than the above figure.

Deforestation and causes

On a landscape scale, and over long periods of time, naturally developed forest communities result the greatest amount of biological diversity under the prevailing climatic and soil conditions in a given region. Therefore loosing the natural forest cover causes a severe impact of the existing biological diversity and other intangible uses. In 1995, the forestry sector master plan has identified the following results as the most serious consequences of deforestation and forest degradation.

i. biodiversity reduction,
ii. irregular water flow and drying up of natural streams,
iii. shortened lifespan of irrigation channels and reservoirs,
iv. soil erosion and associated loss of fertility,

v. increasing fuelwood scarcity, and

vi. contribution to the greenhouse gas emissions.

The depletion of forest resources is also closely linked to the demand for forest products such as timber, non-timber forest products and fuelwood. Population increase combined with economic growth has resulted in higher demand for housing and business construction, which has increased the demand for wood.

The poverty has been highlighted as one of the major causes of forest degradation because shifting cultivation, illicit felling and encroachment activities are believed to be results of the poverty. Moreover the government projects implemented in 1980 s such as Mahawely, Kirindioya, Pelawatta Sugarcane plantations and Sewanagala Sugarcane plantations contributed to the forest depletion in significant manner, i.e., between 1983 and 1992 the contribution of the above projects to the deforestation is 37%.

Depletion of the forest cover continues in the future even with a slower rate due to a high demand for timber, non-timber products and the land hunger for settlements and agriculture with the increasing population. The expanding population base and economic growth will increase the demand for roundwood and poles from about 2 million m^3 in 1995 to 2.7 million m^3 in 2020. During the same period, the need for biomass energy will increase from 9.3 million tonnes to 9.7 million tonnes. At the same time, the closed canopy natural forest cover is projected decline to about 17% in 2020.

Products and services

Other than the wood and non-wood production, the natural forests and forest plantations also provide other environmental services which are demanded by the people. The forestry sector is closely linked to the agriculture and energy sectors. As the population and economy grow, more electricity is needed. Hydropower is the main source of electricity. Therefore, maintenance of the forest cover has become a must to continue the sustainable productivity of the above sub-sectors.

However, the country's wood demand should also be addressed by utilizing the forest resources. Among the highly demanded forest products, sawntimebr, roundwood and fuelwood become more important. Although sawnwood consumption in Sri Lanka (31 m^3 per 1000 persons in 1993) is lower than that of the other countries in Asia such as Malaysia, Thailand, it has been projected to be 0.885 million m^3 in 2020, i.e. by about 12,600 m^3 per year assuming that some substitution of other materials for sawnwood is taken place. According to the forestry sector master plan, the industrial roundwood requirement in 2005 was about 15.61 x 10^5 m^3 which is projected to be more by 4.62 x 10^5 m^3 in 2020,due to the growing demand arisen by the increasing population.

Per capita consumption of paper and paperboard consumption is also low in Sri Lanka when compared with the international figures. However, the demand for paper and paperboard is projected to reach 407,000 t in 2020 compared with 130,000 t in 1993. The average annual growth in total paper and paperboard demand is forecast to be 4.3% (9400 t). Per capita consumption in 2020 will be about 18 kg per year.

Although there are not proper statistics available on the non-wood forest product consumption, most of the population in Sri Lanka uses those products directly or indirectly. Among the mostly used products, medicinal plants, rattan, bamboo, kithul products and wildlife products are prominent.

Electricity and telephone poles are more important in terms of value than in terms of wood consumption. The long-term annual demand for wooden electricity poles is expected to stay at 20,000-25,000 pieces (about 3000 m^3), in spite of extensive electrification schemes. However, there will be a very little demand for wooden telephone poles in the future.

The contribution of the natural forests to the bio-fuel supply is 7% which is 4% by the forest plantations. The country's bio-fuel requirement in 2020 will be 0.889 million m^3. However, there might be a change of this figure in the future due to the increase of use of LP gas and electricity. Moreover, although Sri Lanka is self-sufficient in fuelwood supply as a country, there are fuelwood deficit regions such as Colombo, Matara, and Nuwara-Eliya. Therefore, unless a proper distribution system is introduced, use of fuelwood will also become a major problem.

Forest plantations

In order to address the timber and fuel-wood demand in the country, forest plantations were introduced as the alternatives. One of the other objectives formulated at present is that to address the issue on timber imports from the other countries such as Malaysia. Forest plantations were established for the first time in the 1870s, although most of the planting has taken place since the 1950s. Within that period, about 89,000 ha of forest plantations of varying quality have been established. This area comprises some 5000 ha of mainly fuelwood plantations, which were mainly under the control of tea estates and a tobacco company. In 2004, Sri Lanka Forest Department maintained 93,000 ha of plantations in the entire Island.

Forest plantations in Sri Lanka have mainly been established using exotic species due to their faster growth rates over the indigenous species. Although the history of introducing exotic timber species goes back to 1870s, most of the planting has taken place since the 1950s. The idea of this exercise was to have an alternative timber resource to protect the existing natural forest cover and to rehabilitate the environmentally damaged areas within a short period of time. At present the most favourable species for the plantation forestry are teak, eucalypts, pines, acacias and mahogany.

Although the primary aim of the establishment of forest plantations are to address the timber and fuel wood demand, there are other benefits which might be similar to some of the benefits that are obtained from the natural forests as given below. However, the biodiversity and some of the environmental values cannot be met in the forest plantations especially managed for the timber production. These benefits are:

i. increase of wood production,
ii. savings in the government expenditure,
iii. improvement of landuse,
iv. reduction of the pressure on the natural forests,
v. reduction of timber imports,
vi. increase of revenue for the state, and
vii. increase of rural incomes and employment.

Forest plantations under state control will have to provide a reasonable return to society in order to mark them as true production forests, and as the minimum, the benefits accruing to society should not be lower than the costs. Tree growing has to provide higher return than agriculture before a farmer is interested in investing in it, because of the longer production period and greater risks involved. Private sector investors always have investment alternatives, and wood production still has to demonstrate its potential as a viable investment in Sri Lanka.

The profitability of small scale plantations managed by farmers was assessed by assuming that the yields would be 20% less than in a large scale plantation. According to the financial analysis, small scale monoculture plantations would not be profitable for farmers. The real rates of return of all the selected species under normal site conditions were clearly below the indicative real rate of return (20%) that a farmer would acquire. However, the results do not mean that the small-scale forest plantations would not be established by the farmers under right conditions. When trees are planted on small scale or incorporated into the farming system, tree growing can be a profitable proposition, as is demonstrated by the dynamic home garden sub-sector that is providing wood for the industry, and valuable income and raw material to the farmers.

Involvement of private sector in plantation forestry

In order to increase the tree cover by means of forest plantations to address the earlier mentioned requirements, and to save the government funds for other necessities, the private sector participation for the establishment of forest plantations has been promoted. However, due to the longer duration that has to be waited to obtain the profits, until recent, investments in forestry sector was not popular among the private sector. However, almost all the major regional planting companies (i.e., tea and rubber) stepped forward initially and started planting timber species on their barren and abandoned lands in both upcountry and low country for the production of timber in addition to the already maintained fuelwood plantations. However, the view of the government was not only to focus the improvement of the existing plantations but also on involving the non-estate sector in the establishment and management of new plantations. At the same time the state has recognised the

necessity of supporting policy, legislation and other support systems such as extension and access to financing are in place.

Management of forest plantations

Managed forests are generally less complex than natural forests because management typically attempts to optimize only a few species - usually those of high commercial value; those which are characterized by fast growth (high productivity); or those that can be grown in pure stands or in relatively simple mixtures.

Villages in forest concessions, timber harvesting, timber industry and population are closely linked. This means that sustainable forest use and agriculture are also closely linked. However, the private sector engaged in timber harvesting, timber industry, job creation cannot take care of agriculture. Agriculture is a completely different branch with a different approach and different expertise. To harmonise both - forestry and agriculture - government support is necessary, and governments need the support of donors in order to integrate forestry/agriculture in projects with research and education. However, it has been recognised that the private investors have to respect the existing laws and traditional rights especially at the harvesting period. Requests by the population for better regional infrastructure and road-building are followed by private companies when supported by government authorities and financially feasible.

Challenges in plantation forestry

The planetary ecosystem at present may have a minimum threshold of forest cover necessary to support a certain level of human habitation. Mostly, foresters assume that an existing, desirable forest cover type can be maintained by the same silvicultural treatment that was successful in another area or on another site. This, of course, may not be so if the two stands exist on significantly different site types or have resulted from different disturbances.

Furthermore, as emphasis in forest management changes from simply trying to grow the "best trees" on "the best sites" toward maintaining forests in a more natural condition while still utilizing the

resources, it is becoming even more important that attention has to be paid to the physical environment that controls forest ecosystems. One of the reasons for this change may be due to the understanding of the environmental safeguards or due to the recognition of the importance of the requirement of the standards such as forest certification.

Forest certification has been introduced to promote the sustainable forest management with the protection of existing biodiversity. However, medium and small companies will not be able to cover the costs of certification because there is no guaranteed price increment for the certified timber at the world market at present. Moreover, the opportunity to export the Sri Lanka timber to the countries interested in certified products is low under the present government policy. This means that these markets have to bear certification costs alone or five times more than other markets not bearing those costs. In addition to higher production costs for improved sustainable forest management, the growers will have to bear quite important costs for certification.

Constraints in plantation management

Forest management is a complex exercise due to the web factors involved with it other than the economic, ecological and cultural aspects. There is also an involvement with the technical aspects, institutional rules, political influences which are decisive for the behavior of the user of natural resources in general and of the forest in particular. In constitutional states these limits and possibilities for owners and users are fixed in legal acts, such as constitutions, laws, decrees etc.

Among the major constraints faced in plantation forestry, the land availability, social issues, environmental issues, lack of scientific information and research become prominent. At the same time, the unforeseen catastrophes create significant problems by reducing the growth rate or destroying a part or the entire forest.

Availability of land

Land availability, sustainability and the profitability of plantation forestry are major issues if industrial plantations are to be established in new areas. Locating large new areas for forest

plantation development will not be a very easy task. In the more productive wet zone and up country areas, competition for land is intense and the forest plantation sector cannot expect to acquire significant additional land unless they are taken from other uses. Availability of the suitable lands is the main constraint faced by the private sector investors at present. Mostly the available lands are infertile or abandoned after planting agricultural crops such as rubber. Obtaining a suitable land with a large extent is more problematic in the wet zone. In order to obtain a higher growth from infertile lands, most intensive management practices have to be applied which can increase the cost significantly. It will also take time to reach high quality productivity levels on such lands. The expected final harvest of the private forest plantations are much shorter than that of the Forest Department plantations and therefore more and more financial inputs may be necessary to uplift such plantation conditions.

Social and environmental impacts and risks

Management practices that are ecologically sound on a site or local ecosystem level may not address landscape and regional concerns. Although private owners are not obligated to consider regional ecological concerns (other than those specifically covered by law, e.g., harvesting of endangered species, harvesting on high slopes or sensitive areas), many of them are interested, and often eager, to accommodate them within limits of economic efficiency.

Environmental issues

Plantation forestry especially with even-aged monocultures is criticised in causing environmental degradation. The situation becomes more severe with the exotic species such as pines and eucalypts. With those plantations, the issues have emerged on degradation of the soil quality especially when they are planted on slopes. Lack of biodiversity in such forests is also common. Moreover, there are issues regarding the aesthetic values. The erosion problem becomes severe if the plantations are clear felled after reaching the maturity. Therefore the necessity of a system to protect the soil quality by using proper management schems is always highlighted.

Unforeseen catastrophes

Unforeseen catastrophes are common in forest plantations. In Sri Lanka the major damage is caused by the fire, diseases and pests. Teak in the dry zone and eucalypts in the up country are vulnerable for fire. Teak is commonly attacked by the defoliators and the skeletonizers at the nursery stage and very young stage in the field. However, mahogany is considered as the best example for vulnerable plantation species for the insect attack that can be caused by shoot borer called *Hypsophylla*.

Lack of scientific knowledge and research

This has become a serious issue for the private investors on plantation forestry. In order to make their plantations economically viable, the age for the final harvest for both mahogany and teak which are the preferred species by them, has been decided around 20 years which is significantly lower than the state plantations. Therefore, they have to use the most intensive management principles to achieve the expected growth within the given period. In order to facilitate these requirements, enough studies of growth rates, growth enhancement, site quality differences, and protective measures from pests and diseases are yet to be conducted.

Conclusion

Two things are clear concerning comprehensive and newly strengthened national programmes to sustain forests: they must be country-driven and country-initiated; and they will, in many countries, require new and more effective international support. Sustaining forests can best be achieved through a combination of national and international policy reforms, long-term plans to stabilize forest areas and industrial countries' commitment of greatly enhanced financial and technical support to developing countries.

The investor-institute partnership should be maintained in order to achieve the goals set in the plantation forest management and a flow of information from one sector to the other should be established. Moreover, partnership agreements could specify the actions to be taken by countries inside and outside the forest sector to address the underlying causes of deforestation and the support and actions to be undertaken by the international community.