



Section B

Forestry for Environmental Sustainability and Profitability: The Sri Lankan Perspective

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1. Introduction

As a developing country, Sri Lanka strives hard to achieve its economic and developmental goals. Agriculture plays a key role in the economy. Significant proportion of the population is dependent on agriculture. According to the Central Bank of Sri Lanka (2014), the agricultural sector accounted for 10.1% of the Gross Domestic Product (GDP) in 2014. Clothing and textiles, gems, tea, rubber, coconuts and other agricultural products are among the country's main exports. The Agriculture sector's contribution to the GDP was 10.1% of GDP in 2014, which is a 0.7% decline compared to 2013. With industrialization and globalization, the country's economy is gradually transforming from a traditional agricultural based economy to a more diversified service-based economy. Sri Lanka is now considered as a "middle income" country with a per capita GDP of US \$ 3,625 and per capita GNP of \$3536 at the end of year 2014 (Central Bank of Sri Lanka, 2014).

In the past, forests played a key role in the rural economy. With industrialization and allied social transformation, the harmonious dependency of our communities on forest resources for subsistence needs has gradually declined. Instead, tendency of clearing forests mainly for alternative land uses has substantially increased. This has placed country's rich biodiversity in a permanent risk. However, with the global paradigm on development shifting towards the concept of "sustainability", most governments including Sri Lanka have adhered to the concept of sustainable development and incorporated it in new forest sector policies to provide greater protection for remaining forest resources.

One of the most widely accepted definitions of sustainable development was proposed by Gro Harlem Brundtland through the World Commission on Environment and Development in 1987; '*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'. The concept of sustainable development recognizes that utilization of natural resources will change natural ecosystems, but at the same time, their conservation is also important. In the context of forest resources, it recognizes that utilization of forests is important for achieving social goals, such as poverty alleviation; however, it should be balanced. Sri Lanka's forestry sector at present appears more conservation oriented, and certain legal restrictions have hindered realization of the full potential of country's forestry sector. Under the framework of sustainable forestry, sustainable forest management refers to "the process of managing forests to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services, without undue reduction of its inherent values and future productivity *and without undue undesirable effects on the physical and social environment*" (Higman et al., 2005). This paper analyzes the present status and recent developments in Sri Lanka's forestry sector within the framework of sustainability, and explores potential avenues to develop it into a more profitable, socially beneficial and environmentally oriented sector in the economy.



2. Sri Lanka's Forestry Sector: An Overview

2.1. Biodiversity

At present, the closed canopy forest cover of the country is estimated at 21.9% of the total land area while the total natural forest cover is estimated as 1,951,473 ha; 29.7% of the land (Edirisinghe et al., 2012). Country's forests vary from wet evergreen forests to dry thorn forests. Wet evergreen tropical lowland forests harbors majority of the biodiversity. "Sinharaja" rain forest; the country's largest remaining virgin forest also belongs to this category, and have been recognized as a UNESCO Man and Biosphere reserve as well as a World Heritage site. Six wetland ecosystems in the country have also been recognized as 'Ramsar' sites. Table 1 provides the extent of forests by forest type.

Table 1: Extents of forests by forest type

Forest Type	Extent (ha)	Percentage
Lowland rainforests	123,302	1.9
Moist monsoon forests	117,885	1.8
Dry monsoon forest	1,121,392	17.1
Montane forests	44,758	0.7
Sub-montane forests	28,513	0.4
Riverine dry forests	2,425	0.0
Mangrove forests	15,670	0.2
Savanah forests	68,044	1.0
Open and sparse forests	429,484	6.5
Total	1,951,473	29.7

Source: Edirisinghe et al. (2012)

Despite its relatively small size, Sri Lanka's forests possess a high level of biodiversity. A noteworthy feature of Sri Lanka's biodiversity is the remarkable high proportion of endemic species among its flora and fauna. In fact, Sri Lanka has been identified by the Conservation International as one of biodiversity hot spots in the world. About 28% of the flowering plants and in the island are endemic with most of being confined to wet evergreen and wet montane forests of the central and southwest parts of the country (MOE 2012). The fauna also exhibits very high endemism. The number of species in each taxonomic group keeps changing with taxonomical revisions and descriptions of new species. Among vertebrates, amphibians show the highest endemism followed by reptiles and fish (MOE 2012). The wet zone has many more endemic species than the dry zone.

2.2. Forestland ownership

State Forests: Sri Lanka's forests are predominantly state-owned. Natural forestlands are managed by two state institutions namely, Sri Lanka Forest Department (FD) and Department of Wildlife Conservation (DWC). Forest Reserves, Proposed Forest Reserves and National Heritage and Wilderness Areas managed by FD exceed 17% of the total land area. In addition, FD manages about 90,000 hectares of forest plantations comprising teak (*Tectona grandis*), eucalypts (*Eucalyptus grandis*, *E. robusta*, *E. microcorys* and others), mahogany (*Swietenia macrophylla*), tropical pines (*Pinus caribaea*) and other local species which accounted for nearly 1% of the land area. Rubber and Coconut plantations and other agroforestry systems such as home gardens, which covering 20% of the land adds up to the tree cover (FD 2015). DWC manages



the Wildlife Protected Areas Network of the country, which accounts for approximately 8500 km², representing 13% of the total land area (DWC 2015).

Forest plantations in the plantation crop sector: Sri Lanka's economy has been traditionally based on plantation crops such as tea, rubber and coconut and, therefore has a well-developed export oriented plantation industry. There are 23 leading privately owned regional plantation companies in the country. Many companies own forested lands that are in association with their main plantation crops. In the past, wood from these forests were mainly used for fuel. At present, there's an increasing tendency among plantation companies to grow commercial timber species on their unproductive lands.

Community forests: Community forests are another component of Sri Lanka's wood resources. Many of them were established between 1993 and 2000 under the Participatory Forestry Projects funded by Asian Development Bank (FAO, 2002). At present, there are about 10,000 ha of farmer's woodlots mainly concentrated in the Dry zone of the country.

Private forests: Commercial forestry is becoming popular among private sector companies. At present, several private enterprises are involved in commercial tree plantations where plots of young trees, mainly teak and mahogany are sold to buyers as investments. Although the extent of such establishments is small, the rate of establishment continues to grow.

2.3. Economic contribution of the forestry sector

According to the Central Bank of Sri Lanka (CBSL 2014), the agricultural sector accounted for 10.1% percent of the gross domestic product in 2014, while the forestry sector contributed 0.5%. Even so, the true economic contribution of forestry is undetermined due to incomplete data on harvesting, market prices, and time spent on collection and consumption of fuel wood and non-wood forest products. The forest sector accounted for less than 2 % of Sri Lankan exports in 2014 (Central Bank of Sri Lanka, 2014).

2.4. Forest Governance

Sri Lanka's present forestry policy is mainly conservation oriented. This is understandable in the context of rapid declining of country's natural forests. The history of modern forest policy in Sri Lanka dates back to 1929, and the Forest Department introduced comprehensive sectoral policy objectives in 1953. The main policy objectives were to "Maintain, conserve and create forests for the preservation and amelioration of the environment, soil and water resources, and for the protection of the local fauna and flora where required for aesthetic, scientific, historical and socio-economic reasons" (Fernando, 2002).

The subject of Forestry was considered as a sole responsibility of the government until early 1980s. Soon, policymakers realized the importance of public involvement in developing the country's forestry sector and as a result, a forest policy reform took place in 1980. Under the new transformation, rural communities were recognized as an important stakeholder, and were encouraged to develop private woodlots and adopt agro forestry systems through programs of social forestry.

The draft National Forest Policy in 1991, which is the basis for the current forest policy define its objectives as follows (Fernando, 2002).

- To conserve forests with particular regard to biodiversity, soils, water and historical, cultural, religious and aesthetic values.
- To increase the tree cover and productivity of the forests in order to meet the current and future demand for wood/forest products



- To increase the contribution of forestry sector to the welfare of the rural population as well as the national economy, with special emphasis on equity in economic development.

The present National Forestry Policy tries to integrate relevant government institutions and, is consistent with National Economic Policy, National Policy for Wildlife Conservation and National Conservation Strategy.

Forest plantations have been recognized as the major alternative to meet the rising demand for country's wood demand (Perera et al., 2006). A recent development in forestry sector development in Sri Lanka is the increase of private sector participation. The government is also making such provisions as long-term land leases under concessionary rates for forestry projects to increase private sector participation in forestry (Ministry of Mahaweli Development Environment Sri Lanka 2014). As a result of these policy reforms, in 2004, several plantation management companies converted their unproductive lands into forest plantations. Opportunities also exist for foreign investors to invest in forestry projects in the country with government approved tax benefits provided by the Sri Lanka Board of Investment, including a tax waiver for the first 5 years and a 35-percent decrease in income tax from the fifth year onward for duty-free imports (Perera et al., 2006).

3. The Forest Products Industry

Wood and Wood Based Industry of Sri Lanka is performing as one of the important manufacturing sectors with a wide array of products including saw milling, furniture, construction, parquet flooring, wood-based panel products and carvings. The sector depends almost entirely on the local wood supply for raw materials. Although wood-based industries are spread all over the country, furniture and woodworking mills are clustered in few areas such as Moratuwa and Ambalangoda which are traditionally known for woodworking. Private Almost 95% of the wood and wood-based industry consists of private sector ownership providing close to 50,000 jobs (Ministry of Industry and Commerce, 2015). These industries predominantly supply their products to the domestic market while, relatively smaller number of manufacturers target export markets.

The particleboard and fiber board industries depend mainly on imports. The domestic resources contribute about 61% of the national requirement. There are two government-owned paper mills in the country; one has been closed down while the other is operating below its production capacity. The main reason for fiber and paper product imports is the inadequate technology the mills have to utilize the domestic fiber resources. Many Pine forest plantations were established with the expectation of utilizing them as fiber resources, however the necessary technology to process pine fibers found to be too expensive.

Despite these drawbacks, both wood and paper industrial productions in the country have shown a gradual increment over the past decade with majority of the production being domestically consumed. As indicated by Table 2, logs and sawn timber production overall shows a decrease, but the production of railway sleepers and transmission poles has increased with growing infrastructure developments. However, these figures mainly represent timber from state-managed timber sources and products of the State Timber Corporation (STC).



Table 2: Timber Production from State Forests

Year	Logs (m ³)	Round Poles (nos)	Fence Post (nos)	Transmission Poles (nos)	Sleepers (nos)	Sawn Wood (m ³)	Fire wood (m ³)	Furniture (Rs)
2007	120,576	190,173	99,273	66,502	95,273	4,918	85,412	55,700,000
2008	94,429	99,908	42,938	52,552	134,095	5,887	84,661	65,800,000
2009	91,416	106,777	68,439	77,656	163,484	5,384	75,985	57,800,000
2010	137,317	126,065	79,858	19,472	133,822	5,519	118,544	83,400,000
2011	138,632	113,584	77,135	31,863	66,699	3,753	97,838	140,205,788

Source: State Timber Corporation, 2013

The export wood based manufacturing sector has shown a significant growth in the recent past. Performance of wood products exports of Sri Lanka during the last ten years are summarized in Figure 6. At present, more than 100 companies have registered with the Export Development Board of Sri Lanka in seeking new market opportunities for their products (EDB, 2015). Currently, wooden products such as brooms and brush blocks, parquet, plywood, household utility items, wooden toys, carvings and ornaments, household furniture, office furniture and furniture in knockdown form are exported according to buyer specifications to markets mainly in UK, UAE, Pakistan, USA, India, France, Germany, Australia, China and Maldives (EDB, 2015). Sri Lanka is competent in producing such items to the higher end of the market. In addition, the country also exports fibers (coir), charcoal/activated carbon, decorative/hand-made paper and wood residuals etc.

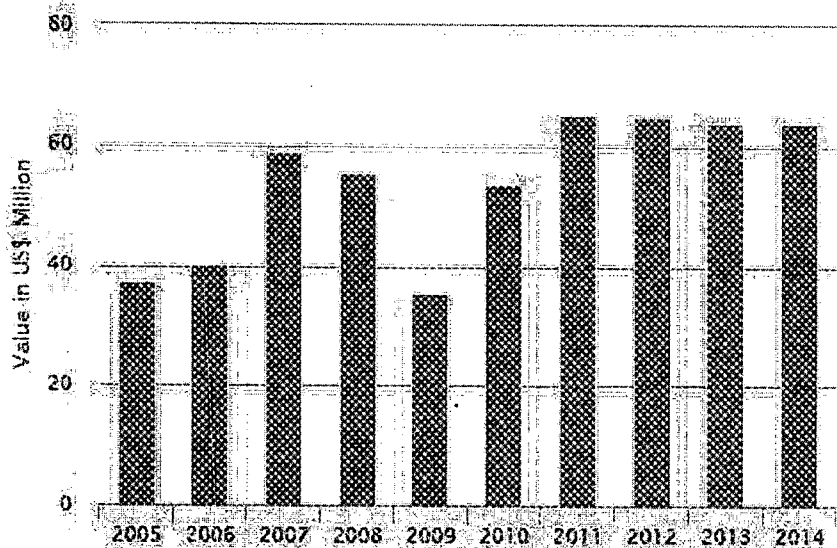


Figure 1: Wooden Products Export Performance in Sri Lanka 2005 to 2014 (Source: EDB 2015)

Raw materials for the industry mainly come from forest plantations annually released by the Forest Department for harvesting, forest plantations released by Regional Plantation Companies for harvesting, timber from land clearance for development projects and Private home gardens. The State Timber Corporation (STC) currently has the monopoly of extracting timber from these sources except private home gardens. The STC mainly sells timber through their public timber auctions. In addition, timber from illegal logging and illicit timber confiscated by the judiciary also make a significant contribution. Timbers from illegal logging mainly go for small scale mills that produce for domestic market. These industries



often buy timber directly from private landowners. Jak, Teak, Alstonia, Mahogany, Ebony, Satin wood, Melia sp. and Coconut are among the main species utilized in domestic industries. Eucalypts species are mainly used for constructions and railway sleepers. The exporting industries predominantly depend on rubber wood for their raw materials. Pine wood and other domestic species are used to a lesser extent.

4. Key forestry sector issues

Forestry sector in Sri Lanka can be identified as a key component of country's economy that has a tremendous potential to flourish. Unfortunately, many factors have hindered its sustainable development. Some key issues are discussed herein.

Forests and Forest Plantations

Deforestation: The forest cover of Sri Lanka has shown a steady decline over the last few decades. At present, the forest cover is 29.7% of the total land area with an estimated annual change of 0.23% per year (Edirisinghe et al., 2012). It is further revealed that most land use changes are taking place in the dry zone, while the forest area in wet zone seems to remain constant. Population growth, large-scale agricultural projects, shifting cultivation, and illegal logging are among the main causes of deforestation. Alongside these, one can observe policy and institutional failures which often lead to inappropriate land use practices causing deforestation. Most common repercussion of deforestation and forest degradation include reduction in biodiversity due to habitat destruction, increased soil erosion, loss of soil fertility resulting reduced agricultural productivity, irregular water flow and drying up of natural springs, reduction in base flow of streams together with flash floods during rainy season, reduction of life span and capacity of irrigation reservoirs and channels and widening gap between the demand and the supply for wood products resulting in rapidly increasing prices together with increasing imports of sawn wood and other wood products.

Management of forest resources: Almost all the natural forests are managed for conservation purposes. Given the extent of remaining natural forest cover and the need to sustain country's biological diversity, this can be justified. According to recent studies, the current annual timber consumption in Sri Lanka is 1.6million m³ from which, around 10% is supplied by imports (Ruwanpathirana, 2014). Unlike in the past, the timber supply from natural forests has become limited with diminishing natural forest cover and restrictions on harvesting and transportation of timber (Perera et al., 2012). As such, the forest plantations have become an important source of timber at present. However, current management of state owned forest plantations are not up to the standards. This has directly affected on poor timber and log quality as well as higher wastage in conversion. For instance, log quality defects such as number of knots per meter, bend fraction, hollow position, presence of buttresses and presence of heart rot were found to have a significant influence on the price of teak logs (Jayawardhane et al., 2015). Higher occurrences of log defects can be attributed to poor management of timber stands.

Lack of inter-institutional coordination: Lack of coordination between key state institutions that are responsible directly or indirectly for the conservation and management of forests has deprived optimal performance of the sector. A proper coordination among key institutions such as FD, DWC and Central Environmental Authority is lacking at the moment. Especially in the case of managing and harvesting plantation forests, there are certain disparities between FD and STC with respect to payments of stumpages and valuation of forest coops released for harvesting.



the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. Sri Lanka joined UN-REDD Program partner in 2009 and the National Program was approved for funding in September 2012. This provides an ideal opportunity to benefit from country's natural forests set aside for conservation. A mechanism bringing a monetary value for carbon provides incentives for forest resource users to change their use of forest resources. In addition to the carbon storage role, forests ecosystem services will be sustained while the social benefits to communities will be ensured.

Value addition and accessing new markets for our forest products: Many EU countries demand their imported wood products to be environmentally certified. Introduction of forest certification to Sri Lanka's forestry sector will help exploiting these new market opportunities. At present, certification is confined mainly to the rubber plantation sectors in Sri Lanka. With large-scale MDF facility consuming large quantities of rubber wood, the availability of rubber wood for export manufactures has become restricted. Therefore, certified plantations should make the transition to high-end species such as teak and mahogany where there is a greater potential to capture premiums in price. Since a significant share of rubber wood plantations are owned by small holders, group certification programs is the viable option so that each member can benefit from the savings of scale, while not losing control of their own plantation and its management. For plantation companies and manufacturers alike, the cost of certification should be reduced in order to attract anticipation. There is a need to adopt county specific standards to suit local industries. As price premiums are not always guaranteed for certified products, other benefits of certification such as cost savings through improved production and processing, increasing overall efficiency through better management, deflecting a negative image of the industry, and contributing to environmental protection should be effectively communicated in promoting certification.

Lesser known species potential: There is a wide variety of timber species with superior wood properties that have the potential to be used in domestic and export manufacturing. These can also be used in establishing forest plantations.

Nature-based tourism: Tourism already plays a key role in the country's economy and each year, a significant number of tourists visit the country. Therefore, huge economic opportunities exist to develop eco-tourism using country's natural forests and wildlife.

Summery

Forest resource is one of such resource the country blessed with. They harbor wide variety of plant and animal species. Although official figures indicate that the contribution of forestry sector is little, the actual contribution to the economy remains undetermined mainly due to incomplete data. Majority of the forests in Sri Lanka are state owned and managed for conservation purposes. However, private sector interest in commercial forestry has grown in the recent past. Wood product manufacturing which is a key component of country's forestry sector has also showed gradual development over the years. These industries are entirely depending on local wood supply for their raw materials. Despite the ample resource base, Sri Lanka's forestry sector is facing many obstacles for development. Sri Lanka's wood product manufacturing is characterized by low volume, high wastage, but good quality products. Lack of capital and technology, overdependence on limited number of species, unorganized industrial structure, and legal restrictions have restricted the growth of the industry. Forest plantations on the other hand, are managed unsatisfactorily, yielding low quality timber.

Develop better coordination among state institutions managing the forests, establishment and proper management of buffer zones around protected areas, introduce necessary policy reforms to strengthen



Legal framework: Currently, STC has the monopoly of harvesting in State owned plantations. Furthermore, many timber species that are abundant have been protected by law and there are strict regulations in timber transportation. This has negatively affected on the raw material flow to industries.

Failures in implementing the law: Lack of staff, political interferences and loopholes in the current legislative system make it difficult to control illegal logging and encroachment practices.

Wood-based industry related issues

Poor technology: Many sawmill and manufacturing facilities operate with outdated machinery that has increased the wastage during conversion and production. For instance, sawmill efficiency estimated to be around 42% for Sri Lanka's sawmills, which is highly unsustainable.

Insufficient capitol: Many forest management companies and wood based manufacturing companies do not have the sufficient capitol to invest on new technology and expertise to upgrade their production facilities and improve management processes.

Limited production capacity of export manufacturers: Many producers have the potential to meet international quality standards, but most do not participate in export markets because of limited production capacity. As a result, low volume niche markets are being explored by local manufacturers.

Lack of awareness and knowledge: Many export manufacturers and forest management companies are unaware of the latest market trends (such as niche markets for certified forest products) and technological developments. There are numerous knowledge gaps where research is needed, such as timber seasoning, preservation, accurate estimation of timber volume, improving productivity with intensive management.

Unorganized industry structure: Lack of proper coordination between government authorities and wood based manufacturers as well as among industries is a main factor that hinders development of the sector. This has limited industries' ability to access certain export markets where individual companies alone cannot meet the required volume of products.

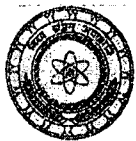
Over-dependence on few popular species: Domestic and export orientated industries are depending on few well-known species. Little attention has been paid over the years for utilizing and promoting lesser known timber species.

Competition from other tropical producing countries: South East Asian tropical wood producing countries such as Indonesia, Malaysia, Philippines, Thailand, Vietnam and Myanmar are the major competitors for Sri Lankan wood based products. They are currently producing quality wood products at competitive prices, and have stronghold in many international markets.

5. Opportunities for development

Although Sri Lanka's forestry sector (including forest products) is faced with several issues that need to be rectified in order to flourish as a sustainable sector of the economy, many opportunities have opened up for development, especially with the recent global developments.

Incentives for conservation and sustainable management of forest resources: United Nations Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. "REDD+" additionally includes



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the existing legislative framework and facilitate implementation, deregulation of harvest and transportation of unthreatened timber species, introduce measures to increase private sector participation in plantation forestry, strengthen research, education and extension in forestry are key requirements for the development of forestry sector (conservation) in general and for the plantation sector (production).

For the wood based manufacturing sector it is necessary that they , Understand current and future markets conditions and focus on key target markets, develop organizational structures to coordinate domestic and export activities for certified products, target several places in supply chains instead of restricting to one, and small producers aggregating the supply and share technologies to access new markets. Research need to be done on examining ways to lower the production cost and increase efficiency of production processes and develop lesser-used-species potential. In this regard, forestry and agriculture experts and researchers in the country have a greater responsibility in transforming Sri Lanka's forestry sector into a profitable and environmentally sustainable one.

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