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DEVELOPMENT OF NON-WOOD FOREST PRODUCTS IN SRI LANKA

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ABSTRACT

Non-wood forest products (NWFPs) have an important role in the rural economy of Sri Lanka and they also provide benefits of considerable importance at the national level. These products play a very significant role in the livelihood of over 4 million people. They have a major impact on the social and economic conditions of village communities by providing a wide array of materials which enrich and diversify rural life. The knowledge, skills and social customs relating to NWFPs have been passed from one generation to the next and form part of traditional culture.

A survey in just one area showed that nearly 200 tree species were used by the adjacent communities. In this paper, an attempt has been made to categorize the various NWFPs available in Sri Lanka. The most important are medicinal plants, Rattan and Bamboo, the products of hunting, tapping, honey and grazing and are dealt with in detail in the paper.

Around 40% of the rural population in the Dry Zone is forest dependent and derives some benefits from NWFPs. The annual income from NWFPs per forest dependent household in some parts of the Dry Zone of Sri Lanka is around Rs 15,000. A most important single activity in the Dry Zone is shifting cultivation which provides an annual income of around Rs 10,000 per family. Kitul is the most significant NWFP in the Wet Zone and it contributes over 70% of the total income of the households engaged in this activity.

Lack of policy guidelines, a shrinking resource base and inadequate knowledge on cultivation, management, harvesting, processing and storage are identified as the major issues which hinder the development of the NWFPs sector. Major reforms in policy, legislation and management strategies, together with a coordinated effort in research on cultivation, utilization and product development, should be undertaken for sustainable development of the NWFPs sector in Sri Lanka. This sector could be developed to form a major force in the poverty alleviation programme in Sri Lanka, especially in the rural sector.

1. INTRODUCTION

The FAO Definition of Non-Wood Forest Products (NWFPs) is as follows:

> Non-wood forests products (NWFPs) refers to market or subsistence goods other than timber and services for human or industrial consumption derived from renewable forest resource and biomass bearing promise for augmenting real rural household incomes and employment.

The products include the use of plants for food, beverages, forage, fuel and medicines, animals, birds and fishes for food, fur and feathers and other products such as honey, lac, and silk and the services of land for conservation and recreation. (FAO Forestry Paper 97, 1991)

According to Section 78 of the Forest Ordinance of Sri Lanka 1956, the following materials, when found in or brought from a forest, are declared as non-wood forest produce:

(a) Leaves, Flowers, Fruits, Seeds, Juices, Wood Oil, Resin, Natural Varnish, Barks, Lac, Gum, Caoutchouc, Catechu and Myrabolans.

(b) Plants which are not trees, including grass creepers, reeds and moss and all parts or produce of such plants.

(c) Tusks, Horns, Shed Horns, Edible Birds' Nests and Bee Honey.

(d) Peat, surface soil, rocks and gems, including limestone, coral, laterite, bitumen, asphalt, bituminous shale, mineral oils and all products of mines and quarries.

The forests of Sri Lanka contain a large number of trees, shrubs and herbs which provide various products other than wood. These products are commonly known as minor forest products or Non-Wood Forest Products. A number of such forest products are used locally, but rarely marketed while only a few enter the export market. These products have numerous direct and indirect uses, while some have traditional uses and are of immense benefit to the people living around forests and sometimes also to those who live in urban areas. They provide the following benefits to the local as well as to the national economy:

(a) They help in meeting the subsistence needs of people living in rural areas and provide cash income and employment. They play an important role in alleviating rural poverty.

(b) They provide material for small industries, employment in collection, transport, trade and processing and they save foreign exchange through the export of unprocessed and processed products

(c) A majority of the Sri Lankan people in rural areas use medicinal plants in one form or another.

2. CLASSIFICATION OF NON-FOREST WOOD PRODUCE

NWFPs can be classified as follows:-

2.1 Gum, Resins and Oleoresin

There are several tree species in Sri Lankan forests from which gums and resin are collected. They are; Dawu (*Anogeissus latifolia*), Hik (*Lannea coramandalica*) and Gammalu (*Pterocarpus marsupium*).

The resin obtained from Gammalu is widely used in Sri Lanka to treat diabetes. Another gum locally used as an adhesive is from the Kohomba tree (*Azadiracta indica*).

Pine (*Pinus caribaea*), which is an exotic tree species widely planted in forest plantations, is tapped for oleo-resin on a commercial basis.

Damar resins are produced by various species of Dipterocarpus. The best known product Dorana Oil is obtained from the Dorana tree (*Dipterocarpus glandulosus*). Kekuna (*Canarium zeylanicum*) produces an oleo-resin which is locally collected in small quantities and is used as incense.

2.2 Barks, Fruits, Seeds, Flowers, Leaves

2.2.1 Bark

Barks are used to extract tannin and also for Ayurvedic medicinal purposes. The main tannin producing barks are Kadol (*Rhizophora*) species, Ranawara (*Cassia auriculata*) and Wattle (*Acacia decurrens*).

Hal (*Vateria acuminata*) bark is used extensively for arresting of fermentation in sap obtained from Kitul and Coconut inflorescences.

The bark of some species are widely used in indigenous medicine. Some examples are Etdemata (*Gmelina arborea*), Kumbuk (*Terminalia arjuna*), Madan (*Syzygium cumini*) and Kohomba (*Azadirachta indica*).

Bark of Goda Kaduru (*Strychnos nux-vomica*) is exported on a small scale from Sri Lanka for the extraction of Strychnine.

2.2.2 Fruits and Seeds

Several varieties of wild fruits are collected by local villagers for food. Some of these fetch very attractive prices in local markets. The popular varieties of wild fruits are: Mora (*Nephelium*), Palu (*Manilkara hexandra*), Weera (*Dripetes sepiaria*), Madan (*Syzygium cumini*), Katuboda (*Cullenia ceylanica*).

Several varieties of seeds are used in Ayurvedic medicine. Some of the most popular varieties are: Ingini (*Strychnos potatoturm*), Madan (*Syzygium cuminam*), Pus Wel (*Entoda phaseoloides*) Attana (*Datura metel*)

2.2.3 Flowers and their Juices

Many wild flowers are used for the production of medicinal beverages. The more

In addition, inflorescences of Kitul (*Careota urens*) are tapped to obtained phloem sap., which is used to produce a range of products such as toddy (Alcoholic Beverage), Treacle, Jaggery and Vinegar.

2.2.4 Leaves

Some leaves are used in cottage industries. e.g. *Furcaria toetida*.

Forest tree leaves are widely used in oriental medical treatments. In addition, a few are used as wrappers and as leafy vegetables. The more important species are; Beedi (*Diosphyros melanexylon*), Kanda (*Macaranga peltata*), Beru (*Agrostistachys hookare*), Bata (*Ochlandra stridula*)

The leaves of Blue Gum (*Eucalyptus globulus*) are distilled to produce oil which contains cineole.

Due to over-exploitation without any planned management, many herbal medicines which were once abundant in Sri Lanka are almost extinct and now have to be imported. One outstanding example is Bin Kohomba (*Munronia tumila*) which was available in the Dry Zone and the mid-country and is now almost extinct.

Leaves of certain tree species are used as fodder for cattle, buffalos and goats.

2.3 Grasses, Bamboos, Cane and Creepers

Various sedges available in the forests are used for handicraft industries such as basket making, hat making and mat making. Bata is used to made kites and religious decorations. Bamboo is extensively used as a substitute for timber in construction, scaffolding, ladders, bridges and fences in Sri Lanka. Numerous articles of daily use such as tool handles, musical instruments are made of different Bamboo species. The traditional industries of basket ware and bamboo flutes are based almost exclusively on a single native species, Bata (*Ochlandra stridula*). *Pseudoxytenanthera monadelpha* and *Davidsea attenuta* are two of the local species used to produce crude basket ware. Four Bamboo species, *Ochlandra stridula, Davidsea attenuta, Bambusa vulgaris* and *Dendrocalamus giganteus*, are widely used in construction industries in Sri Lanka. Bamboo is also used to make curios for the tourist industry. (A fair amount of Bamboo supply in Sri Lanka comes from homegardens).

The Rattan industry of Sri Lanka is dependent on 10 native species. The widely used ones in Sri Lanka are: Thambotu Wel (*Calamus zeylanicus*), Sudu Wewal (*Calamus ovoideus*), Heen Wewal (*Calamus pseudotenais*), Ma Wewal (*Calamus thwaitessi*), Kaha Wewel (*Calamus rivalis*), Nara Wel (*Calamus delicatulus*), We Wel (*Calamus rotang*) and Kukulu Wel (*Calamus pachystemomus*).

Special mention has to be made regarding Weniwel (*Coscinium fenestratum*) which is a woody climber growing in the Intermediate and Wet Zone rain forests. The stem is used as a diuretic and an anti-tetanus drug. There is over-exploitation of this species and the Forest Department has taken steps to control its collection.

3 PRESENT SITUATION REGARDING NON-WOOD FOREST PRODUCTS

The present collection, use and trade in NWFPs has been considered to be insignificant to the national economy. Thus, very few reliable data are available on the demand, supply and trade regarding these products. Most of these products are regulated by legislations, and permits are issued on an annual or short term basis for some commodities. It is clear that the significance of NWFPs in the national economy and in the rural economy has been little appreciated. They offer the poor a means to increase both their food production and their income. A study done in Knuckles has shown that NWFPs provide up to about Rs 10,000 in cash per year per family. This amounts to 16.2% of their total income (Gunatilake, *et al.*, 1993).

According to the survey carried out by Epitawatta (1995) on traditional uses of forests, the income obtained by families who are engaged in collection and utilization of NWFPs is significant. In lowland rain forests this amounts to around Rs 28,000 per year per family; in tropical montane rain forests Rs 21,000; in Savanna land Rs 7,500; and in Dry Zone forests Rs 15,000.

The current situation regarding the following most important NWFPs is considered in this paper.

1 Medicinal Plants	2 Bamboo	3 Rattan
4 Kitul Products	5 Edible plants	6 Resin Tapping

3.1 Medicinal Plants

It is estimated that only about 50% of the population in Sri Lanka uses Western Health Services, the rest rely on traditional remedies under the Ayurvedic medicinal system.

Medicinal plants have been used to treat or cure over 300 ailments in Sri Lanka. It is also recorded that well over 600 plant species are used in traditional medicine in Sri Lanka. The value of medicinal herbs collected around specified forests is given in Table 1. (Socio Economic Survey IUCN, 1995)

The collection of medicinal herbs can be considered a significant income generating activity. However, this is limited to a few villages (Epitawatta, 1995). Although medicinal plant items are collected from Wet Zone forests, this is not widely done in tropical lowland forests with the exception of collecting Weniwel. In relation to other traditional forest uses, the income received from the collection of medicinal plant is not significant in the Wet Zone.

After collection, the plant parts are chopped or sliced and dried in sunlight and put into plastic or gunny bags, and sold to traders, wholesalers, manufacturers and processors. Although the collection, handling, marketing and processing of medicinal plants is a very labour intensive process, the employment potential of these

Table 1 : Value of Medicinal Herbs Collected

Forest	Value Rs/Family/Annum
Delwala	255.50
Dellawa	112.00
Kekunadura	15.00
Kalugala	423.50
Kottawa-Kombala	358.80
Welihena	153.30
Viharakele	848.00
Oliagankele	104.00
Kandewattagoda	19.00
Nahitiya -madampe	136.00
Knuckles	2500.00

3.2 Bamboo

Bamboos continue to hold an important place in the rural economy in Sri Lanka. They are renowned for their usefulness and are called the poor man's timber. The strength of Bamboo, its straightness, lightness, relatively easy propagation and its quick growth makes it very suitable for a variety of purposes in Sri Lanka - such as in the construction of houses, bridges and scaffolding, as substitutes for water pipes, for fencing and for making implements. Bamboos are also used in the handicraft industries - the two main species being *Ochlandra stridula* and *Bambusa vulgaris*. In addition, *Ochlandra stridula* is widely used in traditional decorations (Neela de Soyza, 1988).

Table 2: Percentage of people involved in the bamboo industry

Activity	Percentage of people
Cultivating	6.15
Collecting raw materials from the forest	69.06
Collecting raw materials from private lands	8.12
Collecting from gatherers and growers and delivering	1.54
Producing bamboo-made goods	11.54
Buying and selling bamboo products	3.59

The main districts which deal with the Bamboo industry are Galle and Ratnapura (Swarnamali and Vivekanandan, 1990). See Figure 1. The study indicated that of the people who are involved in the Bamboo Industry, 77% are engaged in collecting Bamboo from state forests and the rest from private lands. See Table 2.

The study also revealed that the production of *Bambusa vulgaris* is about 50 culms per clump. The cultivators have estimated that their nett income is around Rs 750 per clump. Also, cultivators can meet only 45% of the demand. The extent of the

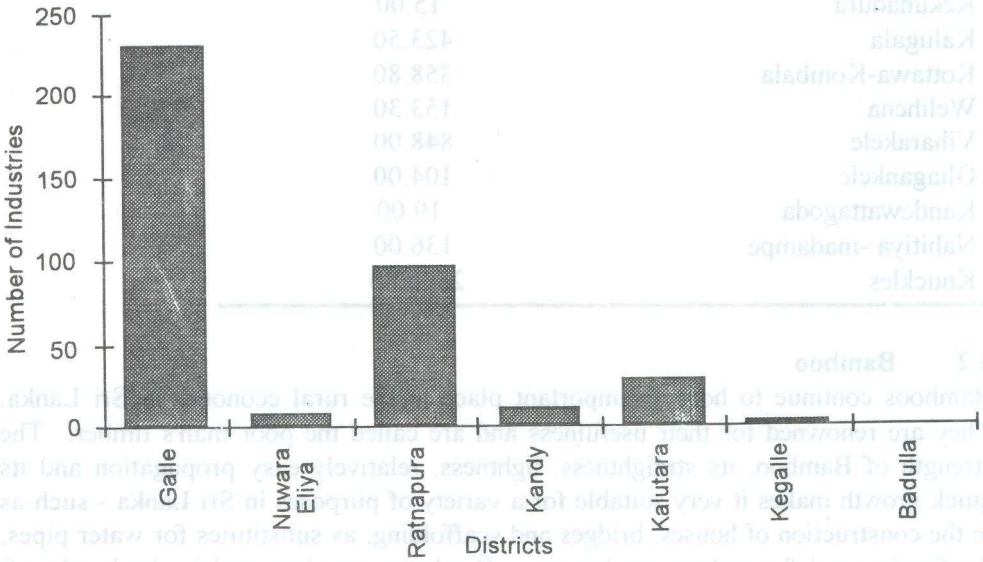

Figure 1 - Districts involved in bamboo production

The quantities of culms transported during 1991 and 1992 are given in Table 4. It is shown that the annual production is around 270,000 culms. In fact a great number of Bamboo culms are cut and used locally and estimates for this are not available. It is estimated that the actual figures of production may be around two times greater than the figures shown in Table 4.

Most people who are involved in the processing of Bata use it in the production of goods such as Bata flower pots, cooking utensils and handicrafts. The producers obtain a net income of approximately Rs 10,000 per year. The main species used is *Ochlandra stridula*. (Swarnamali and Vivekanandan, 1991).

3.3 Rattan

The uses of rattan range from housing construction material (for wattle and daub houses) to raw material for furniture and artifacts, small wood needs and house and kitchen utensils. Rattan is the most important NWFP that provides raw materials for cottage industries. At present, the rattan cottage industry is practised on a commercial basis in 13 of the administrative districts in Sri Lanka. However, during the recent past, some participants have left the practice due to a shortage of raw material. According to the Master Plan for handicraft development in Sri Lanka (1987), about 2100 to 2200 persons are directly engaged in the rattan craft industry

Table 4: Survey on permits issued for bamboo culm transport during 1991/1992

Division	No. issued	No. of Bamboo culm issued
Ampara	117	10650
Anuradhapura	10	930
Galle	780	150291
Monaragala	12	1980
Badulla	48	7876
Kalutara	470	148838
Kurunegala	700	118935
Kegalle	300	48195
Ratnapura	218	13720
Kandy	350	39150

Rattan craft industries are more widespread than those for Bamboo. Kurunegala, Polonnaruwa and Batticaloa are the main districts where the rattan industry is widespread. The percentages of people involved in different aspects in the rattan industry are given in the Table 5. (Neela de Soyza and Vivekanandan, 1991).

Almost every village in the vicinity of forests in the Wet Zone has some form of involvement in rattan collection, whereas in the Dry Zone the collection of rattan is confined only to certain areas of the country (Epitawatta, 1995).

The main sources of rattan are natural forests in various parts of the country. There are 10 native rattan species which are widely used in the rattan industry. Of these, 3 are large diameter and the rest small diameter species. See Table 6.

There are two major groups of edible plants - edible higher plants and mushrooms. Mushroom collection is a countrywide activity and it is recorded in every forest type. However, there is considerable variation in the types of mushroom found and this varies with the forest type or climatic region. Some examples are:

(a) Wet Zone - Kamal Hathu and Athuru Hathu
(b) Dry Zone - Indalolu

Most of the parts of edible plants such as roots, tubers, barks, leaves, flowers, fruits and seeds can be consumed as food. The major yams are dioscorias species commonly named as Kodol, Jamburala and Hiritala. Harvesting yams from forests for domestic consumption is an island-wide activity .

Edible fruits include Goraka (*Garcinia cambogia*) Madu (*Cycus circinalis*) Beraliya, Wood Apple (*Limonia acidissima*) Palu (*Manilcara hexandra*) and Weera. Dried seeds of Mi (*Palacuin grande*) are used for the extraction of oil. A major proportion of food items collected is used for consumption by the family, while in some villages limited items and quantities are sent to the market.
The value of edible plants collected from 10 Wet Zone forests are given in Table 9.

Table 9: Average value of edible plants collected per family per annum from 10 natural Wet Zone forests

Forest	Value (Rs)
Oliyagankele	594.50
Dellawa	888.00
Nahitiya - Madampe	222.50
Delwala	335.50
Kottawa - Kombala	2116.00
Welihena	2240.00
Viharakele	2204.00
Kandewattegoda	985.00
Kekunadura	226.00
Kalugala	447.50

4 MAJOR FACTORS IMPEDING THE DEVELOPMENT OF NWFPs

4.1 Lack of policy on NWFPs

Clear policy objectives are not included in the national forest policy for the development and utilization of NWFPs in Sri Lanka. To some extent, this has been rectified with the forest policy formulated recently. In addition, restrictive forestry legislation has also contributed to the non-development of this sector. As most NWFPs are not marketed, their valuation has become a problem. The economic importance of this sector to the rural economy has been ignored in the national forest policy. Thus, the actual benefits of forests are under-valued and resources are misallocated in the forestry sector without giving adequate consideration to numerous

4.2 Shrinking Resources base

The natural forest cover (closed canopy) in the country has been reduced from 44% in 1956 to around 23.8% at present. The direct result of this is the shrinking of the NWFP resource base. At the same time the population growth and various other socioeconomic factors, such as poverty and unemployment, has resulted in increasing pressure on this NWFP resource base.

4.3 Inadequate Knowledge

As a result of the lack of attention paid to NWFPs in the past, the state of knowledge on this subject is quite inadequate. Detailed basic information on resource availability, yield, quality and methodologies and technologies on extraction, processing and utilization is not available. The relevance of NWFPs to the rural economy is not well understood. Thus these products are treated as insignificant and their contribution to the national economy is ignored. In addition, the above information is essential for developing strategies for management, processing and marketing NWFP resources.

4.4 Seasonal Variations in Supply

Compared to wood products, the inability to secure a standard supply of NWFPs - due to seasonal variations and various other factors - is a major setback in developing markets for NWFPs or related products.

4.5 Multiple Use Management of Forests

Existing forest management plans do not give adequate emphasis to multiple use management - which should provide for the management of NWFP resources. This is particularly importance in protected areas (about 40% of the natural forest cover) where the forest resources utilization has been restricted.

4.6 Traditional Nature of Utilization of NWFPs

Extraction, processing and marketing of NWFPs is carried out in traditional ways using traditional equipment and methods. Further, the suppressive caste system is also associated with the utilization of some NWFPs, for example the jaggery trade.

4.7 Lack of Coordination among various organizations

The development of this sector involves various activities such as collection, processing and utilization of some of the products. Therefore it is essential that a formal mechanism for the coordination of the various organizations involved should be established. However, at present, due to the non-existence of such a mechanism, the development of the NWFPs sector has suffered.

4.8 Lack of Supporting Services

Compared to traditional forestry, agriculture and industry in general, the NWFPs sector has hardly any supporting services. The development of the NWFPs sector will eventually need links with agriculture or other industries and will require supporting services.

5 RECOMMENDATIONS FOR THE DEVELOPMENT OF THE NON-WOOD FORESTRY SECTOR

5.1 Emphasis on multiple use management

There is an urgent need to realise the full potential of forestry to meet the immediate and future needs of a growing population without causing damage to the natural resource base. The multiple use of forest resources, which includes the sustainable development of NWFPs, will lead to greater prosperity - especially for the rural poor. For this reason, all forest management plans should provide adequate emphasis on multiple use management.

5.2 Recognition of the importance of NWFPs in the forest policy

Forest policy should recognise the importance of NWFPs in the forestry sector. Legislation and forest management plans should be formulated accordingly and provision of adequate resources for the development of this sector, especially in the fields of research, education and extension, should be made.

5.3 Revision of existing legislation

Existing legal measures regarding forest resources utilization should be revised in the light of the potential for development of the NWFPs sector. It is especially important that the legislation relating to the management of protected areas should be revised in order to permit multiple use management. These provisions should also be included in the Fauna and Flora protection ordinance and the National Heritage and Wilderness areas acts.

5.4 Establishment of a database

Since the existing knowledge on NWFPs is inadequate, it is necessary to establish a database on silvicultural and agronomic information, employment and income generation, market information and socioeconomic aspects of NWFPs. It is recommended that all the NWFPs are identified - together with their traditional uses.

5.5 Conservation of resource base

One of the overriding goals will be the conservation of the remaining natural forest resources in order to conserve existing NWFP yielding species and there habitats and ecosystems in order to maintain the resource base for use by the present as well as by future generations. It is recommended that, in the establishment of a protected area network, full attention is paid to medicinal plants and NWFPs especially to those that are on the verge of extinction or which may become endangered due to over-exploitation.

5.6 Research and development

As already indicated, information on silvicultural and agronomic aspects, processing, and the utilization of most of the NWFPs is not adequately known. It is, therefore, recommended that the following research be undertaken immediately.

(a) Resource inventories, preferably integrated with forest inventories.

(b) Ethno-botanic studies to improve knowledge on the utilization of NWFPs and to enhance understanding of their role in socioeconomic aspects of the rural poor.

(c) Growth and yield studies and studies on natural regeneration under various management and extraction practices.

(d) Studies on propagation techniques and genetic improvement of source plants to enhance successful establishment and to increase productivity.

5.7 Improve technologies of utilization

Improved processing, transport and storage techniques should be developed to generate added value, make better use of scarce resources and to improve quality and reduce costs.

5.8 Domestication and cultivation

It is necessary to select important source plants for domestication and propagation studies, to establish on-farm trials and to promote cultivation both in forests and in homegardens. These plants can be easily incorporated into homegardens (e.g. under the participatory forestry project) and all other agroforestry systems.

5.9 Marketing and processing

It is essential that market feasibility studies are undertaken as soon as possible. The development of databases and markets, dissemination of market information, deregulation of markets and promotion of small scale or cottage industries is also essential for the development of this sector.

5.10 Extension and other support services

Technical assistance, training and access to credit facilities needs to be provided in order to promote cultivation and sustainable extraction and processing of NWFPs.

5.11 Establishment of suitable mechanisms in order to achieve better coordination

As indicated earlier, a coordinated effort has to be made by various organizations in order to develop this sector. Therefore, it is recommended that a formal mechanism is established to ensure effective coordination among all of the organizations involved in this sector.

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Eucalyptus robusta, Eucalyptus microcorys, Eucalyptus citradora, Eucalyptus globulus

High rated popular alternative species

Teak	*Tectona grandis*
Mahogany	*Swietenia macrophylla*
Jak	*Artocarpus heterophyllus*