**NON TIMBER FOREST PRODUCTS (1+1)**

**Class:- B.Sc (Forestry) IIIrd year**

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**L.S.No.1**

All usufructs / utility products of plant, animal and mineral origins except timber obtainable from forests or afforested lands are defined as non-timber forest products (NTFP) or non-wood forest products (NWFP) or minor forest products (MFP). Services for tourism and recreation are also considered to be MFP.

 NWFP in India are derived from over 3,000 species. According to the Centre of Minor Forest Products, 325 species producing NWFP are very common, commercial and have a base in major industry – they are exported or imported; 879 species are used locally; 677 species are potentially useful only locally; and 1 343 species can be described as “others lesser known”.

Nearly 60 per cent of all the recorded forest revenue in India comes from NWFP. Most of India’s 50 million tribal people receive a substantial proportion of their cash and in-kind income from MFWP (NWFP are estimated to generate 70 per cent of all employment in the India forestry sector), while about 200 to 300 million village people depend on products from forests to varying degrees (Shiva, 1995). The forestry sector, with 23 percent of the country’s geographical area provides 2.3 million person-years of employment. Of this total, 1.6 million person years are related to NWFP. Most NWFP often provide employment during only part of the year because the processing of NWFP is still poorly developed (Gupta, 1994).

 Commercial NWFP alone are estimated to generate Rs.3 billion (US $ 100 million) annually. However, NWFP generate some of the lowest wages of the rural employment sector. While the minimum wage in most states ranges from Rs.30 to 40 per day (US $ 1 to US $ 1.30), most NWFP collectors earn from Rs.5 to 15 (US $ 0.25 to US $ 0.50) per day. Low wages reflect the low productivity of the forest arising from poor management and depressed prices imposed by state trading monopolies and private buyers (Poffenberger, 1994).

 Most of the NWFP are consumed locally (Shiva, 1995). There is no quantitative record of the large numbers of NWFP that are collected by forest inhabitants for their local use and for their subsistence economy. Those commodities, which are exported, generally are stocked in Bombay markets. Data with regard to the quantity of NWFP export are available from the Directorate of Commercial Intelligence and Statistics (Calcutta).

 India exports a large number of NWFP to other countries after meeting internal requirements. Foreign exchange earning total about Rs.10 billion (US $ 384 million) annually (Shiva, 1995). NWFP are primarily exported as raw materials (Gupta, 1994).

Property rights have not been well defined until now. The collectors and growers remain ignorant regarding the requirement / demand of any commodity and therefore collection and production are not regulated.

The NWFPs in India may be divided in to the following classes:

1. Fibres and flosses
2. Grasses, bamboos and canes
3. Essential oils
4. Oilseeds
5. Tan and dyes
6. Gum, resins and Oleo-resins
7. Drugs, poisons, spices and insecticides
8. Edible products
9. Animal, mineral and miscellaneous products.

**Lect.No.2**

The non-timber Forest Products (NTFPs) refer to minor revenue generating products such as honey, edible fruits, medicinal herbs, etc. from the forests and occupy a greater importance in generating income from forest than it is realized. In India alone over 5000 such products are being collected from the forests with an estimated annual revenue of about 135 million US dollars (Pant, 1977) from the local tribes, who have the privilege of collecting them from the surrounding forests. Globally, the value of NTFP harvested is approximately Rs.1500/- ($ 50.00) per hectare (Godoy and Lubowski, 1992). Owing to such importance of NTFPs in employment and income generation among local people, there is a growing awareness on conservation and sustainable use of NTFPs world over. It is also believed that by integrating efforts of local people with the revenue generation through NTFPs, it might be possible also to solicit their participation in conserving the biodiversity. It is, therefore, necessary to study the impact of harvesting NTFPs on their regeneration potential in order to advocate the optimum level of harvest for maintaining ecological sustainability.

It appears that the intensity of harvest has affected the forest structure in terms of species diversity, species dominance, stem density, etc. Especially, the harvest of NTFPs has significantly affected the sapling density, i.e., regeneration of tree species. Such a decreasing trend in saplings could be attributed to three factors. Firstly, the three main species that are harvested for their fruits in this area are *Emblica officinalis, Terminalia chebula* and *T. bellirica*. Their fruit collection probably has reduced the seed density in the forest and therefore reduced the sapling density. The trees are also harvested for their leaf, bark, etc. which ultimately reduce the reproductive success and therefore the regeneration potentials. Secondly due to the movement of people and cattle, the saplings may be trampled. It is also possible, that cattle, which graze in these areas, may consume the saplings.

Ideally, the amount of harvest will be greater and the regeneration decreases with increasing intensity of harvest.

Fifty per cent of harvest of fruits from trees can be demonstrated as sustainable use of the fruits without remarkably losing the regeneration.

**Lec. Sch.No.3**

**Mode of collection of minor forest products**

 The collection and marketing of minor forest products are for the most part in the hands of petty contractors who purchase, from the Forest Department authorities the right to collect these products from the reserved forests. Frequently more than one product is included in a single lease. The contractors collect only those products for which there is a ready demand, through the agency of villagers living in the neighbourhood or the tribal population where they exist. The methods of collection and preparation of the products are often somewhat crude, and hence the quality of the products is often not as satisfactory as it would otherwise be. The products are then sold to large dealers and often pass through several hands before they eventually reach the consumer or exporter. During this long period they frequently deteriorate owing to faulty methods of storage. Considerable improvement is, therefore, necessary in the methods of collection, storage, transport and marketing. There are, however, many difficulties to be overcome, and, in respect of any forest product, seven after considerable knowledge has been obtained as a result of research or experience, there still remains the difficulty of bringing this knowledge to the person really concerned, namely, the actual collector of the product. Research has brought to light many uses for products that were at one time considered to be useless, but there is still enormous work to be done in this direction. In course of time the minor products of India’s forests will assuredly receive greater attention and even at the present time there are indications that improvements have already commenced.

**Lec.Sc.4**

The use of fibres and flosses has assumed increased importance during recent years. Earlier used as stuffing materials, due to its buoyancy and impermeability to moisture they are extensively used in life-saving jackets and similar appliances.

**Fibres**

**Textile fibres Cordage fibres Fibres for other purposes**

(E.g. Cotton, flax, silk, jude) (E.g. Sunn hemp, manila (e.g. Upholstery work,

 hemp, plantain fibre, manufacture of explosives,

 sesal fibre, etc.) paper making)

 The cordage, the wide variety of flexible products viz, ropes, cables, twines and cards, derived primarily from spoon vegetable fibres. The main hard fibre used for cordage in India viz., Manila and Sisal are imported into the country. Small quantity of Cantala fibre, Henquen, Bombay Aloe Fibre and Coir are also used for this purpose).

 Sisal from Agave sisalane – Africa, Indonesia, Haiti and Brazil

 India – Sambalpur (Orissa)

 Hemp – Cultivated Italy, France, Russia, Poland and USA.

 Italian products are of the highest quality followed by French hemp. It is used for producing strong twines.

 India, this is obtained in small quantities in Garhwal, Kashmir, Simla, Kangra and Travencore.

 Bombay Aloe fibre is obtained from Agave Cantala. It is inferior to Sesal but preferred due to cheapness and whiteness. The fibre is used for household and agricultural ropes.

Fibre from Agave vera cruz – from Bihar and Tamil Nadu are sold to Calcutta.

Coir – Coconut husks and used for matting, rugs, carpets and other types of floor covering, cordage and twines. Long and course fibres are used for brushes and brooms and short and curly ones for stuffing upholstery.

**Classification of fibres**

 Botanically fibres are classified into 4 groups. (i) Leaf fibre, (ii) Bast or Inner bast fibre; (iii) Floss and (iv) Coir.

 They are also been classified based on anatomical structure and based on origin of structures.

**Based on anatomical structure**

1. They are primary fibres originating from primary tissues like precambium or protophloel. E.g. Flax, sunn hemp, hemp, etc.
2. Secondary fibres originating from the secondary activity of cambium. E.g. Jute. Mesta, Rosella, Urena and fibres belonging to the order malvales.

**Based on origin of structure**

1. Soft fibre from bast or stem related to the phloem elements, bast or pericycle of dicotyledons and or considerably long. E.g. Jute and Flax. Extraction is done by retting.
2. Hard fibre, chiefly present in monocotyledons.

They are stiff in structure having high lignin content. E.g. Manila hemp, sisal, extraction by mechanical scrapping.

1. Surface fibres very short mainly of cellulose and bone on the surface of seed, stem and leaves. E.g. Cotton.

**Harvesting**

* + Varies from species to species
	+ Flowering is the index for maturity of fibre crops
	+ If plants are allowed to stands for long period after flowering, fibre become course and hamper the quality.
	+ Still pod stage ideal – quality and quantity – jute, mesta and rosella.

**Extraction of the fibres**

 Fibres are extracted with different methods.

 E.g. Retting and scotching (mechanical means).

Retting

Process of separating fibres from the bark and woody core which are loosened by the activity of micro-organisms in the water – India – This is the oldest process – have certain defects – loss of original colours.

* + Over retting spoils the strength of fibres
	+ Under retting retains gummy matter making separation and proper clearing of fibre difficult
	+ Certain fibres e.g. Calotropis giganta are used without retting as they become useless if immerse in water.

**Retting method**

Stem tied small bunches – submerged – running or pond water – under cover aquatic weeds – allowed fro certain period – fermentation

* + In this process, the pecptins, gums and other mucilagenious substances are dissolved.
	+ Fermented bundles are beaten against water – remove dissolved gummy and other materials.
	+ Time of retting – few days to a month or more – species – age of the plant, temperature of water etc.

**Break and jerk method**

 Retting plants are held in the left hand breaks the upper parts bundle from the top and separates the fibre from the broken sticks. Then by onward and backward pushing in the water continuously fibres are totally separated from the woody core.

**Single plant extraction**

 Fibres are stiffed off one by one, washed and dried in the sun. E.g. Bast fibres like jute, mesta, sunn hemp and species of hibiscus.

**Extraction from Ramie**

 Two processes

a) Decortications: Stem is passed through decorticator for breaking the woody core and squeezing out the non-fibrous tissues of stem.

b) Degumming – Fibres are degummed by chemicals like caustic soda, phosphate, etc.

**Extraction from Agave – Sansevieria and pine apple**

 Leaves are scrapped by pedal scrapers to remove green matter from the fibrous layer or passed through crushers; mechanical decorticators are also used in bulk and regular supplies. Extracted fibres are washed in clean water, thrushed on a stone washed and dried.

**Grading of fibres**

 Strength, fineness, colour, luster, etc. are used to grade fibre.

 Hand and Eye method are generally employed - In these experts – distinguished good and poor quality fibre by touching the read and testing the strength of the filament with fingers and hearing the sound of tearing force.

**Physical properties of the fibres**

 Length, luster, elasticity, durability, strength, buoyancy, etc. Most important from utilization point of view.

 **General classification of fibres**

1. Textile fibres
2. Brush fibres
3. Plaiting and rough weaving fibres
4. Filling fibres
5. Natural fibres
6. Paper making fibres