

**Review article**

# Current status, issues and conservation strategies for Rattans of North-East India

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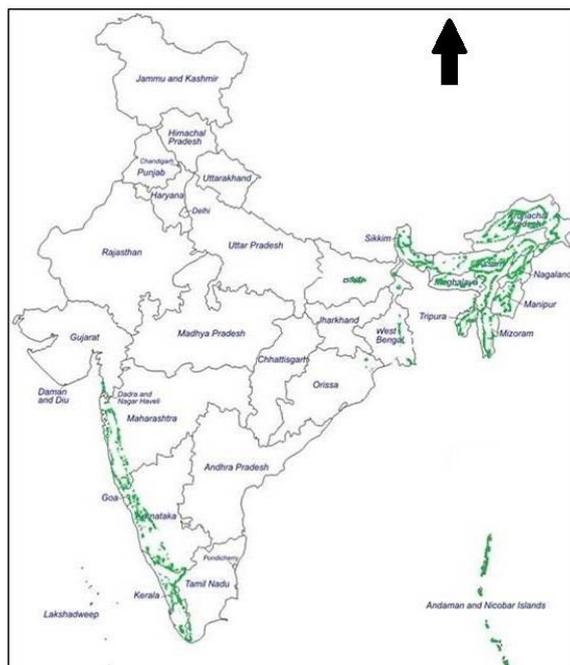
**Abstract:** A comprehensive account of the status of rattans found in the north-east region of India is presented here. Out of the 600 species found worldwide, a total of 20 species of rattan are found in North-East India. Rattan is inseparably attached with the tradition and culture of tribal people of the North-Eastern region. Since antiquity, people of this region have used to make many articles of daily use. The unique mix of characteristics such as strength, durability, flexibility etc, makes rattan a very good raw material for furniture and handicraft industries. But sadly, these industries, through their continued overexploitation and unsustainable extraction of rattan, have exhausted the natural rattan resources of the region. Major issues and threat to the conservation of rattans are noted, and lastly solutions are suggested for the sustainable extraction and conservation of this valuable resource.

**Keywords:** Rattan - Furniture - Handicraft - Overexploitation - Sustainable - Conservation.

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## INTRODUCTION

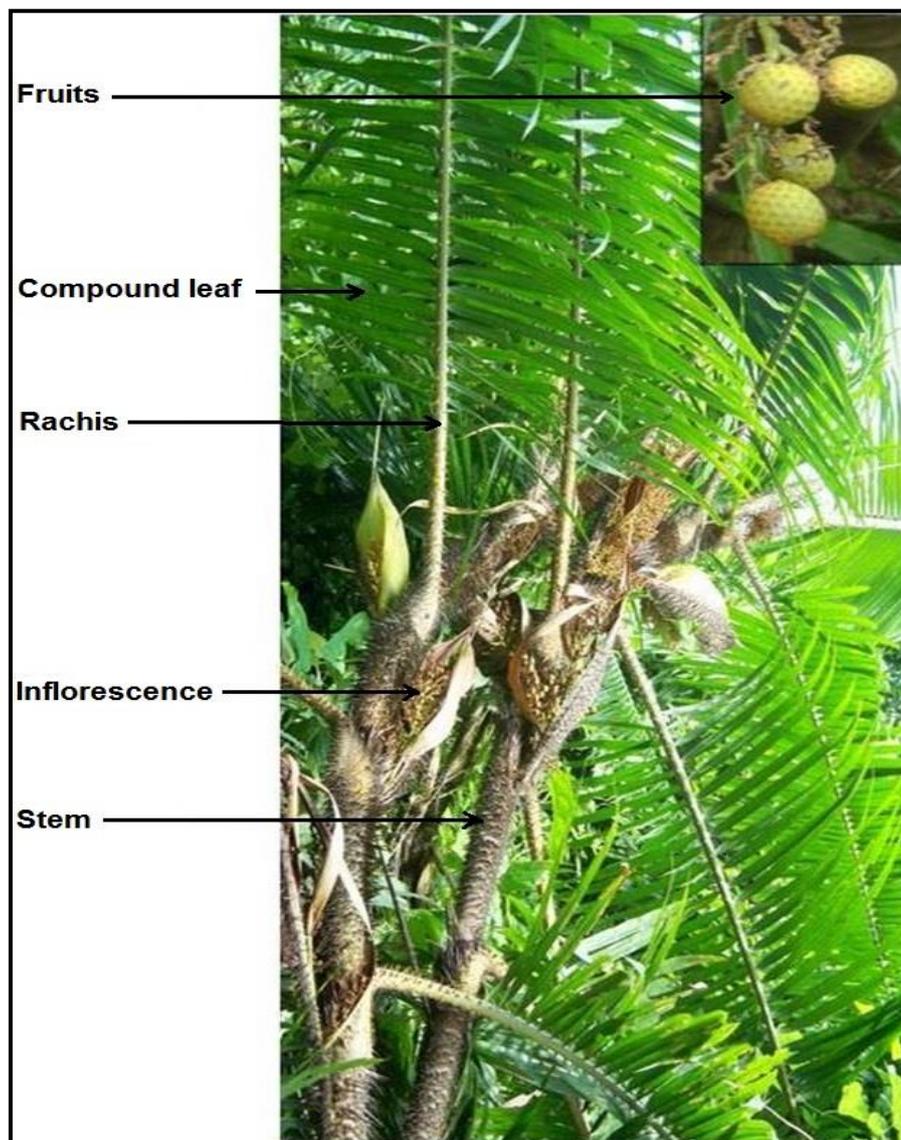
Rattans are climbing spiny palms belonging to the Calamoideae, a large sub-family of Palm family (*Palmae* or *Arecaceae*). There are around 600 species of rattans belonging to 14 genera in the world (Dransfield 1981). These are naturally distributed in the South East Asia from Fiji Island to Africa and from southern China to Queensland (Australia) with the greatest concentration in the Dipterocarp rain forests of the Malaysian Archipelago (Weidelt 1990). India has a good representation of rattans with 5 genera and 60 species mainly found in Western Ghats, Andaman and North-East India (Renuka 1999) (Table 1, Fig. 1). In fact, the rattans comprise more than fifty per cent of the total palm taxa found in India (Basu 1985).



**Figure 1.** Geographical distribution of rattans in India.

**Table 1.** Diversity of rattans in India.

S. No.	Genera	No. of species distributed in		
		NE Region	Andaman & Nicobar Island	Western Ghats
1	<i>Calamus</i>	14	11	23
2	<i>Daemonorops</i>	1	3	-
3	<i>Plectocomia</i>	4	-	-
4	<i>Korthalsia</i>	-	3	-
5	<i>Salacca</i>	1	-	-
	<b>Total</b>	<b>20</b>	<b>17</b>	<b>23</b>

**Figure 2.** Habit of rattan.

### PLANT HABIT

Rattans have long and flexible stems that need support (Fig. 2). Some species are single-stemmed while others are multi-stemmed. Single-stemmed species can only be harvested once, while the multi-stemmed ones can be harvested sustainably/multiple times. Surrounding the stem are sheathing leaf bases which are nearly always fiercely spiny, the spines are sometimes arranged in neat rows and interlocking to form galleries in which ants make their nest, to provide extra protection to an already well protected plant. This may prevent animals from feeding on the tender growing point (called “cabbage”), hidden within the leaf-sheaths. In addition to sheath spines, rattans usually have whips, either on the leaf sheaths or at the ends of the leaves. They are armed with grouped, grapnel-like spines and play a major role in supporting the rattan as it climbs in the forest canopy. These whips and spines make collection unpleasant (Dransfield 2001).

## FLORAL BIOLOGY

Rattans are dioecious, the male and female plants being separate and the flowering is annual, although *Korthalsia* is a monoecious genus in Asia and the flowers are bisexual. If the rattan is a single stem species the whole plant dies, on the contrary if the plant belongs to clustering species only the individual stem dies.

In pleonanthic species, after a juvenile period of vegetative growth, maturity is reached and inflorescences are continuously produced without compromising the vitality of the stem. All the species of *Korthalsia*, *Laccosperma*, *Plectocomia*, *Plectocomiop* and *Myrialepsis*, and a few species of *Daemonorops* are hepaxanthic. All other rattan species are pleonanthic (Dransfield 2001).

## OVEREXPLOITATION OF RATTANS

The tribal people of North-Eastern India make extensive use of long canes of *Plectocomia* and *Daemonorops* for making cane bridges. Split strings from the slender canes are used as cordage and dragline for catching fish. Strong but slender canes are used for making bows and arrows. Radical leaves of *Calamus andamanicus* and *Daemonorops kurzii* are used as thatch. To the Jarwa tribes of Andaman Island, *C. andamanicus* is the source of soft drinking water (Sangal 1971). A section of a 3-m long cane, when cut and held vertically, yields sap that trickles down from the cut end.



**Figure 3.** Commercial uses of rattan: **A**, Harvested raw material; **B**, Stacking and processing of canes; **C**, Edible tender shoots; **D-E**, Cane furniture; **F**, Cane handicraft.

Rattan is of great economic importance in handicraft and furniture making because of its richness in fibre, with suitable toughness and easy for processing (Fig. 3). They are highly valued and have social and economic importance because of their unique characteristics such as strength, durability, looks and bending ability; they are regarded as ‘green gold’ (Mohan Ram & Tandon 1997). In 1996, about 80% of the rattans at the international market originated from Indonesia and in 1999, the export volume was 590,021 tons and a value of US \$ 1.147 billion (Anonymous 2000).

From the utility point of view, their position is next to timber and possibly equal to that of bamboos. Canes play an important role in the rural economy employing many people in the remote areas, who earn their livelihood through extraction of canes, cleaning and processing. Urban people are employed in the small-scale industries and cottage industries manufacturing cane furniture and other articles.

Because of high demand for rattan products worldwide and its collection from wild habitat, rapid deforestation and land-use/land-cover change, there exists a considerable threat to the survivability of most of the species of rattans (Singh *et al.* 2004).

## STATUS OF RATTANS

Of the approximately 600 species of rattan, 117 are recorded as being threatened to some degree (Walter & Gillett 1998); of these, 21 are endangered, 38 are regarded as vulnerable, 28 as being rare and 30 as indeterminate (IUCN Red List Categories 1997). North-Eastern states alone accounts for 4 genera and more than 20 species. Out of these 20 species, 14 species are being threatened including eleven endemic species (Basu 1992).

## MAJOR ISSUES

Threats to rattan come from several sources including:

- Decreasing natural forest cover leading to loss of habitat.
- Selective exploitation of stems for the furniture industry.
- Increased exploitation for handicrafts.
- Exploitation of apical stem and seeds for food (most damaging of all threats) and
- Biotic factors such as diseases and pests.
- Rattans are dioecious, *i.e.*, the male and female plants are separate but the sex of the plant cannot be identified till they flower which is after 5 years of planting (Ahmad & Ghani 1989). Hence extraction before flowering may reduce the number of any one sex of the plant in the population.
- In India, reproductive biology of rattans has not been studied in detail. Application of molecular tools (markers, particularly DNA markers), for sex determination in early stage is very much desired.
- At present out of the species reported, six species are critically endangered, eight are endangered and 26 are vulnerable and has no conservation strategy
- In rattans even though fruits are produced in large quantities in natural forests, practically no natural regeneration from seeds is seen near the mother plant in many areas. Whether this is due to dispersal mechanisms or due to other ecological reasons is not known.
- Since the rattan requires the stake for its proper growth and development, thereby it can be intercropped with the important economic agroforestry species.
- Suitable tree species for rattan farming and silvicultural model has to be identified.
- Package of practices for its cultivation has not yet been developed.
- Little information is available on the edaphic and climatic requirements of different species of the rattan.
- Moreover there is no mention of rattan in Green India Mission and state of forest report.

An analysis of distribution of rattans in the three different major areas in India shows that much change has taken place in their distribution over the years because of the shrinkage of the natural forest cover. In the north-eastern states shifting cultivation had been degrading and denuding the forests since long ago. Many of the species reported earlier from certain localities are absent now (Renuka 1999). The growing popularity of rattan furniture resulted in overexploitation of this important forest resource. In many regions, commercial species have been seriously depleted as the rapid exploitation continues unabated. This situation, if left unresolved, will

bring about severe economic and social repercussions. *Calamus travancoricus*, *C. rotang*, *C. dransfieldii* and *C. nambariensis* have become extremely rare in their original localities.

Their availability in wild from forests has become scarce due to over exploitation over the years and now there is a need to grow them in plantation to meet various demands. There is an urgent need to disseminate information about cultivation techniques of canes so that their plantations could be raised successfully.

Plantation of cane is not a usual phenomenon in the forestry. Thus there is not much information available to foresters to raise successful plantations. Information on nursery techniques and plantation techniques are, though available elsewhere in the country, it is not accessible to the foresters and farmers of the north-east region in general.

In north-east India, these species are still found in wild habitats and are considered as minor, non-wood forest species. Due to the common practice of shifting cultivation in the hills of this region and rapid urbanisation, the natural reserves of rattan are being quickly depleted. Moreover many communities of north-east consume its shoots and seeds as food disrupting its further growth. This resource is, therefore, bound to dry up in the future. The dioecious nature of the north-east Indian species and indiscriminate harvesting often hamper seed propagation, and regeneration in the natural stand in forest. As a result many species from these reserves have come under threat.

There is no sufficient commercial rattan plantation in India as well as in north-eastern region and natural forests are sole sources of its supply. Due to its versatile and increasing uses and shrinking natural habitat cane resources are reducing at an alarming rate. Most of the rattans are in threatened state, some are on the verge of extinction<sup>4</sup> and many of the species reported earlier from this region are not present now (Renuka 1996).

Many of the cane industrial units in southern India are known to get their supplies from North-East India. But the status of forests in North-East India itself is a matter of concern due to shifting cultivation and heavy logging (Renuka 1996). In the Andaman and Nicobar islands also the natural resource is getting depleted at a faster rate due to over-exploitation (Renuka 1995). If the depletion continues in the present rate, the natural rattan resources will almost be totally decimated in a few years. Most of the rattans that occur in the Western Ghats of Kerala region are in the juvenile stage, due to unscientific exploitation. Mature rattans are restricted mostly to remote areas. Therefore there is an urgent need to develop a strategy for scientific management to conserve this valuable forest resource.

## CONCLUSION AND SOLUTIONS

North-East India is a home of rich and diverse reserves of rattans, which form the most important non-timber forest product of the region. The livelihood of many people depends on rattan as it is used to make a wide range of furniture products and handicraft articles. To meet the demand of industries, rattan has been harvested unsustainably by the tribal people of north-east India. This unscientific exploitation of rattans has depleted the natural rattan resources of the region. To conserve the rattan resources, following strategies should be implemented and applied in the field:

### 1) *Preservation of Natural Resources*

Even though strict control of the exploitation of wild stock is prevalent, many times this cannot be effectively implemented. It is practically impossible to control the illicit extraction from the forest areas. Extraction can be controlled in protected areas like Biological parks and Wildlife Sanctuaries and this will help to conserve rattan to a certain extent.

### 2) *Cultivation*

Cultivation of commercially important species for the industrial sector can relieve the pressure on the wild stock. Before adapting the species for large scale plantations outside its natural home, species trials should be conducted to assess the suitability of the species for a particular geo-climatic region. Though rattans occur from almost sea level to 2000 m, most of them show altitudinal preferences. Many of the species are distributed below 1000 m, while some are found only at higher altitudes. Some species are restricted to certain localities.

Rattan is not domesticated and so it is not subjected to any selection. The method followed in selecting the superior plants in other crops cannot be applied to rattans since the age of the clump cannot be determined in the natural forests. Hence it is very difficult to compare and assess the superiority. Some of the clumps might have been partially harvested earlier, making it impossible to assess the original growth. The only possible way of selection at present is to select the mother plants on the basis of phenotypic superiority.

To start cultivation in the plantation level, a regular seed supply should be obtained for which it will be necessary to set aside some accessible stands of good rattans as seed stands. It has however proved difficult to maintain seed stands in the wild since no rattan seems to be safe from rattan collectors. Extraction of rattan before flowering and the destruction of natural habitat of rattan drastically affect the seed source. Hence there is a need to raise seed stands in protected areas.

Due to the global phenomenon of decreasing forest cover and consequent habitat destruction coupled with over exploitation, there is reduction in the availability of this important non-timber forest produce. Therefore, many industries, which depend on wild resource, are now finding it extremely difficult to obtain their required raw materials. This warrants some urgent measures to be taken up for developing commercial Plantations and farming of rattans. North-eastern states with their favourable agro-climatic condition and habitat, offer immense scope for raising plantation of rattans in commercial scale.

Canes can be grown as inter-crop with valuable timber species which provides shade and support for climbing. Such cultivation will not only add to the productivity but also provide a sustainable source of income in a perennial manner to the farmer. They can also be cultivated in marshy areas, marginal land, jhumfallows and waste land.

### 3) *In situ conservation*

In India, there has been no serious effort so far to conserve rattans *in situ*. Even though National Parks and Bio-reserves are helpful in promoting *in situ* conservation, illicit harvesting cannot be controlled efficiently. For conserving the natural populations, some of the State Forest Departments have introduced extraction rules. Generally the extraction is carried out on a 4-year rotation. The Government has also banned the export of the raw material.

Rattans are planted and protected in sacred groves. There are about 80 rattan bearing sacred groves in Kerala alone (Mohanani & Muraleedharan 1988).

### 4) *Ex situ conservation*

State forest departments of Kerala, Karnataka, Tamil Nadu and Goa have started large-scale plantations of rattans. Certain species are cultivated in homesteads. But only three or four economically important species are protected like this.

A live collection consisting of about 30 species is maintained in the Kerala Forest Research Institute campus. Seed stands of 12 species have been raised in Thrissur Forest Division. The State Forest Research Institute in Arunachal Pradesh has also started germplasm conservation. Advanced Research Centre for Bamboo and Rattan (ARCBR), Aizawl, Mizoram, a unit of Rain Forest Research Institute, Jorhat, Assam under Indian Council of Forestry Research and Education (ICFRE), Dehradun, Uttarakhand have conserved all the 4 genera of rattan found in this region (*Calamus*, *Daemonorops*, *Salacca* and *Plectocomia* spp.), collected from different parts of North-Eastern India. These genera are planted in the reserve forest of the ARCBR campus and maintained for research and extension purposes.

### 5) *Biotechnological approaches*

Since rattans are dioecious in nature and their reproductive biology has not been studied in detail mainly because of lack of rattan plantations and the inaccessibility of the natural populations in forests, therefore, there is an urgent need for the sex-determination in the early stage by employing the molecular and biotechnological approaches which may be helpful in conservation of rattan resources.

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## REFERENCES

- Ahmad HJD & Ghani AB R (1989) Flowering and fruiting in *Calamus manan*. *RIC Bulletin* 8(1/4): 2.  
 Anonymous (2000) *Technical report*. Indonesia Furniture Industry and Handicraft Association. Asmindo.  
 Basu SK (1985) The present status of Rattans Palms in India-An overview. In: Wong & Manokaram (eds) *Proceedings Rattan Seminar*. Kuala Lumpur, pp. 77–94.  
 Basu SK (1992) Conservation status of Rattan in India. In: Chand BS & Bhat KM (eds) *Rattan Management and Utilization*. KFRI, Kerala & IDRC, Canada, pp. 67–75.

- Dransfield J (1981) The biology of Asiatic rattans in relation to the rattan trade and conservation. In: Syngé H (eds), *The biological aspects of rare plant conservation*, John Wiley & Sons Ltd., London, pp. 179–186.
- Dransfield J (2001) Taxonomy, biology and ecology of rattan. *Unasylva* 52(2): 11–13.
- Mohan C & Muraleedharan PK (1988) Rattan resources in the sacred grooves of Kerala, India. *RIC Bulletin* 7(4): 4–5.
- Mohan Ram H Y & Tandon R (1997) Bamboos and rattans: from riches to rags. *Proceedings of the Indian National Science Academy* 63: 245–267.
- Renuka C (1995) *A manual of the rattans of Andaman and Nicobar Islands*. KFRI, Kerala, 72 p.
- Renuka C (1996) Rattans of North eastern India- a cause for great concern. *Arunachal Pradesh Forest News* 14(2): 8–11.
- Renuka C (1999) Indian rattan distribution-An update. *Indian Forester* 125(6): 591–598.
- Sangal PM (1971) Forest food for the tribal population of Andaman and Nicobar Islands. *Indian Forester* 97: 646–650.
- Singh HB, Puni L, Jain Alka, Singh RS & Rao PG (2004) Status, utility, threats, and conservation options for rattan resources in Manipur. *Current science* 87 (1): 90–94.
- Walter KS & Gillett HJ (1977) *IUCN Red List of Threatened Plants*. IUCN, Gland and Cambridge.
- Weidelt HJ (1990) Rattan growing in South-East Asia- an ecological well-adapted form of land use. *Plant Research and Development* 31: 26–32.