

Chapter - IV

Bamboo, Reed and Rattan Working Circle

General constitution:

132. Introduction:

This working circle includes all bamboo, reed and cane bearing areas and the bamboo and rattan plantations raised in the division.

Objects of management:

133. Objectives:

1. To increase the resource base of bamboo, reed and rattan.
2. To ensure scientific management of bamboo, reed and rattan resources and to harvest the same at ecologically sustainable levels.
3. To improve the labour opportunities for the tribals and locals.
4. To rehabilitate the marginal degraded areas of both natural forests and plantations.

134. Distribution of area:

An abstract of the available bamboo, Cane and Reed areas both in natural forest and plantations in the division are given below. This list does not include the areas tackled under the Kerala Forestry Project during the last two years.

**Table No. 53 Division of area under Bamboo, Cane and Reed
(Except areas under Kerala Forestry Project)**

Sl. No.	Nature	Area (ha)
Bamboo		
1.	Natural forest	4000
2.	Plantation	111
Cane		
3.	Natural forest	2500
4.	Plantation	20
Reed		
5.	Natural forest	500
6.	Plantation	36

Bamboo:

135. Analysis of the crop:

Bambusa arundinaceae plantations were raised over an area of 111.00 ha during 1991 and 1992 in Mananthavady and Peria ranges. The growth of bamboo in the plantations is average. Though bamboo is naturally available in all the three ranges, comparative availability is more in Begur range.

136. Method of treatment:

Periodical selection cutting will be allowed. The bamboo available area will be divided into different compartments and the mature bamboo will be extracted in a 3-year cycle. The bamboo bearing areas will be divided into coupes as shown below.

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|------------------|---|----------|
| 1. Thirunelly | : | 1500 ha |
| 2. Hilldale | : | 1500 ha. |
| 3. Shanamangalam | : | 500 ha. |
| 4. Muthumari | : | 250 ha. |
| 5. Vemum | : | 250 ha. |

The bamboo will be allotted to industrial concerns like Hindustan Newsprint, Bamboo Corporation as per allotment order of the Chief Conservator of Forests.

Harvesting of bamboo:

137. General Rules for felling:

The mature bamboo may be extracted on a 3-year felling cycle strictly in accordance with the felling rules.

Felling rules:

1. Immature culms less than three year old shall not be cut.
2. In a clump 12 culms or more at least 6 mature over one year old would be retained and in a clump containing less than 3 mature culms over one year old, all will be retained during the fellings.
3. The height above the ground level at which the culms are cut shall not be below the second node and in any case not higher than 30cm from the ground level.
4. All the debris and cut branches of the culm shall be removed completely away from the clump.

5. No felling will be done during the period from 1st July to 30th September of every year *i.e.* during the growing season.
6. Bamboos shall not be cut in the year of their flowering but all such clumps will be clear felled after they have shed their seed and the cutting of such clumps need not be confined to the coupe of the year.

138. Management of bamboo areas:

1. Where congestion has already set in, the congested culms must be removed even if it leaves only the current year culms.
2. Where the young culms are twisted from top they should be cut so as to remove the twisted portion.
3. Bamboo areas should be strictly protected from local grazing and it will be advisable to wall fence them permanently.
4. Earth should be heaped around bamboo clumps to ensure that the new rhizomes are not exposed to sun.
5. Trees providing light shade to bamboos should not be removed, as bamboos grow best under shade though certain species are better associates than others.

139. Artificial regeneration:

Artificial regeneration of bamboo can be done in open patches of degraded natural forests. Apart from this bamboo and reed can be planted along stream and riverbanks for better stabilization of the soil. Such areas may be identified and planted with bamboo and reed.

140. Selection of species:

The naturally found species namely *Bambusa arundinaceae* may be planted. More promising species may be introduced in consultation with Kerala Forest Research Institute to increase the yield. To overcome the problem of non-availability of bamboo after gregarious flowering of the species, it is advisable that seeds of same species from different locations as well as different species of bamboo are utilized in the artificial regeneration programme. For supply of raw material to local tribals, species of bamboos without thorns may be introduced in the areas adjacent to tribal pamllets.

141. Collection of seed:

Bamboo seeds are not available every year. Hence the seeds are to be acquired from other reliable sources. Proper precautions may be taken to make sure that the seeds procured are best suited for the locality.

142. Planting:

The nursery-raised seedlings either basketted or naked can be used for planting.

143. Espacement:

Depending on the area to be planted, whether open area or stream/river banks, different espacement may be adopted. It is better to adopt closer spacing i.e. 4×4 meters along the river and stream bank and a wider spacing of 6×6 meter in open areas.

144. Management of gregariously flowered areas:

No collection will be permitted during the year of flowering to complete the seed fall. The dry bamboos after one year of flowering may be removed completely and the regeneration may be protected from fire and other biotic interference.

Cane:

145. Analysis of the crop:

Cane is not so common in the forest area of North Wayanad Division may be due to the over exploitation in the past. The identified species of cane in the forests of this division are *Calamus delessertianus*, *Calamus gamblei*, *Calamus hookerianus*, *Calamus thwaitesii*, *Calamus travancoricus* and *Calamus vattayila*. Phenology of these species is described below. Cane was artificially raised over an area of 20 ha during 1996 in Peria range.

1. *Calamus delessertianus* Becc.

Solitary, medium diameter rattan. Stem with sheaths 3 cm in diameter at base, 5-6cm at the apex, without sheaths 2-2.5cm. Leaves about 1.5 to 2m long; leaf sheath green with bulbous based spines; leaflets regularly arranged along the rachis, about 55×2.5 cm, veins ciliated on the upper surface; cilia to 1.5 cm long, black tipped, leaf margin spinulose. Female inflorescence rather large, partial inflorescence to 30 cm long, arising erect at first and then spreading. Fruit globose, 1.5 cm in

diameter, distinctly stalked, scales straw-yellow, in 28 rows, spirally arranged, deeply channeled in the middle.

Distribution: Seen in the evergreen forests between 700 and 1200m throughout Western Ghats.

Flowering: August-September. **Fruiting:** May-June.

Uses: A good medium diameter rattan. Used in furniture industry.

2. *Calamus gamblei* Becc.

A clustering, moderate sized rattan. Stem with sheaths about 2.5 cm in diameter and without sheaths 1.5 cm. Leaves about 1.2 m long; leaf sheath green, armed with bulbous based spines; knee present; leaflets arranged regularly on the rachis, about 40 x 2.5cm. Inflorescence flagellate, about 3m long, partial inflorescence to 90 cm long. Fruit 2 cm diameter, spherical or slightly tapering at the base, short stalked, scales in 23 rows, deeply channeled, pale yellow, shiny.

There are two varieties for this species based on the shape of the fruit. Fruit slightly tapering towards the base- *Calamus gamblei* var. *gamblei*. Fruit spherical- *Calamus gamblei* var. *sphaerocarpa*.

Distribution: This species is seen in evergreen forests above 700 m in Thiruvananthapuram, Thenmala, Ranni, Munnar, Thrissur, Palakkad, Nemmara and Wayanad Forest Divisions, in Periyar Wildlife Sanctuary, Eravikulam National Park and Silent Valley National Park. This is also distributed in the Western Ghat regions of Tamil Nadu and Karnataka.

Flowering: July-August. **Fruiting:** May-June.

Uses: A moderately good quality cane. Used in furniture industry and for basket making.

3. *Calamus hookerianus* Becc.

A clustering, moderate sized rattan. Stem with sheaths measure about 4 cm in diameter, without sheaths to 2.5 cm. Leaves to 2m long; leaf sheath brownish green, densely armed with spines; spines triangular, the longest to 2.5 cm long, 0.5 cm wide at the base, interspersed with numerous smaller spines and abundant brown tomentum, mouth of the sheath provided with long papery spines to 18cm long; knee sometimes present, not conspicuous; leaflets regularly arranged. Inflorescence to 5

m long, partial inflorescence to 75cm long. Fruits about 1 X 0.8 cm, subglobose, scales in 18 rows, yellowish brown with a dark brown border.

Distribution: This species is seen in the evergreen forests up to 1000m throughout the Western Ghats in Kerala, Tamil Nadu and Karnataka.

Flowering: July-August. **Fruiting:** April- May.

Uses: A medium diameter rattan, extensively used in furniture industry and basket-making.

4. *Calamus thwaitesii* Becc. & Hook. F.

This is the thickest cane available in the Western Ghats. Very robust, clump forming, large diameter rattan. Stem with sheaths to 6 cm in diameter and without sheaths to 3.5 cm. Leaves about 3m long; leaf sheath yellow, densely armed with black spines, arising from a raised rim-like surface, the largest 3 X 0.7 cm, flat, smaller spines scattered in between; knee absent; petiole and rachis yellowish, armed with black spines grouped and arranged into oblique whorls; leaflets usually grouped, sharply spinulose along the margins. Inflorescence about 6 m long, partial inflorescence about 70 cm long. Fruit about 2 X 1.3 cm, ovoid, scales arranged in 12 vertical rows with median grooves, yellow with deep brown margins.

Distribution: This cane grows in evergreen, semi-evergreen and moist deciduous forests between 75 to 900 m throughout the Western Ghats. The distribution extends to Sri Lanka also.

Flowering: June-July. **Fruiting:** April- May.

Uses: One of the best quality canes used extensively in furniture industry.

5. *Calamus travancoricus* Bedd. Ex Becc. & Hook.f.

A very slender, clustering rattan. Stem with sheaths up to 0.8 cm in diameter and without sheaths to 0.4 cm. Leaf to 45 cm long; leaf sheaths green, armed with small spines of 0.5 cm length, mouth of the sheath with slightly larger spines of 0.75 to 1.00 cm length; leaflets grouped along the rachis. Inflorescence to 1m long, partial inflorescence 10-12 cm long. Fruit 1cm across, globose, scales in 24 rows, straw yellow with a dark brown border.

Distribution: This rattan is seen only in the evergreen forests from 200-500 m in Thiruvananthapuram, Thenmala, Ranni Konni, Malayattoor, Chalakkudy, Vazhachal and Nilambur Forest Divisions of Kerala.

Flowering: October-November. **Fruiting:** May-June.

Uses: A best quality small diameter cane used extensively in handicraft and furniture industries, but not available in sufficient quantities.

6. *Calamus vattayila* Renuka

A single stemmed moderate sized rattan. Stem with sheaths up to 5 cm in diameter at apex and 2.5 cm at base, without sheaths 1.8 cm. Leaf 1m long; leaf sheath dark green and sparingly spiny; spines generally pointing upwards; leaflets alternate, about 40 X 10cm; inflorescence to 1m long; partial inflorescence to 40 cm long; getting shorter towards the tip of the inflorescence. Fruits in heavy bunches; a single fruit measuring about 2.5 X 0.8 cm, oblong, scales in 27 rows, longer than broad, chestnut brown coloured.

The shape of the leaflet is similar to that of a reed. The local name “vattayila” comes from the shape of the leaflet.

Distribution: Seen sporadically in evergreen forests between 200 to 750m. This is reported from Thenmala, Ranni, Nilambur, Wayanad, Nemmara, Thekkady, Chalakkudy and Vazhachal Forest Divisions. The distribution extends to Tamil Nadu and Karnataka.

Flowering: September-October **Fruiting:** May-June

Uses: A good quality cane used in furniture industry, but not available in required quantities.

146. Method of treatment:

Extraction of cane will not be permitted during the plan period to increase the availability of the same in the forest. Cane may be tried in areas of natural forests where adequate protection can be provided from wildlife.

147. Artificial regeneration:

As mentioned earlier, cane is prone for damage by porcupine, wild boar etc. Hence areas free from wildlife damage may be selected for raising cane plantations. Selection of species for planting may be decided in consultation with Kerala Forest Research Institute.

148. Planting site:

The planting site should be selected in the natural evergreen and semi-evergreen forests depending on the preference of species. Cane may also be tried in suitable areas available in the miscellaneous plantations in the division. But care should be taken to select the best suited species for the locality.

Even though some species extend their habitat to moist deciduous forest also, the evergreen condition seems to be ideal for their growth. Select an area where the forest floor is rich in humus and having moderate number of trees. Canes need the trees for support and shade and at the same time require canopy opening for more sunlight.

Preparation of planting material:**149. Collection of fruits:**

The best months for collection of ripe fruits are April-May. Only ripe fruits should be collected since they only give good germination percent. To check for ripeness, press the fruits in between fingers. If the scaly cover is easily detached, the fruits are ripe enough for collection. Seeds should be kept moist since seed moisture content of about 40 % is essential to maintain seed viability. It is advisable to plant them as soon as they are collected.

150. Extraction of seeds:

To ensure a good germination, it is necessary to remove the outer scaly cover; the inner fleshy layer forms the seed. The scaly cover can be removed by crushing the fruits with hands or by pounding them gently in a mortar with a wooden mallet as done for de-husking paddy. Then soak the seeds in water for about 48 hrs to induce fermentation of the fleshy layer. Remove the fleshy part of the seed by rubbing with hands and collect the clean seeds settled at the bottom of the vessel. These seeds can be stored for a week, but care should be taken to keep the seeds moist, as dry seeds fail to germinate.

151. Fungicidal treatment:

Before sowing, treat the seeds with any one of the fungicides like Captan 75 WP, Thiram 75 WP or Bavistin 50 WP, to prevent any fungal infection. Before fungicidal treatment air-dry the seeds for 30 minutes. Take 1 kg of seeds in a container and add 3 g of any one of the fungicides and shake well so that each seed gets the powdery coating.

152. Nursery techniques:

Keep the treated seeds in moist sawdust in a polythene bag for about two weeks till the seeds start germinating. Sprinkle water over the sawdust when the upper layer gets dry. The process will help to hasten the germination.

The nursery site should be selected near a perennial water source. Nursery must be partially shaded, with a thatch of palm leaves or of coir mat, as cane seedlings need shade for their initial growth. It is better to sow the germinated seeds separately in polythene containers of 15 X 20 cm size filled with a mixture of forest topsoil and sand in the ratio 3:1. Arrange the polythene containers in the nursery over a black polythene sheet spread over the soil, so that the growing roots do not penetrate the ground.

Transfer the sawdust with the seeds from the polythene bag to a shallow tray. Plant the just germinated seeds in the polythene containers already arranged in the nursery.

Alternatively, the germinated seeds can also be sown in nursery beds and later pricked out into containers. It is a labour intensive operation and may sometimes cause damage to the roots while transplanting. Maintain the seedlings in the nursery for a year and out plant in the following rainy season, June-July.

Planting out:

153. Site Preparation:

The site should be prepared for planting in the dry season. Plant the seedlings in line, the rows preferably running from east to west. The planting lanes of 2m wide are taken 8m apart from each other. Remove only the under growth from the planting lane alone and the area between two planting lanes should be kept undisturbed.

154. Out Planting:

During rainy season, June-July, the seedlings can be out planted. Take pits of 30-cm³ size at a distance of 2-4 m on one side of the cleared path. Planting the seedlings along one side of the path helps the canes to climb the trees of that side earlier and this will leave a wider inspection path on the other side. The planting distance depends on the nature of the cane. Clump forming species require more space (4m) while single stemmed ones less (2m). Plant the seedlings after removing

the polythene container without disturbing the soil around the roots in such a manner that the root collar is at level with the ground surface. Care is to be taken to ensure that the seedlings are not planted too deeply as this would delay the production of suckers.

155. Cultural Operation:

i. Brushing and mulching: After the seedlings are established, brushing and mulching of the soil around the clump once in six months will encourage the growth of seedlings.

ii. Weeding: As and when necessary, line weeding should be carried out for 2 years. Once established, rattans require less care and maintenance. The seedlings will be in the rosette stage (without stem formation) for the first three years. In the fourth year stem formation begins and the plants will increase in height gaining 1 to 1.5 m length per year. First harvesting can be done after 8 to 10 years of planting.

156. Future maintenance:

The cane plantations raised may be maintained properly with due consideration to the economic aspect. Huge expenses for raising large-scale plantations of cane may be avoided if the economic return is not justifiable.

Reed:

157. Analysis of crop:

Availability of reed is very scarce in North Wayanad Division. During 1992, 36 ha of *Ochlandra beddomei* reed were raised artificially along Peria river. The performance is fairly well.

158. Method of treatment:

As such, reeds are not available in a sizable quantity in the forests of North Wayanad division. Hence, no extraction is suggested.

159. Regeneration:

Reed may be tried along the stream and riverbanks for better soil conservation. The selection of planting materials may be done in consultation with Kerala Forest Research Institute. Planting of reeds may be done at a closer spacing.

160. Restoration of Reed, Bamboo and Cane (RRB) areas:

Under World Bank aided Kerala Forestry Project an area of 115.60 ha is planted with cane and maintained under Restoration of Reed, Bamboo and Cane (RRB) area scheme. It is too early to assess the growth performance in these areas. Distribution of area under RRB is listed below. The cane species planted is *Calamus thwaitesii*. If the above plantation proves to be successful, further similar areas in the division may be taken up at the rate of not more than 20 ha in a year.

Table No. 54 RRB areas North Wayanad division

Year of Establishment	Range	Locality	Species	Extent (ha)	Reserve
1998 – 1999	Mananthavady	Pannippad	Cane	25.00	Vested forest
1998 – 1999	Peria	Churuli	Cane	21.32	Peria R.F.
1998 – 1999		Churuli	Cane	29.28	Peria R.F.
1999 – 2000		Panoth	Cane	20.00	Peria R.F.
2000 – 20001		Varayal	Cane	20.00	Peria R.F.
Total				115.60	

161. Control:

Necessary control journals like nursery journals, plantation journals etc. may be maintained. Observations and suggestions by the inspecting officers may be recorded properly. The growth performance of different species may be assessed so as to enable for the selection of the better-suited species for the area.

162. Fire protection:

All the areas especially the regeneration areas, of both artificial and natural, may be protected from fire.

163. Grazing:

Grazing will destroy the young regeneration and will cause for surface erosion of soil. Hence, grazing should be completely controlled.