

CHAPTER 1 INTRODUCTION TO THE AREA

1.1 NAME, LOCATION, CONSTITUTION AND EXTENT

Brahmagiri Sanctuary is situated in southern side in Kodagu district of Karnataka State. It lies in between North latitude $11^{\circ} 55'$ to $12^{\circ} 19'$ and East longitude $75^{\circ} 44'$ to $76^{\circ} 04'$. It is named after the highest peak of the sanctuary is called Brahmagiri Hill and the total area of the sanctuary is 181.29 km².

The Brahmagiri Wildlife Sanctuary is unique in its ecosystem, which is stunningly grand and astonishingly beautiful. The Sanctuary is rich in diversity of animals and plants in undulating landscape and altitude varying from 65 mts MSL to 1600 mts MSL, and solitary corridor to Northern part of Western ghats from Southern part of Western ghats for the movement of animals especially connecting Rajiv Gandhi National Park, Bandipur National Park, Wyanad and Aralum sanctuary to the Pushpagiri Wildlife Sanctuary and there on. It consists of amazing rich flora like, Rose wood, Nandi, Mathi, Honne, Sura Honne, White Cedar, Red Cedar, Saldhupa, Kaidhupa, Cinnamomum, Gulmavu, Neralu, Mavu, and so on. It is the home town of Lion tailed macaque which is rare and an endangered species.

The Sanctuary is a paradise to the scholars and scientists who desire to study the flora and enrich their knowledge. Though the terrain is not permitting to cover the entire area by road, by making entries in different points, one can experience different microclimates at different sites like grassy blanks, thickly wooded forests and moist deciduous forests, with lot of animals and birds. Tiger, Elephants, and Indian Gaur are the big mammals commonly found here.

All along the Baropole river, the scenery is panoramic, the water flow is very slow without showing any signs of flow at places and very ferocious at other points. At certain points this river is called Neelam Pole where the water movement is slow and looks blue in color.

1.2 APPROACH AND ACCESS

The Brahmagiri Wildlife Sanctuary can be approached by all weather roads from Mysore (110 Kms) and Madikeri (75 Kms) and several other towns like Hunsur, H.D.Kote, Gonikoppal, Virajpet. Nearest railway station is at Mysore (110 Kms) and Mangalore (160 Kms) is the nearest Airport. Public and private transport buses are plying from Mysore and Canannore regularly.

1.3 STATEMENT OF SIGNIFICANCE

Brahmagiri Wildlife Sanctuary (BWS) nestles in biodiversity-hotspot western ghats in Karnataka State and was notified as a Protected Area (PA : Sanctuary) in 1974. With altitudinal variation of 1507m (65 mts to 1607 mts above msl) and annual rainfall between 2500 mm to 6000mm, BWS landscape is covered with semi evergreen to wet evergreen forests with high altitude grassland shoal forests. Being in continuity with important PAs like, Mudumalai, Bandipur, Nagarhole, Wynad and Aralum. BWS provides extended habitat for large mammalia like elephant. BWS has most of its amphibian and other micro fauna yet to be discovered and recorded; the most threatened of species like LTM, Malabar civet, Slender loris, Nilgiri martin and Clawless otter are found here.

BWS has huge value as source of fresh water as river Laxmantirtha, a very important tributary of river Cauvery originates in it and river Barpole gains significance as river when running through it.

Mythologically this area has sacred importance; as the legend goes when God Rama was returning from Sri Lanka with his brother Laxmana, after rescuing his queen Sita, they stayed in this area; and then Laxmana had struck ground with an arrow to get water so originated Laxmanatirtha river.

Because of the stunningly beautiful landscape with water falls, altitudinal variation and rich forests, BWS is nature oriented tourism paradise and holds immense

opportunity for high-end low-volume trekking and adventure/nature tourism. This has significant implication in form of business opportunity for locals (which can potentially result in development of stake of locals in the maintenance of the sanctuary) and better protection status for the area.

The importance of BWS as part of large forested landscape with high hills causing rains and hence the suitable climatic conditions for growing coffee in Kodagu district cannot be over emphasized, but respected.

CHAPTER II

BACKGROUND INFORMATION AND ATTRIBUTES

2.1 BOUNDARIES

The Government of Karnataka, Vide Notification No. AF050FNL.74 dated : 5-6-1974 has declared Brahmagiri Wildlife Sanctuary and the boundaries are described therein. The same is at Annexure - I.

2.2 GEOLOGY, ROCK AND SOIL

The area is generally of undulating terrain with several steep valleys and hillocks. Several perennial rivers and streams are originating from this region. The highest peak is Brahmagiri, which is 1607 M above MSL. The forest is rich wet evergreen forest, Moist deciduous forest, Shola Forest and high altitude savanna grass lands. The underlying rock is Gneiss in origin. The soil is deep loamy with varying depth, from place to place. The higher elevation in the Sanctuary comes under grassy patches and patches of Shola forests.

2.3 TERRAIN

The sanctuary has hilly terrain with steep to very steep slopes. The range of slope terrain is from 1% to > 35% (KRSRAC).

2.4 CLIMATE

The season is divided into cold, dry and wet seasons. Cold season sets in the end of November and passes into hot season by middle of February. Coldest season is from mid November to mid January. March to May months are the dry months and the wet season is from June to September.

a. RAINFALL

The sanctuary receives rainfall mainly from Southwest Monsoon. It also receives occasional rains from Northeast Monsoon. The main season is from June to September. The mean annual rainfall ranges from 2500 mm to 6000mm. The erosion action of

torrential rain can be noticed in open areas with grass, which are the areas susceptible for fire in dry season.

b. WINDS

The South West Monsoon winds which blow over the sanctuary is the major one. Occasionally Northeast Monsoon wind also blows over the sanctuary.

c. TEMPERATURE

The dry, wet and cold seasons are clearly noticed. The cold season starts from the mid of November and passes on the dry season in the mid of February. The summer season is from February to May. Rainy season is from June to September. During the summer when most of the small streams dries up, the Wildlife especially, the Elephants enter the cultivated lands like coffee estates and paddy fields.

2.5 WATER SOURCES

The sanctuary gives birth to many rivers, which drain towards Bay of Bengal and Arabian Sea. The rivers, which flow towards Arabian Sea are Borapole, Segamanihole, Somahole, Miugorehole and Urthi-hole. The rivers which flow towards Bay of Bengal are Laxmanthirtha, Ramthirtha and Kabini.

Borapole runs towards west bifurcating Urty Reserve forest and Brahmagiri Reserve Forests. In addition to this each of the sholas have capacity to run numerous perennials streams towards down hillside.

The area receives good and heavy rainfall. The mean annual rainfall varies from 2500 mm to 6000 mm of which, the major down pour will be with in a span of 4 months from June to September. This heavy rains, takes the topsoil along with the water resulting in depleting the soil infertility. Even though there is good canopy cover in the forest area, lot of soil and moisture conservation measures need to be taken up like, gully plugging, construction of check dams, culverts, etc. The gully checks and check dams reduce the water run off rate and increase the infiltration, which recharges ground water.

2.6 RANGE OF WILDLIFE, STATUS DISTRIBUTION AND HABITAT

2.6.1 VEGETATION

The main forest types found in the sanctuary are:

1. Tropical Wet Evergreen Forest.
2. Semi Evergreen Forest.
3. Moist deciduous Forests
4. Shola Forest.
5. Grass Lands.

1. TROPICAL WET EVERGREEN FOREST :

It occurs in 80% of the Urty Reserve Forest and in 50% of Brahmagiri Reserve Forest.

FLORISTICS

- I. *Artocarpus species, Alstonia scholaris, Calophyllum apetalum, Carallia inegririma, Caryota urens, Syzygium species, Cinnamomum zeylanicum, Knema species, Holigarna species, Cedrela toona and Lagerstroemia lanceolata.*
- II. *Ixora species, Zonothoxylum, rhetsa, Hydnocarpus laurifolia, Eravatemia heyneana, Actinodaphne species and Vitex altissima etc.*
- III. (a) Bamboos absent.
- IV. *Psychotria species, Memecylon edule, Strobilanthes species and Glycomis pentaphylla, etc.*
- V. *Calamus species, Gnetum ula and Piper species etc.*

The forest floor remains full of seedlings of various species struggling their way up - wards.

2. SEMI EVERGREEN FOREST :

This type of Forest is found both in Urty Reserve Forest and in Brahmagiri Reserve Forest.

FLORISTICS

- I. *Terminalia paniculata*, *Syzygium species*, *Terminalia chebula*, *Terminalia belerica*, *Lagerstroemia lanceolata*, *Xylia xylocarpa*, *Terminalia tomentosa*, *Diopyros species*, *Holigarna species*, *Ficus species*, *Albizzia species* and *Anthocephalus cadamba*.
- II. *Mallotus philippinensis*, *Emblica officinalis*, *Careya arborea*, *Zanthoxylum rhetsa*, *Randia dumetorum*, *Santalum album*, and *Casearia tomentosa*, etc.
- III. (a) Big bamboos and Occasionally *Dendrocalamus strictus* are found.
- IV. *Carissa carandas*, *Embelia robusta*, *Lasiosiphon eriocephalus*, *Lantana camara*, etc.
- V. Climbers : - *Entada phaseoloides*, *Spatholobus roxburghii*, *Wagatea specata*, *Calycopteris floribunda*, *Acacia pennata*, *Acacia concinna*, *Ipomea species*, *Vetilago species* and *Elaeagnus species* etc.

3. MOIST DECIDUOUS FORESTS

Moist deciduous forests exist in the eastern most tail of the sanctuary in Kutta area in Brahmagiri Ghat reserve forest. The species found in these forests include: *Terminalia species*, *Syzygium species*, *Lagerstroemia lanceolata*, *Xylia xylocarpa*, *Diospyros species*, *Holigarna species*, *Ficus species*, *Albizzia species*, etc.

4. SHOLA FOREST :

These are the tropical evergreen forest patches found in depressions amidst the high altitudes grassland. The species found in shola forests are mainly evergreen in nature: these are of dwarf size along the periphery to withstand the heavy breeze blowing the hillocks, to large sized trees towards the middle. Each of this Shola forest has perennial tiny rivulet acting like a mini reservoir. The forests are ecologically very important and the repeated occurrence of fire in these high altitude grass lands is progressively shrinking the area of these forests every year. Hence it is proposed to have an effective fire line all along the periphery of the important Shola forests on top priority.

FLORISTIC: *Syzizium malabaricum*, *Olia dioca*, *Holigyryna grahmii*, *Callophylum innophylum*, *Eliocarpus sps*,

5. GRASS LANDS :

These are found on the top portion of the hills and especially in large extents in Brahmagiri hill ranges encompassing the Shola forests in them. These areas are highly sensitive and prone to the fire.

A list of important flora found in this sanctuary is under.

2.6.2 ANIMALS

The sanctuary is rich in fauna both in diversity and variety. The fantastic variety ranges from small insects and rodents to majestically roaming mammoth elephants. Four types of primates are found in this sanctuary. The Lion tailed Macaque, Nilgiri Langoor, Common Langur and Bonnet Macaque are of importance in this sanctuary. Nilgiri Morteen is also present in this Sanctuary.

ASIATIC ELEPHANT :

The sanctuary has a large population of elephants. The luxurious growth of grass, Rheeds, and bamboo present in the area is the major source of food for elephants. During monsoon, these elephants may go to the adjacent estates mainly for fruits and food and during the summer for food and water. The crop depredation by elephants in cultivated lands are severe in nature and needs to be contained. The elephant human conflict has resulted in many incidents of human loss due to trampling and destroying the agricultural crops.

a. PREY ANIMALS :

The list includes Indian Gaur, Sambar, Barking Deer, Indian Porcupine, Langoor and Monkey. The Indian Gaur which are big land mammals after the Asiatic Elephant is very common. They feed on grass bamboo, Rheeds and other plants. They live in herds and occasionally seen solitarily. The Sambar population is also found in abundance.

b. PREDATORS

Includes in the list are the Majestic Tigers, Leopards, Python, King Cobra and Cobras.

c. SCAVENGERS :

Fox and vultures are the main scavengers, found in the Sanctuary.

AVIFAUNA :

The bird life in this sanctuary is rich and vary from the tailor bird to the endemic Malabar hornbills. Though detailed checklist is yet to be done, a list of commonly found birds is as under.

MAN-ANIMAL CONFLICT:

With the Sanctuary surrounded by villages, agricultural fields and coffee estates, it is but natural for the wild animals to stray out and deprade crops which are more nutritious. Likewise, during illegal collection of small timber, firewood, N.T.F.P., grass by villagers from within the sanctuary, or the elephants while deprading crops, does result in the trampling or killing of a few villagers, accidentally.

Carnivores like tiger and panther, also kill domestic cattle, when they graze in the sanctuary or when the carnivore move out of the sanctuary in search of prey. In all the three cases i.e., damage to crops, human death by wild animals and domestic stock killed by wild animals, as well as injury by wild animals, they are compensated for as per Government orders.

STRATEGIES TO MITIGATE MAN-ANIMAL CONFLICT :

The term elephant human conflict usually refers to negatives interaction such as crop raiding by elephants, human injuries and death caused by the elephants and killing of elephants for reason other than ivory extraction. In Kodagu District many subsistence farmer loose a high proportion of their crop and face extreme hardship, simultaneously, wealthy farmer suffer heavy losses if the crop destroyed are of high

cash value. This conflict problem is hence cause for concern because it threatened to erode local support for conservation in the areas wherever human life and property are at risk of distraction by the elephants. The strategies are classified into temporary solution and permanent solution as follows:

1. Temporary strategies to ease the problem of Man-animal conflict :

- ◆ Scaring of elephants back into the forests by engaging local villagers for elephant scaring camps during night time.
- ◆ Compensation for injury or death of human, live stock and for crop damages.

2. Permanent strategies to ease the problem of Man-animal conflict :

- ◆ Creation of size stone masonry wall all along the boundary.
- ◆ Elephant Habitat improvement to contain them inside their habitat.
- ◆ Reducing of Human-Elephant conflict by envisaging people's participation at all levels in all the programs implemented for controlling straying of elephants outside their habitat.
- ◆ Excavation of Elephant Proof Trench (E.P.T).

One can be Perambulates the entire boundary of the Sanctuary before doing the action plan regarding Permanent structures which have been controlling of Man - Animal conflict. Because of the sanctuary boundary consist, heavy terrain, streams, rivers, Swampy fields and Hill slope.

CHAPTER III

HISTORY OF MANAGEMENT AND PRESENT PRACTICES

PAST SYSTEM OF MANAGEMENT.

The Coorg forest department appears to have been organized during the year 1865 and it was designated as "Forest conservancy department". This department had taken up the management of all the government forests and it was then headed by the Conservator of forests, Mysore. The main functions of the conservancy department were extraction of all suitable trees of superior species, in easily accessible localities and to make as much revenue as possible. The principles of forestry were not observed with the result that all the valuable timber species in the accessible forests like Anekad were indiscriminately exploited.

During the end of the nineteenth century, priorities began to change with the introduction of plantation crops like coffee, cardamom, orange etc. in addition to the extensive openings made for paddy fields.

The detrimental effects of conversion of large extents of forest areas into plantation and agricultural crops were felt soon and the administration realized the need to have a holistic view of land management. Necessity to curb indiscriminate damage to forests and to protect them in the sensitive areas was felt. Such concerns came out in the form of rules of forest management in 1865. Subsequently during implementation when inadequacy of these measures was felt, new rules for better management and preservation of forests were introduced. The Government of India in 1871 issued these rules, which were applicable only to the Coorg.

Later on forest rules were modified and the system of issue of licenses/permits to exploit timber that was prevalent during the time of Raja of Coorg was stopped. Timber was sold through depots opened at numerous places. Work of formation of forest roads

was started in 1883. In the year 1876 for the first time, fire protection measures were taken up in the Anekad forests. All the timber depots were forced to close since the people started to meet their demand from their private *bane* lands. As a result the central depot at Hunsur was opened to attract the merchants from Mysore and other places.

In the years 1892 and 1894, the working plans for the Dubare and Anekad Reserved forests were prepared respectively. In the year 1898 another working plan was prepared for Dubare and Arikeri Reserved forests. Here the main prescription was selection-cum-improvement felling to be regulated on area basis. But it was not followed properly and only good timber was removed without giving any importance to improvement. This was continued till 1910.

Mr. Tireman, dissatisfied by this system of exploitation and its injurious results, prepared a new working plan in 1912. Here the main prescription was selection felling combined with improvement felling to favour and induce reproduction of valuable species with certain supplementary regulations. Under this system, the areas were divided into 20 compartments with a felling cycle of 20 years. The exploitable girth was fixed as 7 feet for Teak and 7½ feet for Beete and Honne. This plan was followed till 1925, but the whole area prescribed for working could not be completed, as the yearly area was quite big and could not be completed with the available staff and labour and with inadequate transportation facility. More than half of the prescribed area was left without working.

The above system was replaced in 1925 by clear felling with concentrated artificial regeneration with Teak. This was continued till 1932, in anticipation of Brandis working plan, which actually came into force in 1933.

Brandis plan was from 1933 to 1943 for 10 years. In this plan clear felling of 200 acres per year spread over in four felling series was prescribed. The rotation fixed was 150 years.

Since Brandis plan was found outdated, early revision of the plan was taken prior to 1943 and therefore in the year 1940, Mr. Rangaswamy's plan came into existence, which was for 15 years. Mr. Rangaswamy's plan prescribed clear felling of 300 acres every year in 5 felling series, the rotation being 100 years. He constituted the following working circles:

1. Conversion working circle No. 1 area = 42854 acres
2. Conversion working circle No. 2 area = 30727 acres
3. Conversion working circle No. 3 area = 32033 acres

In addition to the above, overlapping working circles were also constituted, these were Bamboo working circle, Minor forest produce working circle and Grazing working circle.

In the above two conversion working circles the principles of working were the same, i.e., clear felling and artificial regeneration, one for ordinary area, the other for degraded areas where degradation was caused due to heavy selection felling in the past. Subsequently as per the instructions of the Inspector General of Forests, both the working circles were merged into one. The total area regenerated during 1940-1955 was 6533 acres and total area planted up to 31st March 1955 was 13778 acres including sandal plantations.

The mode of raising teak plantations was partly by sowing and partly by transplanting seedlings from teak nurseries. In 1890 'Kumri' cultivation was also encouraged. The system of stump planting was introduced in 1937. In between 1947 and 1952, teak regeneration areas used to be burnt at the end of the first year during the hot weather and cut back with the idea of inducing vigorous coppice shoots and thereby aim at a faster rate of growth. This practice was given up in 1953.

Miscellaneous plantations of Beete, Honne, Nandi, Matti etc. along with Teak were tried from 1945-51. This was a failure as the miscellaneous species died after the end of first year due to burning.

PAST HISTORY OF MANAGEMENT OF GHAT FORESTS:

From 1867 to 1916, permits were granted to West Coast merchants to remove timber from any part of the forest without any control. The slopes within the elephant haul and along the river margins were mainly exploited. Mr. Tyreman's plan of improvement felling was adopted in 1916. The blanks created by improvement felling were made good by dibbling of seeds. These have been quite successful. Since there was a great demand for bamboo, Burma bamboos, namely *Dendrocalamus brandisii* and *Dendrocalamus gigantea* were introduced by Mr. Tyreman and these were planted along the river margins and lower slopes. In Bhagamandala range vast area of evergreen forest turned into deciduous forest due to shifting cultivation. In 1919, Sir. George Heart who was the then Inspector General of Forests advised for carrying out regeneration felling. After this in 1926 a scheme was prepared for felling of marketable trees of 4 ft and above in girth and this was stopped in 1929, because of the resolution passed in the 3rd silvicultural conference held in Dehradun which advised against all heavy felling in the evergreen forests. From 1936 selection method followed by improvement felling was adopted and the girth limit was fixed at 6 ft except for Pali and Poon for which a minimum girth of 4½ ft was fixed. This system continued till 1938.

In 1938 Mr. Vanhaefte's plan came into existence. Its period was ten years. In the first working circle, the annual coupe was fixed at 100 acres with a felling cycle of 120 years. The yield was regulated by area. The felling was to be followed by tending operation in the 3rd and 6th year whenever necessary.

The second one was selection working circle. It was in Kerti and Keepalli blocks. The annual coupe was fixed at 300 acres with a felling cycle of 30 years.

Cardamom cultivation was encouraged by giving land on lease for a period of 21 years. From 1941 onwards a new method called the plantation method of leasing land

for cardamom cultivation was introduced. As per this method the under growth of the whole area was cleared and planted by cardamom. This was a serious menace to evergreen forests.

In the year 1954, 1957 and 1959, Mr. K.K.Somaiah had written the following three working plans for the different areas for the erstwhile Coorg division:

1. Working plan for ghat forests of Coorg (1954-55 to 1973-74),
2. Working plan for a portion of the eastern deciduous forests of Coorg (1957-58 to 1971-72) and
3. Working plan for the sandal forests of Coorg and other reserved forests (1959-60 to 1973-74).

Two of these plans expired in 1974 and the third one, the eastern deciduous forests of Coorg expired in 1972. Even though the above plans expired, the same prescriptions were continued till 1987 with some changes and deviations. Somaiah emphasized mostly protection of this belt and he advocated removal of mature trees only by selection system. He brought all inaccessible areas under protection system and imposed ban on exploitation. He had recommended the stoppage of cardamom cultivation inside the forest with the idea of saving the evergreen forest ecosystem.

Mr. K. K. Somaiah had proposed twelve working circles in his Working Plan for Ghat forests. These are:

1. Evergreen selection working circle:

This working circle comprised of all the accessible evergreen timber bearing areas with almost even distribution of the girth classes. Mr. .K.K.Somaiah added one more word saying that the circle extends over the whole of the economically exploitable localities of the evergreen forests. The felling cycle was fixed at 45 years. The minimum exploitable girth was fixed at 6 ft at breast height for all the species except for *Evodia lunaunkenda* for which a girth limit of 3 ft was fixed. He prescribed ban on cardamom

cultivation in the selection felling area thinking that it would interfere with the natural propagation of timber species. A tree in the evergreen locality would take 144 years to attain 6ft girth; keeping this in mind he made 135 years as rotation period which is multiple of 45 years, the felling cycle. His method of treatment for felling was to extract the mature, over mature valuable trees without creating large gaps. After the extraction operations, the gaps created by felling were artificially regenerated. In the usual course, no two trees were marked within 100 ft radius.

In the plan the Working Plan officer did not mention about the number of trees that are to be removed per acre; he only said in the usual course that no two trees are to be marked in 100 ft radius. The staff as well as the agency took advantage of this and carried out felling indiscriminately only in easily accessible and transportable localities. The result was over felling, creation of large gaps and impoverishing the forest from valuable species i.e. no even distribution of valuable species was seen in the forest. Forests were heavily exploited. In place of evergreen species, dry deciduous species came up. Climbers, bushes and colonizers like *Premna tomentosa* occupied some of the places where large gaps were created. The forests become valueless. Only some green cover was seen. This is because the Working Plan was not implemented in its true spirit.

Other agencies like plywood factories etc. were allowed to work in the same place where selection felling was carried out. This made the situation worse. Such working had badly damaged the forests.

2. Evergreen tending working circle:

As per his assessment Mr. K.K. Somaiah found that between the period 1918 to 1948 heavy felling was effected even in the improvement working circle and as a result large openings were created. The said area and the selection felling area as proposed by him together formed the evergreen tending working circle. The main treatment given was tending and thinning. Refilling of the gaps by dibbling of germinating seeds and planting with one-year-old nursery seedlings.

With all the above operations, the gaps were not closed, whereas felling continued with and without the Working Plan prescriptions, leading the accessible areas into degradation. Such areas where timber extraction was considered uneconomical i.e. steep areas in higher altitudes were included in this working circle. National planning committee's report of that time had envisaged development of inaccessible forests by improved communications, so that the timber from these areas would also be extracted in the interest of the national forest economy. After the communication facility had been extended automatically these areas were merged with selection felling circle.

3. Cardamom working circle:

This working circle included forest areas leased out for cultivation of Cardamom. Cardamom cultivation in forest was at that time considered profitable as there was no known use of the Ghat forests.

4. Softwood plantation working circle:

The deciduous bits of the Ghat forests usually found outside and along the fringes of the evergreen forests were taken into this working circle. Due to the shortage of matchwood throughout India, the Government of India had suggested to the provincial Governments to start match wood plantation in suitable areas and announced 50% subsidy also.

The degraded areas that were left after shifting cultivation, areas which failed due to the committed mistakes in the evergreen forest, failed teak plantations etc., were clear felled and planted up in the ratio of 50:50 for raising softwood and hardwood plantations.

Since softwood species grow faster and hardwood species grow slower, for silviculture treatment such mixing was not found desirable. Raising the species in separate blocks would have given better results.

5. Teak plantation working circle:

This working circle dealt with teak plantations raised since 1876 and up to 1952. The Ghat forests were not found suitable for teak plantations. Mr. Tireman and Mr. Van Haefkens said this earlier also in their working plans. Mr. K.K. Somaiah also agreed with the observations of earlier foresters and felt that teak should not be introduced in the Ghat forests. But again his assertion that teak should be confined to the successful pockets in the Ghat forests appears to give contrary meaning of his earlier contention.

6. Miscellaneous plantation working circle:

This working circle comprises of plantations of miscellaneous species such as rosewood, honne, burga, hebbalasu. The area under this working circle was only 337 acres. Mr. K.K. Somaiah had not proposed any new plantation but only proposed maintenance works such as tending operation, protection from grazing and fire. Since these were the local species, they thrived well.

7. Cashewnut plantation working circle:

An area of 276 acres was brought under this working circle and fresh area of 1050 acres was suggested for planting by Mr. K.K. Somaiah. Cashew comes up well on the lower elevation of ghat forests of Sampaje and Makut Ranges.

8. Deciduous, Protection and Improvement Working Circle:

This working circle comprises of deciduous timber bearing tracts of Ghat forests. Prior to 1902, some of the areas of evergreen zone were subjected to shifting cultivation. Faulty forestry practices such as failure in raising teak plantations and heavy felling by different agencies in the same area had changed the character of the forest at patches from evergreen to deciduous type. Such areas were included in this working circle. Here the main object was to give protection, to remove dead and wind fallen trees and to improve the growing stock. Under the improvement operations, weeding and tending were carried out. In the blanks and openings, species like nandi, ulve, irulu, mathi, tadasal, honne were planted.

The objects of this working circle were definitely good. Planting of local species in such areas helped in their rehabilitation.

9. Manure leaf working circle:

This working circle was located in Sampaje range. The adjoining villagers were permitted to meet their requirement of leaves for manure from this working circle. In this working circle, the villagers were permitted to cut and lop the branches of trees with certain conditions.

10. Bamboo working circle:

In this working circle bamboo was worked on a three year felling cycle. Felling rules were also prescribed. It was prescribed that not more than 25% of the culms should be cut from a clump. Bamboo plantations were also taken up under this working circle.

Even though Ghat forests are not that suitable for bamboos, planting of bamboos on the riverbanks and valleys checked to the certain extent the total degradation of such accessible areas from over exploitation.

11. Grazing working circle:

This is an overlapping working circle covering the entire area of the working plan. The plantations above 5 years were also included in this working circle. Under this working circle nominal rents were collected for allowing cattle into the forest.

Removal of grass from the forest was also encouraged. Rupee 1 was collected for a cartload of grass.

12. Minor forest producing working circle:

In this overlapping working circle, the lease period was three years. At that time, *Paisaries*, *Devarakadu*, *Urudeves* were also included in this working circle in addition to the Ghat forests. MFP items were listed and sold in public auction or in tender.

Working plan for a portion of the Eastern Deciduous forests of Coorg.

In the above working plan Sri Somaiah made five working circles:

1. Conversion working circle.
2. Selection working circle.
3. Protection working circle.
4. Grazing working circle.
5. Minor forest produce working circle.

1. Conversion working circle:

In Mr. Rangaswamy's working plan he had made two Conversion working circles. One for the existing teak plantations and the other for planting of teak in the non-teak areas. Sri. Somaiah combined these two working circles and made only one Conversion working circle. The areas, which were unsuitable for teak, were proposed with species like rosewood, honne, nandi and mathi under miscellaneous regulation. Rotation was fixed at 100 years with a girth of 6' at B.H. As per the instruction of the then Inspector General of Forests, he proposed to leave a belt of natural forests in between plantations of teak. He also proposed Kumri cultivation in young teak plantation area. He proposed 6 thinnings at the age of 6th, 12th, 20th, 28th, 38th and 50th year. Grazing was closed in the younger plantation for 6 years. Sandal seeds were sown around the margin of the new plantation in patches.

2. Selection working circle:

All the unworked areas and the left-out areas of conversion working circle were included in this working circle and once in three years the area of sanctum sanctorum was taken for felling. All the trees above 7' B.H. were prescribed for selection felling. The felling cycle was 30 years.

3. Protection working circle:

The areas that were not included in either working circle were included in this circle. This was mainly in the western region of the tract. A total area of 3200 acres was made available to this circle. None of the areas of present Madikeri division came in this working circle.

During the plan period no exploitation was suggested because of the poor nature of the crop. Only saleable dead and wind fallen trees were permitted to extract at the time of extraction of the adjoining area of selection working circle. Complete rest combined with rigid fire protection was prescribed.

4. Grazing working circle:

This working circle is an overlapping working circle comprising almost all the areas of the Working Plan except the new plantations, elephant grazing ground allotted by the then Conservator of forests and only other areas if these were considered necessary to be excluded by the Conservator of forests. In 1952 the government allowed free grazing with a number of restrictions. This encouraged grazing in the forests and revenue from grazing was diminished.

5. Minor forest produce working circle:

The area of this working circle included the whole area of the Working Plan, inclusive of *Paisaries*, *Devarakadus*, *Uruduves*. The area was divided into 3 blocks, each as a unit and were sold in public auction or by tender. A three-year lease period was given. Only the listed items were permitted to be removed.

Though by and large the approach taken in this Working Plan was towards conservation of forests in the sensitive areas, in the absence of strict implementation and rigid control the accessible areas were over exploited in the Selection working circle. The prescription for the exploitation of trees of 7 feet GBH in the core wildlife areas that are termed as sanctum sanctorum in the plan has also caused degradation to certain extent. However, areas brought under the protection working circle had got the reprieve from over exploitation. After the abolition of grazing fee, though restrictions were imposed

on the number of cattle it had resulted the over grazing of areas beyond the carrying capacity. This added to the intensity of degradation.

Working plan for sandal forests of Coorg and other reserved forests:

This Working Plan covers all govt. lands (reserve and non reserve) and all private lands including redeemed and unredeemed bottamanya, uruduve, devarakadu etc., where sandal was found. The reserve forests in Somvarpet range and Attur reserve of Kushalnagar range were also included in this Working Plan.

Mr.K.K.Somaiah divided the working plan into eight working circles:

1. Working circle for extraction of dead and spike diseased sandal,
2. Sandal plantation working circle,
3. Conversion working circle for regeneration of teak,
4. Conversion working circle for regeneration of non teak area,
5. Selection working circle,
6. Protection working circle,
7. Minor forest produce working circle (overlapped) and
8. Grazing working circle.

This Working Plan was in force from 1959 to 1974 i.e. for a period of 15 years.

1. Working circle for extraction of dead and spike diseased sandal:

This working circle provided for the extraction of the dead, Spike diseased, damaged and fallen sandalwood from government and private lands followed by tending operation. The sandal trees that were killed or infected with the Spike disease were uprooted along with the dead in the allotted area and brought to the depot. Separate account was kept in respect of sandalwood collected from private land and the price was paid to the landowners as per notification.

Immediately after the removal of sandal from the prescribed coupes, tending operations were carried out to free the sandal from suppression.

2. Sandal plantation working circle:

This working circle provided for clear felling and planting with sandal. Most of the plantations failed due to Spike disease. In the clear felling system, the annual coup was not clear felled and about 20 medium sized permanent host trees were retained.

3. Teak conversion working circle:

The Teak conversion working circle consisted of all areas in the moist and dry deciduous forests, which are suitable for teak plantations. The areas already under teak plantation were also included in this working circle. The areas of poor growth and failed plantations of sandal were also included.

The silviculture system followed was clear felling and artificial regeneration. *Kumari* cultivation was also encouraged. A rotation period of 100 years was fixed.

Thinning :

Mechanical thinnings were prescribed in the 5th year and 8th year of formation. 3rd elite thinning was prescribed in between 20th year and 23rd year. Fourth thinning was prescribed between the 30th and 33rd year, the 5th and final thinning between the 40th and 45th year. After final thinning about 65 to 70 stems per acre was retained.

4. Working circle for non teak area:

The area consists of all failed sandal plantations. Since the department had focused on teak plantation only, on experimental basis, *Ailanthus*, *Bombax* and *Evodia* were planted. A rotation period of 30 years was fixed tentatively due to the non-experience in this field.

The silvicultural system adopted was clear felling and artificial regeneration of non-teak species.

5. Selection working circle:

The Selection working circle included the deciduous forests, which were not covered by Conversion working circle and excluded the areas with stunted crops. Since no prescription was made for working in these areas in Mr.Rangaswamy's plan, these areas have been taken up in this working circle.

Silvicultural system prescribed under selection system was only removal of mature and over mature trees with a minimum prescribed girth. A felling cycle of 30 years was fixed and exploitable girth was fixed 6' at B.H.

6. Protection and improvement working circle:

The areas that were not included either in conversion working circle or in selection working circle had been included in this working circle. The area was mainly inaccessible and precipitous having stunted growth. No exploitation is carried out in this area due to the poor nature of growth. Prescription given was full rest to the entire area. The only work carried out in this area was removal of dead and wind fallen trees and rigid fire protection.

7. Grazing working circle:

This was an overlapping working circle comprising the entire area of the working plan except the newly formed plantations, Elephant grazing grounds and the areas that the Conservator of Forests felt fit for closure from free grazing.

The restriction imposed on the villagers was very difficult to enforce, because of the paucity of staff with the department.

8. Minor forest produce working circle:

This working circle covered *Paisaries, Devarakadus, Uruduves* and Reserved forests of Somvarpet range lying to the north of Harangi river whereas the portion of south of the river was covered by the eastern deciduous Working Plan. This working circle was divided in to two units or blocks for convenience of management.

The MFPs were listed and sold in public auction or tender. The period of lease was for 3 years.

Working Plan for Madikeri forest division by Shri Akbar Sha (1986-1995):

In Mr. Akbar Sha's Working Plan, he divided the Working Plan area into twelve working circles depending up on the diversity of forest types, prevailing conditions in the area at the time and the demand of forest resources. Different working circles were constituted with different objects of management. The working circles were:

1. Protection working circle,
2. Wild life working circle,
3. Selection working circle,
4. Improvement working circle,
5. Regeneration working circle,
6. Teak working circle,
7. Bamboo working circle,
8. Sandal working circle,
9. Cane working circle,
10. Reeds working circle,
11. Plantation working circle and
12. Minor forest produce overlapping working circle.

1. Protection working circle:

This working circle was formed with the sole intention of protecting the sensitive areas of the plan, which require immediate attention. They were watersheds, grass lands, precipitous hillocks and other areas, which need urgent attention. The main treatments provided were protection from fire, grazing, pilferage/ smuggling, erosion etc. Strict implementation of improvement works like afforestation, soil conservation and tending operation etc. was proposed. An area of 16595.57 ha was earmarked under this working circle. The allotment of the area was made on the merit, potential and productivity of the site and not on the criteria of inaccessibility. These areas were very

sensitive and once deterioration sets in further damage was very fast and after certain stage it was very difficult to check the deterioration.

Fire was the most important agent of degradation in the deciduous forests. Overgrazing was another factor in addition to hacking for fodder and small timber. No forestry activity was recommended in the working circle except salvaging of dead and fallen trees. Planting with indigenous species, which have the inherent adaptability to local site conditions, was recommended. Tending was prescribed but caution was insisted upon for careful implementation of the operation. Soil conservation works like check dams and gully-checks with planting of vegetative soil stabilisers and brushwood check dams were also prescribed. Vegetative gully checks were recommended, since the area receives high rainfall.

2. Wild life working circle:

In the plan priority was given to the conservation of wild life and stress was given for the improvement of their habitat. Talacauveri, Brahamagiri and Pushpagiri, the three wildlife areas were brought under the plan totalling an area of 37109.46 ha and recommended to be managed exclusively for the conservation and development of wildlife. A separate working circle was allotted to the wildlife in the plan. This was an overlapping working circle. The main treatment given was to improve the habitat. Importance was also given to ensure effective safety to the wildlife.

3. Selection working circle:

In this working circle the area considered was 11757.64 ha which is inclusive of evergreen and deciduous type of forests. In this working circle the system prescribed was selection system. All the extraction works were to be by area basis controlled by the number and size of the trees from a unit area. Even though the principle was the same for all types of forests, the criteria of control were different for different types of forest. The felling cycle was 20 years. With this felling cycle he has prescribed working for half of the area. The other half, even though it was marked on the map, was retained for subsequent plan operation.

The special object of the working circle was conservation of forest eco system. The selection felling system of the circle was to keep the well stocked forest in ideal condition and also to provide chances for all the species to have their own distribution pattern with all age classes. Another objective was to meet the need of the general public by making sustained supply of available products. In the entire working circle regeneration by artificial planting was emphasized.

The rotation was fixed at 120 years, which was equal to the time required to bring the area under full stocking. According to the author of the Plan the rotation or production period is equal to that of the average age of the trees to be removed. The exploitable girth was fixed generally at 180 cm at B.H. but varies from species to species. For *Evodia* and *Anogeissus* it was 90 cm, for Nandi and Huluve it was 150 cms, for Eboney, Pali, Irulu, Honne, Teak, Beete, Jack, Ala, Mathi, Nerale, *Adina*, Sampige, *Trewia*, *Lopopelatum* it was 180 cms. For *Tetramilis*, *Hopea*, *Kalpains*, *Kingeodendram pinnatum*, *Vateria indica*, *Cedrela toona*, Mango, Balanji, *Canarium strictum*, *Bombax ceiba* it was fixed 210 cms. For Poon and White cedar it was fixed 240 cms at B.H. The number of trees to be removed was 2 to 11 per ha depending upon the condition of the area.

4. Improvement working circle:

In the plan the area allotted for the tending cum improvement working circle was 46502.45 ha in the Reserved forests and 3463.37 ha in *Paisari* lands. This working circle was distributed all over the plan area including the Ghat areas. Since the distribution of native species of all classes was not even, immediate attention for improvement was emphasized. The main treatment provided was rest with rigid protection and intensive enrichment work. Removal of dead and fallen was prescribed to keep the forest free from fire and pilferage. This was made a regular affair in dry belt but it was not a ruling in case of evergreen forest.

For improvement of stocking the main operation suggested was under planting and gap regeneration. To attain this, 1/20th of the working circle area was suggested to be tackled every year.

Top priority was given to soil and moisture conservation. The main prescriptions provided for the improvement of these areas were tending, thinning of the congested patches of pure regeneration of *Vateria*, *Dipterocarpus*, *Hopea* etc. and introduction of endemic species wherever there are large gaps. Steps were taken for fire protection and control of grazing from domestic cattle. Seed collection and removal of wildlings was not encouraged in this working circle.

5. **Regeneration working circle:**

An area of 14842.60 ha from the Reserved forests and 1325.31 ha from *Paisari* lands had been made available to this working circle. The plantation areas will be with this working circle only for 4 years, first year for preparation and 3 years for maintenance. Afterwards the areas will be tagged on to the Plantation working circle for further care. All the plan and non-plan schemes including special plans like NREP, Social forestry, WGD, RLEGP etc., which were in operation then were considered while suggesting different types of plantations. In this working circle also, protection of the area from grazing was stressed.

The rotation for different types of plantation was fixed as follows:

- | | |
|-----------------------------|-----------|
| 1. Soft wood species | 40 years, |
| 2. Hard wood species | 60 years, |
| 3. Fuel wood species | 10 years, |
| 4. Cashew | 40 years, |
| 5. Fodder Plantation | Physical, |
| 6. Strip Plantation (Roads) | Physical. |

6. **Teak working circle:**

Areas that can support quality teak in the teak-bearing belt to an extent of 1313.5 ha and older teak plantations measuring 2915.82 ha were brought under this working circle. All plantations raised in this working circle were to be retained in this circle only and not to be tagged on to the Plantation working circle. To break the monoculture a belt of different species were suggested around the periphery of the teak plantations. Poor quality of teak trees and poles were recommended to be cut back to get better coppice growth. Planting of stumps and pre-sprouted seedlings was prescribed.

In all 7 thinnings were suggested of which the first two were mechanical, third one was silvicultural and the last four were elite thinnings. The age fixed for thinning was 5th, 10th, 20th, 30th, 40th, 50th and 60th year. After final thinning only 100 stems were to be retained.

7. Bamboo working circle:

Areas having good stocking of bamboo in natural forests and bamboo plantations, totally covering an area of 5114.34 ha, were considered in this working circle. Prescription for systematic extraction of bamboo along with improvement works was provided in this plan. Restocking the area wherever necessary by artificial means was prescribed in the working circle. Bamboo seen outside this working circle was to be worked under the general principles. However the treatment and silvicultural system suggested were the same. All areas in regeneration working circle which were suitable for bamboo were to be planted with bamboo and after completion of 3 years it was to be taken into bamboo working circle for regular management. A four-year felling cycle was suggested. Only culms of more than two years of age were suggested for cutting retaining 8 older culms along with the younger culms. The clump was not considered for extraction if the older culms are less than eight in number in the clump.

Akbar Sha's Working Plan mentions about the gregarious flowering of big bamboos in Dabbadaka to Makut during 1974. It is also mentioned that during 1974 February-March, Hindustan Paper Corporation had carried out a regeneration survey of bamboos in Mercara division and had reported the large-scale availability of

regeneration. However, during October 1976, when the exercise was repeated with the object of assessing the progress made in the regeneration and their establishment, it was found that there was no substantial progress in the establishment of bamboo regeneration since it was last studied. The report had further elaborated that regeneration that had come up along the streams and moist areas, which were free from adverse biotic factors, had slightly progressed and a few sizeable culms had come out of rhizomes. Even though regeneration was scanty in many areas of dry belt, by and large it was good in evergreen belt. The only reason that could be attributed to the failure of establishment was lack of protection from fire and grazing especially in dry belt.

8. Sandal working circle:

All areas having more than 5% of sandal growth in the natural forests and sandal plantation raised in the past were included in this working circle. The sandalwood trees seen in other areas were also to be given the same treatment and same silvicultural system was to be followed. Exploitation was fixed on physical maturity. Natural regeneration was to be supplemented by artificial regeneration by large-scale sowing and planting. Spike diseased trees were recommended for removal physically.

9. Cane working circle:

Since cane was found only in evergreen forests of the Western Ghats, some of the areas of evergreen forests were included in this working circle. Even though the availability of cane was limited, systematic extraction and improvement work was suggested for increasing the population of cane.

10. Reed working circle:

For the first time a Reed working circle was formed. Areas supporting reeds were identified and included in this working circle.

11. Plantation working circle:

All the plantations other than teak, sandal and bamboo were included in this working circle. Inclusion of all plantations in one circle helped in carrying out all the timely operations required for the plantation. All the plantations raised under this working circle were not suggested for exploitation. A list of plantation is enclosed as Annexure-X

12. Minor forest produce working circle:

The minor forest produce working circle was an overlapping working circle and it included the areas covered by the selection and improvement working circles. If any important items of MFP were found in any of the other 8 circles, it would be collected departmentally. During the fire season the main areas were also closed. The MFP items were listed and co-operative societies were permitted to collect such items. In this process preference was given to tribal societies and labor societies.

13. Miscellaneous regulations:

Prescriptions pertaining to providing agriculture implements and other minor needs of the people living in and around the forest, boundary maintenance, buildings, communications, control forms and records, financial outlay, fire protection, grazing problem, live stock etc. were included under Miscellaneous regulations.

Although Akbar Shah's plan was in currency till 1995-96, its prescriptions could not be strictly followed. With the imposition of a ban on clear felling of forests, followed by ban on felling of green trees, working of forests in the State had undergone changes. With the pronouncement of the National Forest Policy in 1988, the approach towards forest management had become more conservation oriented. Reorganization of the division area that resulted in the creation of Virajpet division and Talacauvery, Brahmagiri and Pushpagiri sanctuaries also adversely affected the systematic and scientific working in the division.

Recent management:

During the recent years, the thrust of forestry has been more on plantation activities rather than on harvest of trees. Extensive plantations were raised under various schemes in different ranges. Most of these plantations are of the fast growing species, especially of *Acacia auriculiformis*. Miscellaneous species including cane and bamboo also have been raised. An abstract of the extents of plantations raised in the division during the last ten years is given below:

Sl. No.	Year.	Extent in ha
1.	1990-91	168.20
2.	1991-92	298.50
3.	1992-93	209.00
4.	1993-94	517.26
5.	1994-95	228.74
6.	1995-96	288.00
7.	1996-97	165.50
8.	1997-98	120.00
9.	1998-99	349.00
10.	1999-2000	299.00

Removal from forest was primarily restricted to salvaging of dead and fallen trees and elephant damaged poles. The extracted timber is sold through public auction sales in the Government timber depots of the division.

Thinning of Teak poles was carried out in certain plantations; but this was done very conservatively. Besides, many Teak plantations were not thinned apparently for the lack of sufficient funds.

In case of Bamboo and canes, extraction was done from relatively easy areas depending upon the demand. These were extracted and disposed off through public auction and retail sales besides supplying to artisans at concessional rates.

Minor forest produces in the division are sold to the LAMP societies and also to MFP contractors through tender-cum-auction sales.

3.1 GENERAL

The Sanctuary is linear in shape and runs in curved boundary touching agricultural land and coffee estates in larger part and for about 55.00 Kms it runs as common boundary of the Karnataka and Kerala interstate boundary. Most of the boundary line of the sanctuary runs along the adjacent agriculture land but the pressure on sanctuary for grazing and collection of minor forest produce is low. But the illegal collection of bark of *Cinnamomum* and *Mechalus macharantha* (Gulumau) is found occasionally. The most difficult part of management of this sanctuary is that there is no proper approach road and no road runs inside the sanctuary from one boundary line to the other boundary line either North to South, or East to west. The all season motorable road from South to Northwest is essential. At present about 20 Kms of state highway road runs on the Northwestern boundary of sanctuary. (i.e From Virajpet to Makutta Road).

3.2 TIMBER OPERATION INCLUDING BAMBOO, AND THE HARVEST

The forest coming under this sanctuary was under the control of Coorg State (C State) till the reorganization of linguistic states. Then these forests were in the Madikeri Forest Division till 1992. Even though the area was declared as sanctuary in 1974 the management was continued in Madikeri Forest Division till the separate Wildlife Division, at Hunsur was formed in 1992.

In the early years, the management practices were mainly for the regeneration of important timber species and of more conservation oriented. The practice was selection felling system and selection cum improvement felling system. Then the consumption of forest resources was almost negligible, accordingly the extraction made from the forest. During world wars lot of timber was extracted from this sanctuary area, especially from

Makutta Range. The first and second world war caused a major change in the forestry practices, large scale felling in concentrated area and removal of only certain preferred species for war purpose affected the silvicultural system then in practice. So the areas was heavily worked for timber. Now the sanctuary is managed by the wildlife Division, Hunsur, and, the conservation and developmental activities oriented towards the better management of wildlife and the whole landscape are planned and executed as per the established scientific practices.

3.3 NWFP COLLECTION

Illegal collection of bark of *Cinnamomum* and *Mechalus macharantha* (Gulumau) is noticed occasionally.

3.4 LEASES

The details of the only lease of land made for rubber plantation near Makutta range office by the Virajpet-Kannanur road side existing in the sanctuary are at annexure-x.

3.5 HABITAT DEVELOPMENTAL WORKS

The major activities taken up in the sanctuary area for improving the limiting factors of habitat is increased availability of water during pinch period in certain areas of the sanctuary and curtail the soil erosion since it is a high rainfall area. During last 5 years 1 water tanks at Mepalli in Srimangala range and 1 water tank at Kutiyala in Makutta range have been dug, and 5 check dams constructed apart from the stone gully plugs in the sanctuary area.

3.6 FOREST PROTECTION

3.6.1 LEGAL STATUS

Brahmagiri Wildlife Sanctuary, with a total extent of 44,630.06 Acres or 181.29 Sq.Km was notified vide Govt. No. AFD. 50 FWL. 74 Dated 05.06.1974. This sanctuary is under the control of wildlife division exclusively, from 1992 onwards. The sanctuary is formed of two reserve forests: Brahmagiri RF and Urti RF. Brahmagiri Ghat RF was

notified by Chief Commissioner of Coorg on 3rd May 1904 with effect from 30th June 1904 under section 19 of the Indian Forest Act (VII of 1878), and, Urti RF was notified by Chief Commissioner of Coorg on 24th June 1908 with effect from 5th August 1908 under section 19 of the Indian Forest Act (VII of 1878).

3.6.2 ILLEGAL ACTIVITIES (POACHING/ILLEGAL FELLING OF TREES/ ILLEGAL REMOVAL OF NWFP/ENCROACHMENT)

There are no human habitations inside the sanctuary. The enclosures, as mentioned in the RF notifications are also under possession of the Department.

The local people of this area are equipped with quite a good number of arms as their traditional custom but the attempt for poaching is not aggressive. The sanctuary is surrounded by the agricultural lands and coffee estates and there is seen tendency among coffee planters to encroach the forest area. Illegal ganja cultivation has been one of the important issues to deal with in the sanctuary in the past but in the recent years, improved patrolling, erection of watch towers at Roja betta and Pattimalai, and movement of trekkers and staff inside the forest on important routes, has helped control the situation. During the year 2010-11, there has been no case of illegal ganja cultivation reported from the sanctuary.

There are Ten Anti Poaching Camps (APCs) in operation in the sanctuary which have greatly helped in protection of the sanctuary and it is especially so as there are more than 50% vacancies among Foresters and Forest Guards. There are 5 APCs in operation in Makuta range (Kutiyala 2, Sollekolli, Pottachipare and Votekolli) and 5 APCs in operation in Srimangala range (Nathangala, Narimale, Abailu, Pookala and Kootiyala 1).

A respectful mention is made here of the supreme sacrifice made by Late Ponnappa, Forest Guard by laying down his life in the early morning hours (about 3:30 am) on 23-12-1997 in CPT 28, when not bothered about his own safety, in utmost

dedication to his duty, while attempting to arrest the timber smugglers from Kerala, received bullet injuries.

3.6.3 GRAZING

There is some grazing pressure in the sanctuary in Makutta range in Votekolly area especially in Compartment no. 27 (CPT 27).

3.6.4 CROP RAIDING

The animals like Elephant, Gaur and wild Boar are causing damage to the agricultural crops. Man-elephant conflict is a major issue and is on the rise. This is especially so in Kutta and Manchalli villages adjoining areas. Elephant after crop raiding take sanctuary in the PA.

3.6.5 FOREST FIRES

The grassy patches in the higher elevation in the sanctuary are most fire prone areas. These directly impact the spread of the sholas which are of huge ecological importance. The grass grows upto a height of 2 - 3 mtrs and dries up during the end of December or earlier. Control of fire in these areas is of critical importance. Reaching the higher elevation of the sanctuary is not easy due to difficult terrain and non availability of approach roads.

a. Srimangala Wildlife Range

Srimangala Wildlife Range has an area of 129.46 Sq.Kms with lot of grass lands. The terrain is undulated with hillocks and there is no motorable approach in the sanctuary to the grassy areas.

Reason for Fire:

1. The villagers from fringe areas purposely set fire to the forests for the losses they incur by wild animals especially elephant to their crops.
2. The culprits booked by the department for various offences make use of this season by setting fire to the forest as revenge.

b. Makutta Wildlife Range

Makutta Wildlife Range has an area of about 55.00 Sq. Kms and comprises of evergreen forests with grassy patches and hillocks at higher elevations. Most of area in the range is inaccessible for lack of motorable roads. The area is surrounded by villagers on both sides of the forest.

Reasons for Fire:

1. The offenders booked by the department for various offenses set fire to the forest for revenge.
2. The villagers set fire for the crop damages caused by elephant and cattle killed by carnivorous animals.

3.7 TOURISM

Brahmagiri Wildlife Sanctuary has ample scope for tourists, as well as for nature lovers. The Sanctuary has panoramic view, scenic spots with beautiful waterfalls, hillocks, grassy lands embedded with Shola Forest, Valleys, thick forest with variety of flora and fauna. It is a paradise of birds. It has ample scope for trekking and exploring the nature. The following facilities can be made available in the sanctuary.

1. Nature camp
2. Wildlife Viewing.
3. Treks and Trails
4. Rest Houses
5. Interpretation center
6. Watch Towers.
7. Waterholes and Saltlicks.

3.8 ADMINISTRATIVE SET UP

Brahmagiri Wildlife Sanctuary is headed by a Deputy Conservator of Forests, stationed at Madikeri and is assisted by Assistant Conservator of Forests also stationed at Madikeri. The sanctuary is managed by, two Range Forest Officers stationed at

Srimangala and Makutta. The existing staff pattern is not sufficient for protection of the sanctuary and also the basic facilities are in-adequate.

The presence of good vehicles is very essential, for the protection and also the wireless network needs to be improved by providing with static sets, mobile sets and walkie-talkies.

Considerable work has to be done, in watershed management, habitat improvement, maintenance of roads, fire line and protection from poaching. In addition to the existing roads two or three more roads to be formed in order to improve the tourism and to maintain the sanctuary effectively.

The budgetary provision made for the sanctuary is very meager and needs to be increased for the over all protection of the sanctuary and development of wildlife habitat.

Wildlife Working Circle

Introduction

Wildlife whether vertebrate or invertebrate fits into its respective ecological niche evolved over thousands of years. Kodagu forest, once popular for the densely populated wildlife species of different types, belong to tropical zone. If the essential characteristics of the environment is changed, by disturbances in the ecosystem, the survival of many of the species can-not be assured for long. With the population pressures, leading to habitat encroachment, this tract is becoming poorer, day by day, in the rich heritage of wildlife. Several decades of disturbances did much to disrupt the varied tropical habitats of Kodagu and the once plentifully wildlife that depended upon them. All forms of life either human, animal or plant are so closely interlinked that disturbance even in one aspect cause imbalance in the other. It is high time to check this, and prevent further deterioration, by intensifying the management approach. In the recent years there has been much pressure for the conservation of wildlife its

habitat. Wildlife conservation is a total concept involving animal, plants, micro-organisms, and soil, as also other physical elements of environment in which they live and on which they depend.

Management Design :

Wildlife management affects people, and hence needs precise planning, organized working, and positive objectives. The ecosystem has been neglected and deteriorated to a considerable extent and has created an atmosphere inhibitive to the survival of wildlife. Therefore, protection and preservation of whatever wilderness areas we are left with along with its wildlife content is the urgent need of the day. At present Kodagu has three wild life sanctuary, Brahmagiri Sanctuary, established in 1974 in a mountainous primeval forest area. It is rich in tropical species of plants and animals and is scenically majestic.

General Constitution:

This working circle is constituted in areas which are ideally suited for rain forest animals for their living and application. These areas are seen to have quite a few endangered species and since this is an exclusive working circle maximum protection to these animals and improvements to the habitat can be assured. The vegetation type and its stocking pattern along with the available facilities and the infrastructure required for the welfare of animals are also taken into account while constituting the working circle. Due care is taken to bring the considered areas within the complete administrative units having uniform ecological status.

Special Object of Management:

The rich heritage of wildlife had been grievously depleted, in the course of this century, due to rapid denudation of their habitats. It is observed that some rare species of birds and beasts are woefully threatening to vanish from our landscape, and hence it is absolutely essential to take immediate steps to prevent their extinction. Wildlife and its conservation is gaining much attention and a concentrated effort even though late is an urgent need. The main object of this working circle is conservation of wildlife and

improvement of their habitats. Preservation and propagation of biological diversities particularly of animals and plants unique to the area is at Intensive research works on animals and their habitats required for formulating management policies is also given top-priority. Unless public, especially those who live in the forest belt, involve totally and an awareness is created in their minds all efforts taken to develop wildlife may result in failure. Hence, it is found essential to educate people for exploring and appreciating nature and to meet this object needful prescriptions are given in this plan as explained in para 10.1.6. Tourism is not recommended in these during the plan period.

Sl No	Name	Compartment No.	Area in Hectares.	Total area in Hectares
1.	Brahmagiri Wildlife Sanctuary	8	1039.00	
	a.) Brahmagiri R.F			
		9	1246.00	
		10	1168.00	
		11	1168.00	
		12	1116.00	
		13	908.00	
		14	857.00	
		15	1605.99	
		16	857.00	
		17	907.00	
		18	1115.00	
		19	961.44	12948.43
	b.) Urty R.F	24	847.39	
		25	1091.00	
		26	1002.00	
		27	1250.00	
		28	1307.00	5517.39
			Total :	18,465.82

Areas outside the Circle:

The management of wildlife need not confine only to this working circle, since it requires the rehabilitation of available animals in other habitats, also falling outside the working circle. The sanctuaries included in this working, for the exclusive management occupy 38% of the total forest area. Development programmes for the benefit of wildlife in the adjacent lands also will have considerable influence on the wildlife seen within in the circle. All restrictions and regulations stipulated in the wildlife act should be strictly enforced in all the areas irrespective of the nature of the working circle.

Wildlife Management:

The habitat of the wildlife seen here are mostly evergreen forests and hence the management will be totally different from that practiced in sanctuaries of deciduous forests. For the sanctuaries in deciduous belt, the management pattern are standardized and the ways and means for improving the habitat and the animals are well documented. We do not have much details on the management of tropical rain forest animals, and in the absence of scientific details concentrating more on activities focused on animal welfare is not advisable, Hence the task prescribed in this plan is only protection and improvements of the habitats.

Present Management:

Presently improvements works undertaken for the benefit of wildlife in this belt is almost nil. Attention is diverted only to the protection of animals and that too only when necessity demands. There is no special staff posted to this area exclusively for wildlife care. The territorial staff, along with their routine works, attends to the animal's protection. Hence, quite often the priority on wildlife welfare works is found to be the least. Concentrated attempt even in game sanctuary areas for preventing danger and damage to wildlife is not done. The local staff invariably act only after the harm is done to the wildlife. The general ecosystem development works undertaken will help the improvement of the habitat also but it is not the extent required. The big animals like

elephant, Gaur, tiger, panther, sambar, spotted deer etc., are not abundant. The prevailing act prohibits hunting in these forests.

Proposed Management :

Main thrust is given to improvement of habitat and protection of wildlife from a host of biotic pressures. Basically protection work is to be intensified all over the area. The resource oriented exploitation works from these sensitive areas are to be controlled meticulously and can be permitted only in areas where the tree removals are absolutely essential for the improvement of the crop. Gaps seen in the forests have to be replenished artificially with local species preferably useful for the rain forests fauna. Further, the forestry works like tending, climber cutting, removal of M . F. P. etc., is to be minimised. The prevailing rights, concessions, and privileges which imposes terrific pressure on the ecosystem is to be extinguished through required legislation from the area considered in this working circle in the interest of conservation. Proposal is to be processed for the evacuation of inhabitants, living in enclosures, from the working circle area and to resettle them on the outer periphery of the reserved forests. The sanctuary areas will continue to be part of the existing ranges as they are strengthened by additional staff. The measures referred to will help in arresting the rate of depletion of many species of animals particularly in the areas covered under this working circle.

AREA OPERATED UNDER OTHER WORKING CIRCLES

Comp. No.	Wildlife w.c	Protection w.c	Selection w.c	Improve ment w.c	Reeds	Plantati on w.c	Research w.c	Regenerat ion w.c	Canes w.c
8		175.00	-	864.00	-	-	-	-	-
9	1246.00	325.00	-	921.00	-	-	-	-	-
10	1168.00	450.00	-	718.00	-	-	-	-	-
11	1168.00	-	428.50	731.15	-	8.35	-	-	-
12	1116.00	-	379.25	736.75	-	-	-	-	-
13	908.00	200.00	163.50	544.50	-	-	-	-	-
14	857.00	37.50	124.50	695.00	-	-	-	-	-
15	1605.99	-	10.75	1,547.34	-	19.15	-	28.75	-
16	857.00	-	337.00	358.50	-	-	-	161.50	-
17	907.00	-	272.25	598.00	-	-	-	36.75	-
18	1115.00	-	220.00	808.25	86.75	-	-	-	-
19	961.44	-	-	961.44	-	-	-	-	-
24	847.39	834.89	-	-	12.50	-	-	-	-
25	1091.00	976.75	-	-	114.25	-	-	-	-
26	1002.00	692.75	-	237.75	91.50	-	-	-	-
27	1250.00	490.42	-	677.00	68.75	13.83	-	-	-
28	1307.00	-	757.50	-	-	61.38	488.12	-	-

CHAPTER IV

THE PROTECTED AREA AND THE INTERFACE LANDUSE SITUATION

4.1 THE EXISTING SITUATION IN THE ZONE OF INFLUENCE

The Sanctuary is surrounded by the Reserve Forests in Karnataka and Kerala, coffee estates on the N.E boundary, the river Barapole S.E. boundary, and villages with coffee estates in the remaining area.

There are coffee estates on the periphery of the sanctuary with a substantial labour population. They are generally not dependant on the sanctuary for firewood etc as the coffee estates have sufficient shade trees which are lopped annually for regulating shade for coffee plants. The labour do occasionally move into the sanctuary for their requirements of fuel wood. There are stray cases of smuggling of timber. Of importance, is the movement of Wild animals into these estates where there are no barriers and chances of being shot. In addition, crop depredation by Wild animals also takes place.

4.1.1 The location, extent, boundaries and natural attributes of the Zone of Influence:

All villages, falling within a radius of 5 kms of the sanctuary, it is felt would effect the sanctuary and as such are treated as within the Zone of Influence. Coffee estates, villages fall within the Zone of Influence. The boundary of the sanctuary and coffee plantation were almost on hilly slope , and major valleys, down pour streams, swampy like places (Paddy fields) were existed in villages, so the boundary of the sanctuary always influences by wild animals.

4.1.2 Villages inside and outside the PA, Ethnic identities, traditions, customs, relationship between distinct groups of people, relationship with forest:

There are no human settlements within the sanctuary.

4.1.3 The state of peoples economy, vocations, land use, use of Forest and Non Forest based resources by people and seasonal patterns:

Peoples economy:

Other than the coffee estate owners, the people living in and around the sanctuary are agriculturists or labourers. Comparatively the coffee estates owners are more affluent and we have both large as well as small holdings among them. They are generally self sufficient.

Vocation:

The vocation of people living around the sanctuary is agriculture, plantation, animal husbandry and forest based cottage industry like basket making and carpentry. Jobs are very few except in large coffee estates, local banks, hospitals, schools etc. In the coffee estates in addition to permanent labour, a lot of floating labour is utilised during the coffee picking season in December-January.

Land use:

To the N.E. & eastern boundary of the sanctuary are coffee estates with paddy fields in the valleys. A large variety of forest species are grown in between coffee for shade purposes. In addition, a variety of fruit species are grown around habitation, for their personnel use, as well as the market.

4.1.4 Implications of the land use and resource dependence for the conservation of PA:

With the people living around the sanctuary having low subsistence level of economy, they illegally fell trees, remove fuel-wood, bamboo and small timber, graze cattle inside the sanctuary and attempt at encroachment within the sanctuary. This exerts tremendous pressure.

4.1.5 Forest/PA Management practices and their implications for people:

Stoppage of Timber operations, thinning, removal of dead and fallen timber, raising of plantations which generated a number of mandays, seriously affected the people living on the fringe of the sanctuary

4.2 THE DEVELOPMENT PROGRAMMES AND CONSERVATION ISSUES

Developmental programmes are taken up by the Forest Department as well as other Government Departments in the Zone of Influence and to a very small extent within the sanctuary. These developmental activities, are taken up taluk wise and under the direct control of the Taluk Executive Officer.

4.2.1 The interplay of market forces and their impact on the subsistence economy of the local people:

With publicity for luxury goods being made regularly through TV, Radio etc and with its wide spread distribution, markets for luxury goods have been created in these villages too. Forests being easy source of illicit money, market sources have thus increased pressure on thefts in forests. With Towns in the vicinity of the sanctuary there is a lucrative market for fuel-wood and small timber and many poor families thrive on this illicit trade.

Moreover with good bamboo available in the sanctuary and a high demand for bamboo products in and around the sanctuary and towns, illicit removal of bamboo to meet this demand does take place, degrading the forest. Likewise with good demand for amla fruits and honey, illegal collection does take place on the periphery of the sanctuary.

4.2.2 Summary of problems faced by people that affect the management of the PA and the Zone of Influence:

4.2.2.1 Problems faced by peripheral villagers:

- i) Man-animal conflict and delay in payment of compensation.

- ii) No grazing grounds.
- iii) Lack of forestry employment.
- iv) Restrictions on collecting fuelwood, timber, & NTFP.
- v) Firewood depots to be opened to meet the demands of the villagers.

CHAPTER V

PLAN OBJECTIVES AND PROBLEMS

Brahmagiri is a unique ecosystem with beautiful undulating landscape and abundantly rich flora and fauna life. In spite of significant biotic pressures on the sanctuary it has been possible to retain the glory of diverse vegetation. Therefore it is absolutely essential to ensure that the existing resources are not only effectively conserved but also necessary appropriate steps are initiated to further develop these resources. The sanctuary could be put to multiple uses namely education, recreation, scientific etc., to optimize the benefits.

The sanctuary, over the years, has been effectively protected. However most of it remains to be explored: it is felt that there are many species of fauna especially amphibian that remains to be discovered/recorded from this area. There is a high chance that even new species of micro fauna and amphibians may be discovered.

4.1 OBJECTIVES OF MANAGEMENT

This Plan is being developed for a period of five years (2011-12 to-2015-16); basically because this sanctuary remains to be explored and studied to document all its components which may include even discovery of several new species of lesser known fauna. During these five years the focus will be on protection and development of stake of local stakeholders in maintenance of the sanctuary. Research to further discover and inventories the sanctuary will get high priority. Species and associations based management to optimize their habitat needs may be strategies in the next Plan. The major objectives of this Plan are as under.

- a. To conserve and protect the bio-diversity through improved PA management.
- b. To arrest and eliminate the factors of degradation like forest fire and grazing to restore sanctuary to its pristine glory through habitat improvement.
- c. To associate local people in maintenance of the sanctuary in order to develop their stake in its maintenance and perpetual existence.

- d. To educate the children, by exposing them to the various features of the sanctuary by organizing group activities like nature camps.
- e. To develop opportunities for high-quality low-volume eco-tourism to enable the visitors to appreciate the values associated with the sanctuary ecosystem.
- f. To encourage scientific studies to explore and document the species endemism and their associations to highlight the uniqueness of the area.

4.2 PROBLEMS IN ACHIEVING OBJECTIVES

The relatively inaccessible location, linear shape and difficult terrain of the sanctuary makes it free of any significant biotic pressure that may cause concern and biotic pressure remains under tolerable limits. Biotic pressure can be addressed by adopting eco-development programmes in the surrounding villages. However, increasing man-elephant conflict that can potentially turn opposite the wave of conservation, and, forest fires in high altitude grass lands that have high impact on conservation of Shola forests are the major hurdles in achieving the decided objects of management.

CHAPTER VI THE STRATEGIES

6.1 BOUNDARY DELINEATION AND DEMARCATION

The boundary of the sanctuary is well defined in the sanctuary notification in linking with Brahmagiri Reserve Forest and Urty Reserve Forest. Though the boundary on ground is demarked well, in most of the part of boundary and maintained accordingly, but in some places where especially the agriculture land touches the boundary the demarcation is bit confuses, still staff are maintaining the old line of demarcation. This gives some clues of doubt.

The planters adjacent to the boundary line of sanctuary are always trying to encroach the land, which is very fertile and suitable for raising such cash crop plantations. So it is very much essential, to survey the entire boundary lines of the sanctuary and demarcated by fixing cement cairns at regular interval. If it is further supported with Elephant Proof Trench (E.P.T) then the boundary lines of the sanctuary will be retained and maintained very effectively. By this a barrier is also created to restrict the movement of the wild animals especially, the Elephants which frequently cross over to agricultural fields and damage crops. This can mitigate the main complaint of the villagers all along the boundary of the sanctuary. The detail activities are indicated in Annexure.

5.2 ZONATION

The area of the sanctuary is not favorable for zonation, since it is a linear one. The entire area has to be taken as core zone where some spots to be treated as tourism zone. However the periphery is considered as buffer zone. The hilly terrain of the sanctuary and absence of human habitations inside the sanctuary clubbed with low human and cattle population within close proximity of the sanctuary is to the conservation advantage of the sanctuary.

5.3 HABITAT DEVELOPMENT WORKS

The Brahmagiri Wildlife Sanctuary though it lies in Western Ghat, it is noticed that some of the areas suffer from scarcity of water. The water is an essential one for the wildlife not only for quenching the thirst but also for reducing the body temperature by lying in water. Among the two ranges of the sanctuary, the Srimangala Range is the higher suffered one, the water holes or water-retaining structures if created, will be helpful to wildlife in this belt of the Forestland. Similarly there are few grassland patches measuring from 1 Ha to 200 Ha areas where the water is a scarce commodity in summer should be supplemented by creating artificial water holes.

Finally to improve the fodder position some of the failed plantation areas can be planted with fruit plants, bamboos, reeds and grass so as to facilitate the improvement of fodder availability.

In the Brahmagiri hill ranges, there are Shola Forests, which provide shelter and fodder to animals, are to be protected from fire from surrounding grassy area. So it is proposed to have fire resistance live fence (i.e. Aghave, accasia species fencing etc.), around the Shola Forests.

In the flora of the sanctuary the Bamboo is an attractive one in view of wildlife and it is available in good density. In order to improve and enrich the growth of Bamboo culms the soil work can be carried out to improve the fodder position.

In order to achieve the good and effective management, the following works are proposed to be taken up.

1. Creating of water holes at necessary points.
2. Desilting and deepening of existing tanks.
3. Construction of Check Dam and gully checks.
4. Enrichment of degraded area by planting work.

5. Creation of fire resistance belt around the Shola Forests.
6. Enrichment of Bamboo clumps
7. Creation of a few artificial Saltlicks for viewing on Trek Routes..

6.4 PROTECTION FROM FIRE

Fire is a very important factor, and forest fires have a tremendous influence on the faunal and floral components of a habitat. One obvious fact is that fire destroys the organic matter, which contributes to the humus content of the substratum; this may cause deterioration of the soil and consequently, the value of the site may be lost. The organic compounds of fallen wood, dry leaves and the nitrogen present in the roots of plants are completely lost; however, potash and other minerals are available immediately after fire. Animals lose considerable cover and fodder after the outbreak of fire. The high temperature generated during the fire also destroys many micro-organisms which inhabit the soil, and thus stops their activities which are essential for the decomposition process. The eggs of birds and reptiles are destroyed by fire, and at times, animals themselves succumb to fire injuries. Fire also causes the animal population to abandon a habitat and to proceed randomly in various directions, which may disturb the spatio-temporal utilization of a habitat by animal species. However, despite all these effects, one must not forget the fact that in a controlled way, fire is used for managerial purpose. It is one of the earliest tools which man has used to alter the environment. Fires favour grasslands and encourage shrubs and herbs in place of trees. This has a direct affect on wildlife species since it increases the relative abundance of those animals, which are adapted to grazing and browsing in a more open terrain. The size of a burn, its edge and interspersion with other cover types beyond the burn are structural features, which may bring important responses in birds and mammals. A *number of small fires* in an area will create more edge and interspersion than a single large fire, because, as the burns become larger in size, the amount of edge and interspersion becomes less. A very small burn, however, might not provide enough change to make any significant impact on wildlife. Large burns, sometimes, may not be occupied for lack of cover. *Small burns and edges may be used more*, because animals can readily retreat to nearby unburnt forest.

Though large scale forest fires are not desirable but occasional or limited forest fires do not cause an utterly negative response. Further since incidence of fires have both creative and destructive aspects, conventionally incidence of fire in forest areas is recorded in terms of the area affected by the fire and not as loss or benefit in monetary terms.

All fires in the Sanctuary are man made. The major reasons identified are as under;

1. Fires put with the intention of initiating or extending encroachment.
2. Burning the forest by those having grudge against the department
3. Fire put by poachers or smugglers to divert attention of the staff.
4. Fire resulting due to negligent behavior of tourists, pilgrims, etc.

The strategy to deal with the forest fire essentially consists of three distinct measures, namely;

1. Fire prevention measures
2. Fire detection measures
3. Fire fighting measures

6.4.1 FIRE PREVENTION MEASURES

The success of strategy to prevent forest fires lies in pre-empting the reasons those are responsible for it. All forest fires in the sanctuary being man made fires it becomes necessary for the management to take the people identified causing the fire along. The action points towards prevention measures thus are;

1. Employing the fire watchers.
2. Reclearing of fire lines in the high fire recurrence areas, on priority, prior to onset of fire season.
3. Seeking assistance of the EDCs in convincing the villagers for refraining from putting fire to the forests.
4. Having incentive scheme for the EDC villages for non occurrence of fire in their neighboring forest area.
5. Putting up sign boards for awareness creation and warning all the people who enter the sanctuary regarding fire.

6.4.2 FIRE DETECTION MEASURES

Earliest detection of fire decides if the fire so detected could be controlled and put off before it affects a large area. The efficiency of fire detection depends upon the vigil maintained by an experienced staff who has the thorough knowledge of the area-in-view from the fire watch tower. Detection of fire is complete only after it is communicated to the fire fighting squads stationed at appropriate locations. Therefore the men and material required to achieve successful detection of fire are;

- Experienced staff with through knowledge of the area to be able to locate the place of fire and his ability to communicate the same to the fire fighting squad.
- Identification of 2-3 such experienced staff who could be deputed on the fire watch towers in case of non availability of any of them for any reason.
- Identification of watch towers for complete coverage of the range/landscape.
- Availability of communication equipment (wireless network) with the staff on the fire watch tower and the fire fighting squads.

6.4.3 FIRE FIGHTING MEASURES

Having received the message regarding detection of fire, the leader of the fire fighting squad should immediately refer to the map in the topo-sheet identify the location of fire on the map and decide on the route to be taken to reach the spot. The time-distance (the time required to reach the fire spot rather than the distance in absolute terms is of importance when it comes to fire fighting) at which the fire fighting squad is from the spot of the fire is of crucial importance. Therefore ideally, while planning the location for stationing the fire fighting squads it is desirable that there is no area of the range that is at a time-distance of more than 15 minutes. The tools to fight the fire, like green leafed branches, katti, Spade, Baskets (For collecting soil and spread on fire) Walky-talky, water cane (Collecting water near by streams), Torches, glucose, packed food, etc should be reported as checked-up by the staff responsible for the same, with the staff proceeding to the spot/in the vehicle being dispatched to the spot. It is essential that a fire fighting squad should be lead by a staff specifically designated for this purpose. A leader is not only necessary to maintain the fire fighting squad in readiness but also to command and coordinate the staff during the actual act of fighting

fire. The leader should normally not beat the fire himself but should maintain vigil on the staff fighting fire for any accidents. One important task he has to perform is to identify the trees/bushes, in close proximity to the fire, branches of which could be used for beating the fire. The driver of the vehicle should carry water cane from the spot where the vehicle is left to the spot of fire. The men and material resource required for fire fighting are;

- A fire fighting squad consisting of 8-10 members and a designated squad leader.
- A vehicle. Driver of the vehicle should be aware of the area he has to operate in and would be responsible for maintenance of all the material like green leafed branches, katti, Walky-talky, water cane, glucose, packed food, etc at any time during his duty hours.

6.4.4 STRATEGY TO PREVENT, DETECT AND FIGHT FIRE.

The strategy developed herein to seek involvement of the local people associated with incidence of fire in the area as a preventive measure, to detect fire early and to reach the fire location in minimum possible time (strike time 15 minutes) to limit the area affected by fire to the minimum; is based on the past information regarding the incidence and causes for fire and factual information now available regarding the biotic influences in the area.

The considerations that are basis to fire control plan are;

1. From the **fire recurrence map, susceptibility of different areas to fire** has been identified and the ranges classified as highly prone or moderately prone to incidence of fire.
2. The watch towers have been identified based on the **coverage-area concept** so that all the fire prone areas are within view for immediate detection of fire.
3. **Experienced staffs**, minimum of 2 for each watch tower, have to be identified to man the identified watch towers.
4. A walky-talky is to be provided to each watch tower for **immediate communication regarding the fire detected**.
5. **Locations of the Fire Fighting Squads** have to be decided such that no fire prone area is beyond a distance of **strike time of 15 minutes**.

6. Desirably vehicle should be available at nearest road head to each fire fighting squad location.
7. **Green branches will be used to beat the fire.**
8. burnt, on priority, at the onset of the fire season in the fire prone areas.

Trans-boundary problem:

With a common boundary with Kerala on the South and S.W of the Park and with a river in between, there have been many instance of poachers and smugglers operating with impunity. **As such, frequent meeting with officers of both the sides are necessary to exchange intelligence and control any attempt at poaching or smuggling.**

CHAPTER VII

TOURISM, INTERPRETATION AND CONSERVATION EDUCATION

7.1 OBJECTIVES

1. To spread the awareness regarding the need to preserve all forms of flora and fauna by providing an opportunity to the public to see and appreciate the rich resource/heritage of our country.
2. To educate the people especially those living near by the sanctuary regarding the ecological and economic values associated with the sanctuary and thereby enlisting their co-operation in its maintenance.
3. To imbibe among children love for all forms of life and need for conservation of natural resources by conducting nature camps and other group activities.
4. To provide for trekking, creative and adventure sports opportunities in the designated zone of the sanctuary.

7.2 NATURE EDUCATION CAMPS

Nature education camps play a very important role in inculcation of awareness among the young mind. The sanctuary is conducting such camps for school children in and around the sanctuary area. They will be taken to the Narimalai and Abailu comp site at of the hillocks. This trip is of both trekking and educative. They will be in the camp for two days. Even trekking the Brahmagiri is also a part of it and also visit to the famous Munikal caves. They will be taught about bird watching and importance of forests etc.

7.3 WILDLIFE VIEWING

As such there is no organized way of taking tourists into the sanctuary for wildlife viewing. The spots having high demonstration value for education/recreation of tourist and nature lovers need to be identified and improved. Facilities

like watchtowers and saltlicks need to be created for better sighting of animal and appreciation of the values associated with the sanctuary.

7.4 TREKS AND TRAILS FOR ADVENTURE TOURISM

There are five regular trekking paths in Srimangala Wildlife Range and three in Makuta range. Further the regular trek path can be done upto the Brahmagiri peak and Munikal. This sanctuary has several peaks for trekking.

7.5 PUBLICITY

Publicity is a powerful weapon not only to popularize tourism but also create awareness. Publicity and propaganda should be carried out in a systematic and well planned manner. Production of video films with the past history is development, present stage, diversity in flora and fauna, the threatened species, inhabiting the area may be made available to education institution tourism departments, Doordarshan and other mass media. Publicity materials like posters, brochures, stickers and such other may be brought out and distributed.

7.6. *Corridors and Linkages:*

A corridor, tenuous as it is, is vital in ensuring gene flow. It needs to be maintained, to avert threats to population viability. It is also necessary for free movement of Wild animals lest they get fragmented.

The corridor is the one linking Nagarahole, Wynad and Alarum Wildlife Sanctuary, with the Brahmagiri Wildlife Sanctuary. The Southern end of Nalkeri R.F forms a corridor with the Brahmagiri R.F via a series of coffee estates. As there was heavy damage to the coffee plantations, these have now been solar fenced and elephant proof trenches dug, obstructing the free movement of animals.

The Indian Institute of Science, Bangalore, has identified the Brahmagiri Tirunelli corridor, on the Karnataka Kerala border. The Elephant populations in the Western Ghats along the Brahmagiri are connected to those in the Kodagu plateau only through the northern Wynad region of Kerala. The southern tip of the Brahmagiris extends into

Kerala's Wynad North Division, where the Tirunelli Reserve Forest and Kudrakote Reserve Forest provide a narrow connection eastward to the Tholpatty and Kudrokote Wildlife Sanctuary. This is an extremely important corridor to maintain habitat contiguity for elephant populations in the Western Ghats, and is accorded very high priority.

At present, the passage is around 6 km long and between 0.5 to 2 km wide along its length. There is a great need to protect this crucial corridor from excessive human usage, degradation and fragmentation. Human pressures in and usage of the area pose a threat to elephant movement due to the numerous forest roads that facilitate cattle and human movement across the entire corridor area. It is proposed that resettlement of villages is carried out and strict protection against habitat degradation ensured to protect this area for future elephant movement.

CHAPTER VIII ECODEVELOPMENT

To gain the confidence and support of the local people and to reduce the pressure on the forests it is necessary to educate them. Beside some programmes aiming towards the improvement of their economic condition are necessary to secure their active involvement in protection of wildlife. As most of the people living around the sanctuaries are coffee estate owners the demand for small timber, fuel wood and grazing is not much.

Involvement of the locals in development and maintenance of the sanctuary is of deciding importance. They therefore need to be organized into Eco Development Committees. Eco Development programs need to be taken up in the fringe villages after preparing integrated microplans and EDCs should be encouraged and assisted to take up erection and maintenance of solar fencing so as to be able to deal with the increasing elephant crop raiding incidences. Eco Development Committees could also be encouraged to involve themselves in development of ecotourism inside the sanctuary and promotion of local handicraft for their better sustenance.

LIST OF VILLAGES WHICH COMES WITHIN 10 KMS FROM THE BOUNDARY OF BRAHMAGIRI WILDLIFE SANCTUARY

NAME OF THE RANGE	DISTRICT	TALUK	VILLAGES	
1	2	3	4	
Srimangala	Kodagu	Virajpet	1.	Konageri
			2.	Hysodlur
			3.	Badagarakeri
			4.	Parakatageri

			5.	Birunani
			6.	Teralu
			7.	Poradu
			8.	Tavalageri
			9.	Nemmale
			10.	Biruga
			11.	Kurchi
			12.	Ajjamada
			13.	Manchalli
			14.	Doddamanchalli
			15.	kakkur
			16.	Kumtur
			17.	Badaga
			18.	Kutta
			19.	Pujekallu
			20.	Nellur
Makutta	Kodagu	Virajpet	1.	Heggala
			2.	Bettoli
			3.	kottoli
			4.	Baikeri
			5.	Virajendrapet
			6.	Chikpet
			7.	Kuklur
			8.	Aymangala

			9.	Maggula
			10.	Ambatti
			11.	Balugodu
			12.	Bittangala
			13.	Naluvattokalu
			14.	Bilugunda
			15.	Rudrguppe - 1
			16.	Kolatidabigodu
			17.	Hatur
			18.	Kunda
			19.	Kandangala
			20.	Rudraguppe - 2
			21.	Halligattu
			22.	Hoddur
			23.	B - Shettigeri
			24.	Kuttandi
			25.	Hudikeri
			26.	Chenivada
			27.	Begur
			28.	Nadikari
			29.	Kongana

CHAPTER IX
PEOPLES PLAN & TRIBAL REHABILITATION

There is no human settlements within the sanctuary.

CHAPTER x

RESEARCH, MONITORING AND TRAINING

This sanctuary remains largely unexplored from the point of view of lower fauna and flora. It is likely that any inventorisation studies in the sanctuary might lead to discovery of hitherto unreported species or all together a new species. The ecology and the dynamics of components of ecosystem in the sanctuary need to be observed and documented. Various aspects of ecology like change in size and species composition of Sholas need to be monitored on continuous basis. The latest census and monitoring protocol developed by the Government of India primarily for Project Tiger area could be adopted for the sanctuary for periodic documentation of change in vegetation and animal density and distribution. Research and monitoring could focus on the following aspects during this Plan period;

1. Distribution of animals, their seasonal migration and habitat usage.
2. Habitat monitoring studies.
3. Documenting shoals and monitoring them.
4. Develop monitorable indicators to detect changes in ecology of the sanctuary.
5. Inventorising food plants.
6. Quality and quantity of discharge in streams and rivulets.
7. Sociological research on resource dependency of the local people and the interface between the vegetation, animal and the people.

TRAINING

There is a strong need felt to provide the staff with basic training in identification of flora, animals and birds of the sanctuary in order that they become conscious of their presence/absence in different parts of the sanctuary.

CHAPTER XI
ORGANISATION AND ADMINISTRATION

The management and administration of this sanctuary comes under the Hunsur Wildlife Division, whose head quarters is at Hunsur, headed by a Deputy Conservator of Forests, who is assisted by Assistant Conservator of Forests in Nagarahole. Two Range Forest Officers based at Srimangala and Makutta manage the sanctuary. The existing staff pattern is as follows.

9.1 STAFF PATTERN OF BRAHMAGIRI WILDLIFE SANCTUARY

Sl. No.	Designation	Sanctioned Post	Filled	Vacant	Additional Requirement
1.	Range Forest Officer	2	2	--	--
2.	Forester	5	4	6	2 (For APC's of 2 Ranges)
3.	Forest Guard	13	4+4	12	11 (3 for remaining compartments / Beats, 8 for APC's)
4.	Forest Watcher	8	8	0	19 (One for each Beat, One for each APC Forester, One for each APC)
5.	S.D.A	1	--	1	1 For Makuuta
6.	M.R. Basis Watchers	12	12	--	--

9.2 DETAILS OF BEATS AND SECTIONS, RANGE WISE OF BRAHMAGIRI WILDLIFE SANCTUARY

Range	Section	Beat
Srimangala Range	1. Irpu	1. Irpu, C.P.T - 9
		2. Bettathadi, C.P.T - 8
		3. Biruga - 1, C.P.T - 10
		4. Biruga - 2, C.P.T - 12
	2. Palemane	1. Kakkata River -2, C.P.T - 11
		2. Kakkata River - 1, C.P.T - 13
		3. Theralu, C.P.T - 14
		4. Palemane, C.P.T -15
	3. Pookala	1. Birunani, C.P.T - 16
		2. Pookala - 1, C.P.T - 17
		3. Pookala - 2, C.P.T - 19
		4. ** Pottachipare, C.P.T - 18
Makutta Range	1. Makutta	1. Makutta, C.P.T - 28
	1. Sollekolly	1. Sollekolly - 1, C.P.T - 26
		2. Sollekolly - 2, C.P.T - 25
	2. Votekolly	1. Votekolly, C.P.T - 27
		2. V.Badaga, C.P.T - 24

9.3 PROPOSED BEATS AND SECTIONS, RANGE WISE DETAILS OF BRAHMAGIRI WILDLIFE SANCTUARY

Range	Section	Beat
Srimangala Range	1. Irpu	1. Irpu, C.P.T - 9
		2. Bettathadi, C.P.T - 8
		3. Biruga - 1, C.P.T - 10
		4. Biruga - 2, C.P.T - 12

	2. Palemane	1. Kakkata River- 2, C.P.T - 11
		2. Kakkata River- 1, C.P.T -13
		3. Theralu, C.P.T - 14
		4. Palemane, C.P.T -15
	3. Pookala	1. Birunani, C.P.T - 16
		2. Pookala - 1, C.P.T - 17
		3. Pookala -2, C.P.T - 19
Makutta Range	3. Makutta	1. Makutta, C.P.T - 28
	4. Sollekolly	1. ** Pottachipare, C.P.T - 18
		2. Sollekolly - 1, C.P.T - 25
		3. Sollekolly - 2, C.P.T - 26
	5. Votekolly	1. V.Badaga, C.P.T - 24
		2. Votekolly, C.P.T - 27

** . Remoteness to Srimangala HQ's, better access & approach from Makutta.

9.4 BUILDINGS

There are only a few buildings in the sanctuary both for official and residential purpose. The existing buildings are not sufficient in number and these need to be repaired and maintained. The requirement of buildings is as follows.

Sl. No	Name of the Building	Total Requirement	Buildings Existing and Location.	Buildings Proposed and Location.
1.	R.F.O Quarters	2	2	--
2.	Foresters Quarters	8	2 (Birunani, Sollekolly)	6 (2 in Irpu, and 1 each in Pookala, Votekolly, Sollekolly Makutta)
3.	S.D.A Quarters	1	--	1 in (Srimangala)
4.	Forest Guard Quarters	14	2 (Irpu)	12 (Nathangala,

				Birunani, 2 Nos.at Pookala, Kutiyala - Badagaraker, Pottachipare, Ther alu, Irpu.Kokka- V,Badaga, Votekolli, Makutta, Sollekolly.)
5.	Drivers Quarters	2	-	2 (Makutta, Srimangala)
6.	Antipoaching Camps	8	5 (Nathangala, Kutiyala, Votekolly, Sollekolly, Pottachipare	3 (kutiyala, Abylu, Narimale)
7.	Rest House	1	1	0

SRIMANGALA WILDLIFE RANGE	
HEAD QUARTERS	
SRIMANGALA RFO OFF & QTR	N12 00.977 E75 59.389
S.MANGALA SECN HQ 8,9,10,11,	
PALEMANE SECN. HQ 12,13,14,15	
POOKALA SECN. HQ 16,17,18,19	N12 00.861 E75 52.611
In BIRUNANI	
IRPU SECTION HQ	N11 58.449 E75 59.048
NATHANGALA HQ	N12 00.396 E75 59.610

POOKALA CPT 18	N12 03.655 E75 49.309
REST HOUSES W .TOWERS	
SRIMANGALA IB	N12 00.977 E75 59.389
NMALE IB & CAMP	N11 57.319 E75 58.055
NMALE FTR	N11 57.386 E75 58.049
NMALE FWTR	N11 57.380 E75 58.053
WATER HOLES	
IRPU FALLS	N11 57.925 E75 59.093
MEPALLI TANK	N11 59.857 E75 50.443
MEPALLI CDAM CPT15	N12 00.246 E75 50.664
IRPU ORIGIN 3km from NMALE TP	N11 57.750 E75 58.213
ANTIPOACHING CAMPS	
NATHANGALA APC & HQ	N12 00.396 E75 59.610
NMALE IB & CAMP	N11 57.319 E75 58.055
PATTACHIPARE APC CPT-18	N12 04.514 E75 48.286
OTHER IMP. PLACES	
IRPU TEMPLE	N11 58.252 E75 59.308
IRPU BRIDGE	N11 58.089 E75 59.154
MEPALLI GATE CPT 15	N12 00.361 E75 51.121
TREKKING PATHS	
1) NARIMALE TP	
NMALE TP	N11 57.999 E75 59.103
IRPU ORIGIN 3km from NMALE TP	N11 57.750 E75 58.213
NMALE FWTR	N11 57.380 E75 58.053
NMALE IB & CAMP	N11 57.319 E75 58.055

NMALE PEAK	N11 57.623 E75 57.701
2) ABYLU TP	
ABYLU SP CPT 15	N11 59.320 E75 52.987
ABYLU CWAY1 CPT 15	N11 58.899 E75 52.374
ABYLU CWAY 2 CPT 15	N11 58.508 E75 52.124
BOUNDARY POINTS near IRPU	
IRPU E PT	N11 58.474 E75 59.088
IRPU E PT	N11 58.492 E75 59.101
IRPU E PT	N11 58.491 E75 59.106
IRPU E PT Near Irpu Temple	N11 58.200 E75 59.210
IRPU E PT	N11 58.402 E75 59.004
IRPU E PT	N11 58.434 E75 59.041
MAKUTTA WILDLIFE RANGE	
HEAD QUARTERS	
MAKUTTA RFO OFF & QTR	N12 05.235 E75 45.125
W.TOWERS & W.HOLES	
FWTR MAKUTTA CPT 25 proposed	N12 05.181 E75 49.292
KUTIYAL KERE C-24 Transect Line	N12 04.350 E75 53.204
BARPOLE HNG BRIDGE	N12 04.614 E75 48.335
TR-28 MKTA Transect Line	N12 06.124 E75 46.740
ANTIPOACHING CAMPS	
KUTIYAL APC CPT-24	N12 05.017 E75 53.160
SOLLEKOLLI APC- 27	N12 04.986 E75 45.256
VOTEKOLLI APC	N12 07.490 E75 47.267

TREKKING PATH	
KOKKE T.KPATH SP	N12 05.290 E75 50.491
KAKKE T.PATH 2KM	N12 04.872 E75 50.501
KAKKE T.PATH 3KM	N12 04.659 E75 50.390
KAKKE T.PATH 6KM	N12 04.212 E75 50.445
CAUSEWAY	N12 05.140 E75 45.355
OTHER IMP. PLACES	
PERAMBADI	N12 08.588 E75 47.808

9.5 VEHICLES

The sanctuary has large area in a narrow strip and needs to be protected from poaching and smuggling. The vehicles are very much essential for protection works to the staff. At present on Jeep and one Gypsy are existing. These vehicles needs to be replaced since they are old one.

Sl. No	Type of Vehicle	Total Requirement	Existing	Newly Required.
1.	Jeep to R.F.O's	2	2	2
2.	Mini Lorry for Patrolling	2	--	2

(Remarks : The newly required vehicle is for replacing the existing the old vehicles)

9.6 ARMS AND AMMUNITIONS

For effective prevention of smuggling and poaching in the sanctuary providing arms to the Foresters and Forest Guards is essential. It is proposed to have D.B.B.L Guns to all Foresters and Forest Guards and Revolvers to RFO's. Hence it is proposed to have the following arms.

Sl. No	Particulars	Total Requirement	Existing	Newly Required.
1.	Revolvers	2	--	2
2.	D.B.B.L Guns	33	15	18

3.	Rifles 0.315	0	4	--
4.	Wireless Set Static	2	2	--
5.	Mobile Sets	2	2	--
6.	Walkie-talkies	27 (8 for APC's, 17 for Beat Guards, 2 for RFO's)	3	24
7.	Telephones	2	1	1 (Makutta)
8.	Solar Charging Units	10	5	5

9.7 ROADS

The sanctuary is situated in unique configuration. It is narrow and very undulating with lot of streams and Nallas. Most of the streams and Nallas are seasonal and few are perennial in nature. Since this area receives a good rainfall in the rainy season, negotiation of the Streams and Nallas is also not possible in most of times. To manage the sanctuary in a scientific and effective way approaching the spot in time is the basic and essential one.

The existing roads should be maintained and wherever it is essential culverts and causeways should be built. Road surface and drains need to be maintained annually. Secondly few more new roads should be formed to traverse within the sanctuary. Details of existing and proposed roads are as under.

Sl.No.	Road	Details
1.	Makutta to Badaga	20 kms (First 12 kms from Makutta to Neelampole, has one causeway, needs 5 pipe-culverts ; rest 8 kms from Neelampole to Badaga exists as trek - path that helps to reach Compartments 24, 25 & Kutiyala APC,which needs one pipe - culvert & one causeway).

2.	Pattimale to Badaga	2.5 kms trek - path, jeepable in fair weather, needs 3 pipe-culverts.
3.	Sollekolly to Votekolly (Narayana path)	7.5 kms, along right bank of karia hole traverses Compartment 26, 27, & 28, 3 kms of this stretch is presently jeepable. Rest 4.5 kms needs widening and 2 cause ways.
4.	Pottachipare to Pookala	Entire 5 kms of new road to be formed. Covers Compartment 17, 18, & Pookala APC. This would connect existing Pookala - Pathipare road & thus help in accessing the interstate border at Pathipare. Needs 3 to 5 culverts.
5.	Nathangala to Brahmagiri	Existing 12 kms bridle - path could be upgraded. Would also serve as trek route covering Nathangala-Brahmagiri-Narimale. Needs 3 causeways.
6.	Birunani to Kerala border via Bottoli.	6 kms , proposed, needs 2 cause ways & 2 culverts.

N.b. All above roads require annual (surface and drain) maintenance.



