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Vanishing bamboo stocks

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THE giant grasses that we call bamboos reach their finest development in the monsoon forests of Asia. The Western Ghats of Karnataka share in this wealth, and bear rich stocks of bamboos, particularly of two species, *Bambusa arundinacea* and *Dendrocalamus strictus*. The former is best adapted to the moist deciduous forests, and for growth along water courses and the latter to dry deciduous forests. Bamboos are light demanders and grow profusely especially when the canopy is opened up. There was once a very rich crop of bamboos, particularly near human settlements, throughout the forested tracts of Karnataka till a few decades ago.

Bamboos are amongst the most versatile of plant materials, and have been put to a variety of uses since the beginning of human civilisation. It has been estimated that bamboo is the single most commonly used material for construction of human dwellings throughout the world, and Karnataka's rural population relies heavily on bamboo for house construction. It is also used for the manufacture of baskets and a variety of other appliances in the rural areas. In the olden days the natural crop of bamboos was abundant enough to meet these requirements, and foresters did not consider bamboos a resource, but rather a weed. The 40-year old working plans of the then Mysore State prescribe eradication of bamboo as a weed of teak plantations.

Bamboo began to be considered a resource of value only with the establishment of paper mills using bamboo as a raw material. One of the earliest of these was established at Bhadravati in Karnataka in 1937. At that time the iron and steel works at Bhadravati used to burn bamboo as a fuel. Soon, however, they stopped this practice as the value of bamboo was becoming established. Bamboo pulp can also serve as a raw material for the polyfibre industry, and was used for this purpose as well in Karnataka for some time.

These industrial uses suddenly enhanced the demand for bamboo by an order of magnitude over the traditional uses. With these uses coming in vogue, bamboo no longer remained a weed for

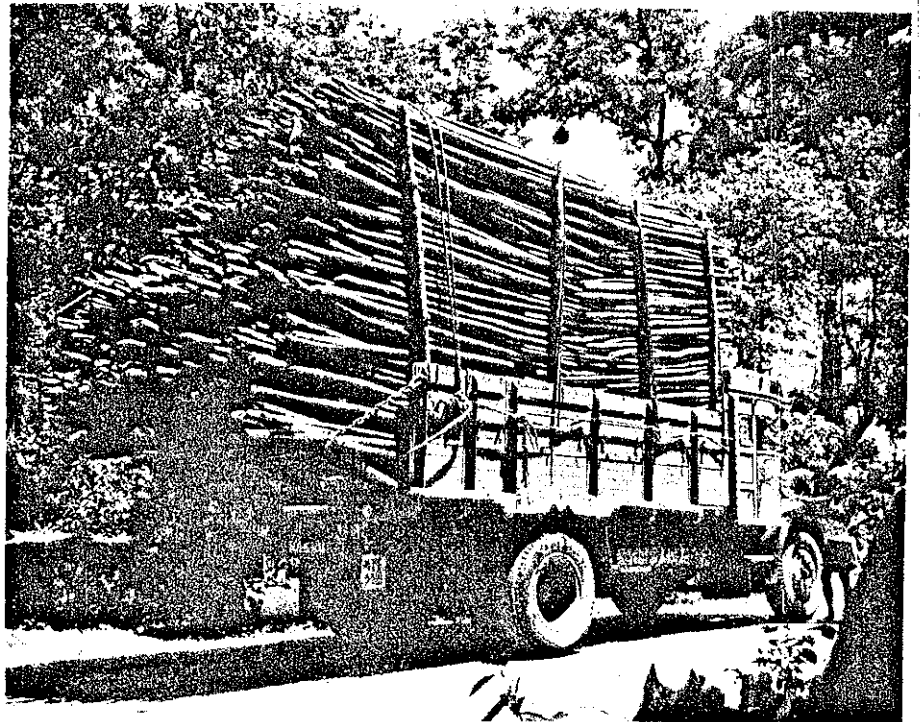
the forester, but became a resource. Nevertheless, it remained a very much less valuable resource than important timber species like teak, and even today continues to be supplied at throw-away prices. In some cases the prices used to be as low as one rupee a tonne.

History of management

The need for rational management of bamboo resources arose with its use as an industrial raw material. In accordance with the prevalent tenets of conservation forestry, bamboo stocks were proposed to be managed on a sustained yield basis. When the Mysore Paper Mill (MPM) was established at Bhadravati in 1937, a survey of the bamboo resources of the division was carried out, and the yield annually obtainable on a sustained basis was estimated at over 100,000 tonnes. At that time, the capacity of the factory was low, and only a fraction of this yield was expected to be utilised. Initially MPM did not face any resource shortage. The yield estimates, however, did not take account of the periodic gregarious flowering of bamboos. Much of the bamboo stock of Bhadravati division

flowered and died in 1954-55, a time which coincided with an increase in the capacity of the mill to higher bamboo requirements of around 55,000 tonnes a year. Following the flowering in 1954-55, MPM started exploiting bamboo resources of other divisions rich in bamboo, namely Karwar, Mercara, Mysore, Chamarajnar and Kollegal. Bamboo regeneration is expected to take 10-15 years to establish itself, and MPM should have been in a position to switch back to Bhadravati division by 1965-70. The regeneration has, however, failed almost totally, and MPM continues to exploit bamboo from all these other areas and also in new areas like Mangalore and Coondapur divisions. The sustained yield calculations have obviously gone wrong at least for this mill.

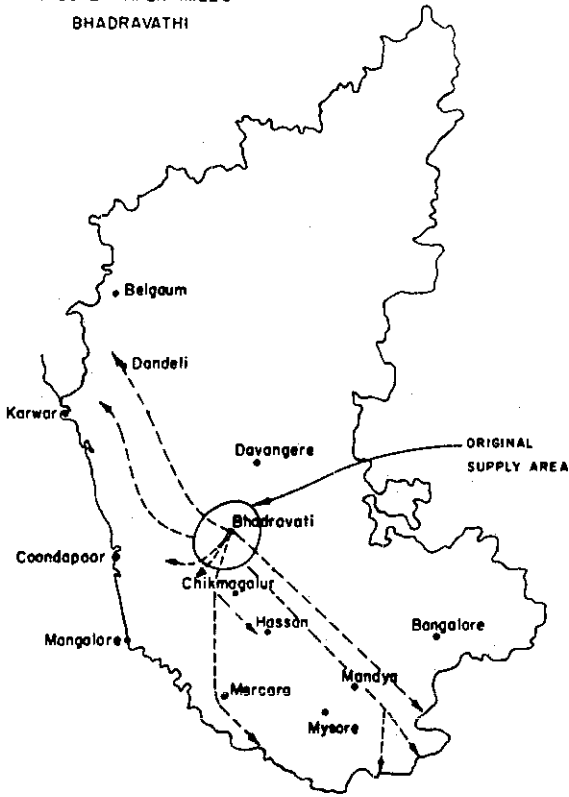
West Coast Paper Mills (WCPM) at Dandeli in North Kanara was the second paper mill to be established in Karnataka, more than 20 years later, in 1958. The mill was accorded a certain concessional area in the North Kanara and adjacent regions. The sustained yield for this concessional area was estimated at 1,50,000 tonnes a year, and the mill was started



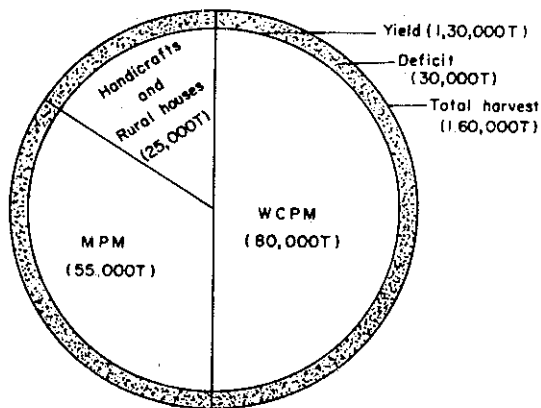
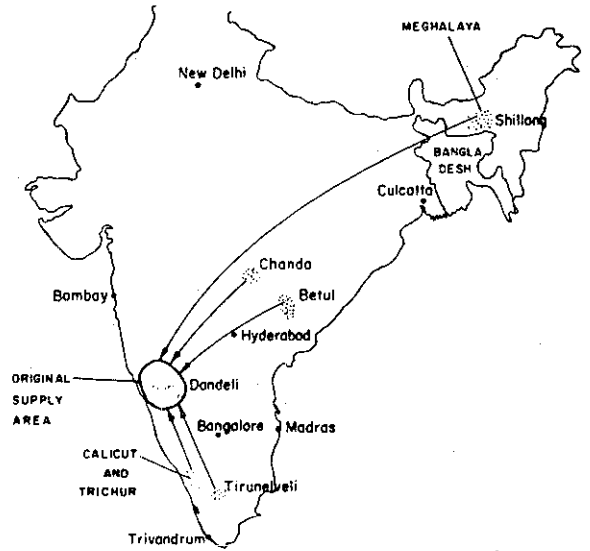
Bamboo being transported from Chickmagalur forest division to the paper mills at Bhadravati.

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**BAMBOO EXPLOITATION BY
MYSORE PAPER MILLS
BHADRAVATHI**

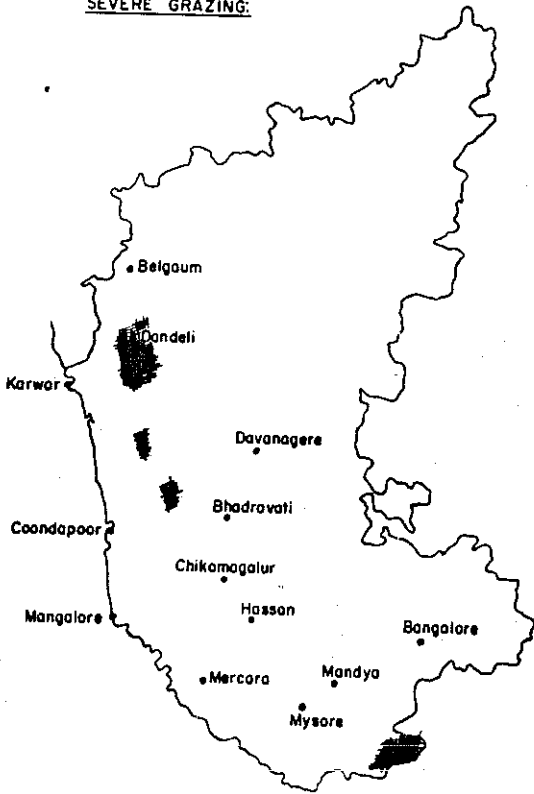


**BAMBOO EXPLOITATION BY
WEST COAST PAPER MILLS, DANDELI**

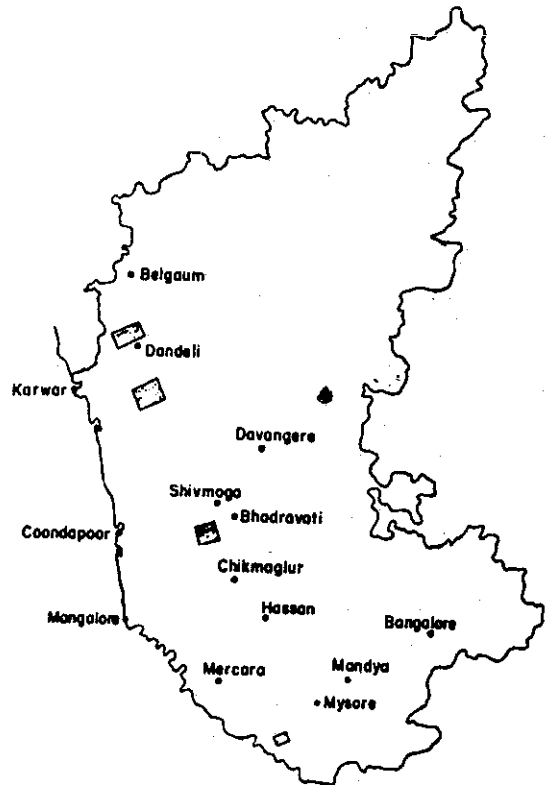


**ANNUAL YIELD AND ACTUAL HARVEST IN TONNES FOR
BAMBOOS OF KARNATAKA AND THE DIVISION OF HARVEST
AMONGST VARIOUS USERS.**

BAMBOO AREAS AFFECTED BY SEVERE GRAZING:



MAJOR SUBMERSIONS OF GOOD BAMBOO BEARING LOCALITIES



with a requirement of about one-half the expected yield. Again, no account had been taken of the possibility of gregarious flowering which began in 1959 just as the mill swung into production. WCPM, however, did make serious efforts to ensure regeneration, and regeneration in its concessional areas has been much more successful than in Bhadravati division. The annual yield, however, still averaged only about 40,000 tonnes in contrast with the expectation of 1,50,000 tonnes. WCPM is, therefore, forced to bring in bamboo not only from the neighbouring states of Kerala, Tamil Nadu, Maharashtra and Andhra Pradesh, but from as far away as Meghalaya. Again, the sustained yield calculations have obviously gone awry.

The third major paper mill in the State, Mandya National Paper Mill (MNPM) uses bagasse and not bamboo as the major raw material. The mill was nationalised in 1965. At that time it was promised an annual supply of 1,40,000 tonnes of bamboo. This raw material was expected to be extracted from Kollegal, Chamarajanagar and Mysore divisions. Now all these three divisions were already being exploited by MPM since 1954-55, which was struggling to meet its annual requirements of 55,000 tonnes. The promise of 1,40,000 tonnes a year was obviously based on wrong information and in fact MNPM has not been able to receive even 25,000 tonnes of bamboo per year.

Decline in stocks

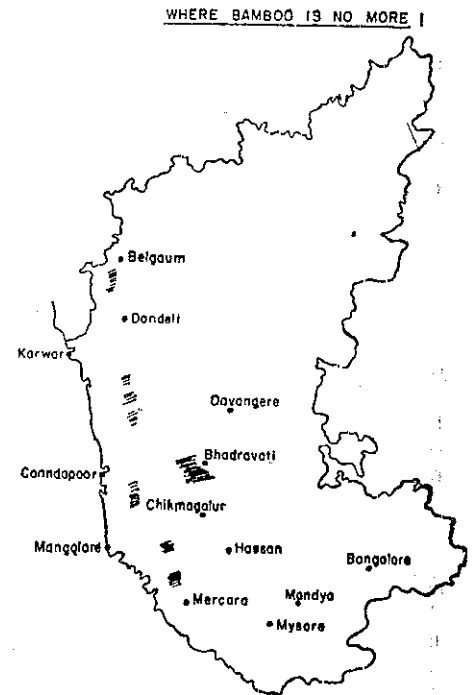
There thus appears to have been a consistent overestimate of the yield obtainable from the bamboo stocks of Karnataka ever since industrial consumption began 40 years ago. We were asked by a working group of the Karnataka State Council for Science and Technology to look into this problem and assess afresh the current position. We carried out such

an exercise on the basis of the data available from the State Forest Resources Survey, the West Coast Paper Mills and on the basis of some fresh field work. The Forest Resources survey figures appeared to be overestimates and a correction had to be applied. Details of these computations are presented in a report submitted to the State Government. The estimate so arrived for Karnataka was that 1,33,000 tonnes of sustained yield of bamboos was available on an annual basis.

This yield is to be contrasted with a regular annual supply of 80,000 tonnes to WCPM, 55,000 tonnes to MPM and 10,000 tonnes to rights and privilege holders. This gives a total of 1,45,000 tonnes. This is probably an underestimate as a great deal of harvest by the rural population for household use goes unrecorded. The total yearly harvest is more likely to be in region of 1,60,000 tonnes. In any case, it certainly appears to exceed the annual sustainable yield.

If our estimates are reasonable and if our conclusion that the harvest of bamboo probably exceeds the annual production is correct, then we would expect a year by year decline in the bamboo stocks of the State. In fact there are strong reasons to believe that such a decline has been taking place. Unfortunately we could not obtain any quantitative data to make a definite estimate of this decline. However, in a number of places that we visited in our survey, we received reports that areas that are now entirely lacking in bamboo were extremely rich in bamboo stock at an earlier time. This phenomenon is particularly evident in the case of *Bambusa arundinacea* which has a much more gregarious flowering habit. The following list gives some examples of areas which were once rich in bamboo stocks and have now been wiped out.

- (a) Coondapur Division:
 - (i) Shankaranarayana Range—Metakalgudde and Tombattu, Mavinagulu
 - (ii) Hebri Range—Ballimane
 - (iii) Coondapur Range—Kodike, Madibara
- (b) Mangalore Division:
 - (i) Belthangadi Range—Varahy and Gonapady
- (c) Sagar Division:
 - (i) Sagar Range—Nagavally
 - (ii) Anandapuram Range—Karadi-betta, Kurgi
- (d) Chamarajanagar Division
 - (i) Punjur Range—Budipadaga
- (e) Koppa Division:
 - (i) Sringeri Range



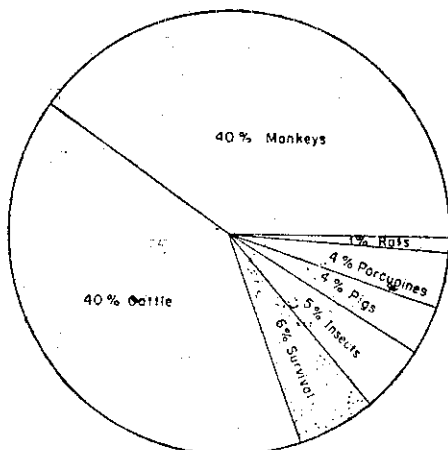
It is also evident that in their efforts to meet the requirements of raw materials in the face of scarce resources, the paper mills are further worsening the resource position. Our field surveys show that the contractors supplying the bamboos to the mills do not follow the silvicultural regulations meant to protect the regenerative capacity of the bamboo clumps. They tend to concentrate extractions in easily accessible areas and overexploit the clumps there. They do not leave intact the current year's growth as required and often go to the length of clearfelling whole areas. Evidently these practices are hurting the long-term supply of bamboo drastically, and are at least in part responsible for the entire disappearance of stocks from areas which once supported excellent growth of bamboos.

Environmental consequences

This failure of what should have been an operation of harvesting bamboo resources on a sustained yield basis, and the consequent depletion of bamboo stocks has had serious repercussions from both an environmental and an economic point of view. Ecologically, bamboo is a sun-loving pioneer species which can grow profusely wherever the canopy of moist or dry deciduous forest is opened up. With the disappearance of bamboo this niche is being taken over by *Eupatorium glandulosum* particularly in the moister tracts.

Once this composite weed takes over, it smothers and totally suppresses all other regeneration. It dries up in the

FATE OF NEW BAMBOO SHOOTS



dry season and promotes intense forest fires. This annual burning up of *Eupatorium* must also be responsible for loss of valuable minerals from the forest ecosystem which would otherwise have been maintained within the standing crop of bamboos. *Eupatorium* also produces certain allopathic chemicals which adversely affect other plant growth. It is not as good a soil binder and soil builder as bamboo. No domestic or wild animals touch it, and its occurrence leads to a serious loss of forest grazing. It affords little shelter for wild animals. It is thus evident that replacement of bamboo by *Eupatorium* over extensive tracts of Karnataka forests has had seriously deleterious environmental consequences.

Economic consequences

The failure of the paper industry to get an adequate supply of raw materials from the neighbouring forest areas which were expected to meet their requirements to the full extent has had serious economic repercussions. Because of this none of the mills has been running to full capacity and their very heavy investment has been lying idle. The large labour force dependent on the paper mills suffers serious economic hardships because of this. Paper mills have then been forced to transport bamboo from vast dis-

tances, from as far away as Meghalaya for the mill at Dandeli. These tremendous transport costs lead to a serious waste of fuel and an increase in the cost of paper production. It is incredible that while all the existing paper mills of Karnataka are thus suffering from serious shortage of raw materials, there are plans for expansion of the capacity of existing units without any attention whatever being paid to augmenting the supply of the raw materials.

The depletion of bamboo stocks has also had an invidious impact on the rural population. Our villagers and tribals, particularly in the Western Ghats areas of Karnataka, depend on bamboo for food, for house construction, for the manufacture of agricultural implements such as seed drills, for mats and baskets. A large community of basket-weavers depends entirely for its livelihood on bamboo supplies, and many other landless labourer communities eke out a living by basketry when they have no other employment. These weaker sections of the society have been the worst victims of our failure to conserve the bamboo resources. In fact, the Karnataka State Council for Science and Technology was prompted to set up a working group to look at this problem because of the agitation launched by the basket-weavers of

the State to draw attention to the great difficulties that they were facing.

Only option

The bamboo resources of the State have so far been managed in theory on the principles of conservation forestry. It is evident that this practice has been a failure. The annual demand for bamboo has already outstripped the annual yield, and the total crop is slowly being wiped out all over the State. At the same time, the paper mills are expanding their capacities by investing hundreds of crores of rupees not only within Karnataka, but also in the neighbouring States so that the supply of bamboos from these areas into Karnataka will also dry up fairly soon.

Thus, the so-called conservation forestry has in fact committed aggression through overexploitation of the stocks. The only recourse open to us now is to take to aggressive forestry in the form of raising bamboo plantations. As pioneer species which grow in open areas, and as species which have evolved as monocultures under natural conditions, bamboos should be highly suitable for plantation activities. They are among the fastest growing plants in the world, and once the technology of raising bamboo plantations is developed, they should be as productive as any other species.

It has been estimated that under proper protection the annual production of bamboos may reach levels of 15 tonnes per hectare. There is thus a tremendous scope for selecting fast growing species and strains of bamboos and for developing the technology of raising bamboo plantations both as pure and as mixed crops. It is to this task that the investment of bamboo-based industry must now turn, instead of spending crores of rupees in foreign exchange for buying machinery which will lie largely idle for want of raw materials, and will at the same time gobble up bamboo at a faster and faster rate till it is totally wiped out from the State of Karnataka.

Acknowledgements

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A Basket weaver of Basavanabetta