



# Protecting bamboo for the future

Restoring this grass could ultimately reduce pressure on natural forests

A natural stand of *Yushania alpina*, the indigenous East African bamboo, in the Aberdares. Such stands used to occupy huge areas in the colonial days, but were mostly cut to make place for plantations of exotic tree species. Was this a mistake? (Photo: KEFRI)

By Gordon Sigu

The indigenous bamboo species found in Kenya is *Yushania alpina*, formerly *Arundinaria alpina* K. Schum. This is a large woody rhizomatous grass, which thrives very well between 2,400 and 3,350 metres above sea level. The ecological range of the species is mainly the Aberdares and Mau ranges, Mt Kenya, Mt Elgon and Timboroa (Kaptagat) plateau.

The limited ecological zone is a concern because haphazard exploitation of bamboo can easily result in depletion of this important plant community. These zones used to support extensive bamboo crops until the 1950s when most of these plantations were replaced with fast growing exotic softwood trees.

Currently, the bamboo is an important and crucial forest type for water catchments and soil conservation in Kenya. The bamboo culm is used in the building and handicraft industries, especially in the tea farming areas. As such, there is need to have good primary ecological information on the best exploitation and management strategies of the plant.

Background information on the exact area, extent and current status of bamboo is limited, making its protection and management ultimately difficult.

## The situation and status

Between 1932 and 1943, investigations were carried out in the Aberdares and the surrounding

bamboo stands to find out satisfactory methods for felling bamboo culms and subsequent regeneration after felling. Fortunately, the investigations were carried out before much damage on the alpine bamboo ecosystem was inflicted. Currently, the stand densities are varied in structure and have suffered much disturbance, leaving them open, scattered and in patchy conditions (Kigomo, 1988).

Excessive exploitation in the past, coupled with mass flowering and death, followed by destruction from wildlife and serious failure of regeneration, have seriously reduced the resource base. Therefore, urgent conservation action is needed not only for restoration of the habitat of bamboo in the highlands of Kenya, but also for identification of *in situ* conservation reserves. A possible restoration measure is to carry out extensive planting of the species, with the active participation of the local population, who would eventually have a stake in the development and utilisation of the bamboo resources.

The area under bamboo forest is estimated to be 155,821 ha. This could even be less due to excision of the forests for the Nyayo Tea Zones and continuous extraction for government use. Currently, there is a ban on bamboo harvesting in the whole country, owing to the considerable decline of the resource, and as a result, the demand has been enormous.

The first bamboo research project in Kenya was initiated in July 1987 with funds from

IDRC<sup>1</sup>. The objective of the project was to select suitable regional and Asian bamboo species for several ecological areas of Kenya and to develop techniques for their mass propagation, establishment in the field and management protocols under local conditions.

## Current management of *Yushania alpina* in Kenya

The life of a bamboo culm of *Y. alpina* is seven to 10 years. The number of culms per unit area over this period remains constant (Kigomo, 1988). It has been generally observed that once a bamboo clump flowers and produces seed, its life ends. However, Wimbush (1947) suggested that the end of the life cycle of *Y. alpina* might not always result in the complete death of the plant and a last-minute vegetative vigour may occur.

Flowering, seeding and dying back in alpine bamboo occurs sporadically in Kenya. Flowering of *Y. alpina* occurs in patches of a half to five or more hectares (Kigomo, 1988). Sometimes this extends to cover tens of hectares of bamboo forest at a time, but no case of any more extensive sporadic flowering has been recorded.

There is evidence that the life cycle of the alpine bamboo is more than 40 years in the Aberdare range in Kenya (Wimbush, 1945). It is however not clear whether it is much longer

<sup>1</sup> The International Development Research Centre, a Canadian Crown Corporation

or shorter in other places where the species occurs.

On average, *Y. alpina* produces 3,700 – 4,000 new culms per hectare every three years. Full sized culms would take five to seven years. An undisturbed crop of this species carries about 10,000 to 17,000 stems per hectare and can produce about 100 tonnes of air-dry weight of culms. Culm production is influenced by the amount of rainfall occurring during the previous one or two years and drought may result in sparse production (Kigomo, 1988).

### Utilisation of *Yushania alpina*

The main uses of *Y. alpina* are fencing of homesteads and farms. Split and whole culms are widely used in the construction of residential houses, huts and farm granaries. Split culms are used in the production of mats and various utility baskets. Recently, there has been increased use of bamboo in making toothpicks.

The greatest handicap to the diversified utilisation of the local bamboo resource in Kenya, as opposed to cases commonly observed in tropical Asia, is the lack of motivated traditional skills. This can however be solved by training through exchange programmes and incorporating the skills in groups handling similar activities.

### Management of bamboo for soil and water conservation

The emphasis on bamboo resource conservation is vital, as both soils and water are the basic resources on which agriculture depends, taking into consideration that Kenya's economy is agriculturally based. The high population has pressurised the exploitation of our land, water and forest resources, causing inappropriate cultivation of steep slopes, riverbanks and encroachment of forests and water catchment areas.

Vast areas of Kenyan highland mountain catchment were cleared in the 1940s and 1950s and replaced with exotic softwoods. Pereira (1962) investigated the role of bamboo and exotic softwood crops in the conservation of watersheds.

Overall, Pereira's results indicated the consumption of water and interception of rainfall of bamboo and softwood crops are about the same. However, the overall efficiency of the two vegetations on the conservation and provision of quality water on a long-term basis should be a more important criterion. It is important that the soil mantle of catchment areas and water quality should be maintained. This is not the case particularly during forestry operations in industrial plantations.

Bamboo is very useful in stabilising topsoil and thus preventing soil erosion. *Y. alpina* is suitable for



fragile ecosystems such as canal banks, steep terrain and riverine areas. The increasing need for the use of bamboo in the reforestation programme of catchment and soil erosion prone areas has called for better understanding of bamboo management, particularly in soil and water conservation.

Bamboo has fast and intensive rhizome development and can be used for soil stabilisation. Preliminary studies have shown that this local species can be cultivated within its natural range and slightly below its natural altitudinal distribution, although its rate of growth is depressed in the latter sites.

No serious cultivation of bamboo has been undertaken in Kenya in the past. There is need to cultivate bamboo so as to diversify the supply base of our natural resources. The ongoing destruction of forest areas, especially in the subtropical belts in many countries, accompanied by an acute shortage of timber, has led to an increasing awareness of the multifunctional services that bamboo can provide. An up-to-date inventory of bamboo in Kenya should be carried out. The status of the entire bamboo ecosystem should be highlighted in this inventory. After this, a national bamboo management strategy can be framed on a larger scale.

### Management and conservation strategies

There is urgent need to review the studies carried on earlier, that is, stand carrying capacity, flowering, influence of recovery on cutting cycle, influence of cutting intensity on recovery and possibly the role of bamboo on soil and water conservation. This information is necessary for forming a basis for the conservation and management of bamboo in Kenya. This will create room to produce a multidisciplinary management strategy for all the bamboo forests in Kenya.

Considerable further study should be geared towards:

- The development of appropriate propagation, nursery and transplanting techniques. Both *in vivo* and *in vitro* methods should be included.
- The development of sound management systems for the sustainable management of natural stands and plantation cultivation of *Y. alpina*.
- Training on bamboo product processing skills.
- The socioeconomic and environmental aspects of bamboo forestry in Kenya.
- The introduction of exotic bamboo species, preferably those that are more versatile in their uses, with adoption especially in the lower drier zones. As in the production of natural tree forestry, this should help reduce pressure on this plant community.

### Conclusion

There is need to protect and manage the remaining bamboo resources properly for the future. A time has come to take this matter seriously and devise ways to manage bamboo areas so that they are brought back to productivity. If managed for sustained yield, the bamboo forest can be a reliable source of goods and services. If exploitation can be controlled and combined with natural and artificial regeneration, productive bamboo forest can be restored and ultimately reduce pressure on natural forests.

### References

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