

Traditional systems of bamboo management in some villages of upper Brahmaputra valley of Assam, Northeast India.

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INTRODUCTION

Assam in the north east of India is endowed with around 42 species of bamboo (Barooah and Borthakur, 2003) which are deeply associated with the cultural, economic and social aspects of life in the region. Growing bamboo in home gardens and groves is an age old practice in the villages of Assam. In homesteads, bamboos are grown in the back yards and in the periphery of the holdings which are mostly clump forming (Nath *et al.*, 2009a). In most of the households, bamboo is considered as a secondary source of income; an investment for rainy days. Nath *et al.* (2009b) has reported the management systems associated with bamboo homegardens in Cachar district in the Barak Valley. In fact, cultivation and management of bamboo is also a common traditional system even in the upper Brahmaputra Valley; but poorly understood. Traditional knowledge based systems are generally valuable as they are established based on long term successful practices. However, before incorporation of traditional knowledge and practices for the development of programmes for the promotion of any crop, systematic assessment of such knowledge for their validity and relevance is required (Chandrashekara, 1996). Thus an attempt has been made here to analyse the scientific validity of certain traditional bamboo management practices prevailing in the upper Brahmaputra Valley region.

The present paper has been prepared based on data collected from a total of 120 households having bamboo home gardens and groves in Jorhat (26°44'N, 94°10'E and 91 m above mean sea level) region of Assam. The most common bamboo species observed in the study area were *Bambusa tulda* (Jati), *Bambusa nutans* (Mokal), *Bambusa balcooa* (Bhaluka) and *Bambusa pallida* (Bijuli). The villagers were generally paddy growers or daily wage labourers. In homesteads, apart from bamboo, seasonal vegetables are also cultivated.

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Soil Management

In majority of the households, sweeping of bamboo and other litter towards the bamboo clumps was recorded. This is done to keep the homestead neat and tidy. Most of the villagers believe that bamboo litter is best utilized by bamboo itself. Incorporation of bamboo litter around the base of bamboo clumps may improve the soil physical and chemical properties. The water retention capacity of litter may help maximize water infiltration rate and also minimise soil desiccation due to evaporation. The dynamics and quantity of nutrient release from bamboo leaf litter and nutrient absorption patterns in different species of bamboo growing in homestead need to be studied. It may also be pointed out that discarding (by sweeping or burning process) bamboo litter from homestead in order to keep the surroundings neat can adversely affect soil, plant health and nutrition dynamics. On the other hand, as discussed above, the traditional practice of sweeping bamboo litter towards the bamboo clumps has several ecological benefits towards bamboo clump management. Farmers do not use bamboo litter as mulch material for other crops. Through their long-term experience, farmers know that bamboo mulch adversely affects the growth and yield of crops.

According to Krishnankutty (2005), homegarden bamboos in Kerala are poorly managed in several villages. Similar situation of poor management of bamboo in farmers fields can be also be seen in Assam. However, management of bamboo clumps applying farm yard manure is not uncommon in majority of homesteads. Before the onset of monsoon, farmers generally apply dung and agricultural wastes such as rice husk, paddy-straw *etc.* Farm yard manure is cheap and easily available and farmers prefer them over chemical fertilizers. Moreover, they consider that bamboo is still profitable without the investment on chemical fertilizers. Application of farm yard manure and leaf litter around the bamboo clumps annually was also reported from the villages of Barak Valley (Nath *et al.*, 2009b).

Mounding of soil around the clump is one of the most popular management techniques adopted widely among the villagers. Chandrashekara *et al.* (1997) and Nath *et al.* (2009b) have also reported from rural Kerala and Barak Valley of Assam respectively the practice of mounding of soil around bamboo to stimulate production of new culms. Mostly the clumps of bamboo are mounded with soil prior to rainy season. The thickness of soil layer may vary from 15-20 cm. This practice coincides with the occasion of the festival of 'Uruka' or 'Goru Bihu' in April and the farmers believe it protects newly emerged shoots and reduces mortality. Apart from that, this activity is known to help in the enhancement of taste of the new bamboo shoots and make them larger and healthier. Bhuyan (2009) has suggested similar management technique for commercial cultivation of bamboo. He reported that after the shoot emerges out of the soil, the shoot sheath becomes green or brown and the shoot becomes bitter and sour. Thus, before the bamboo shoots emerge out, they should be frequently covered with soil to keep them under ground for a longer period, so that the shoots grow

larger. Some villagers even set a light fire to litter heaped at the base bamboo clumps and then cover it soil. According to them, burning of litter followed by soil mounding increases the number of shoots up to a great extent. A field experiment conducted also showed that litter burning followed by soil mounding enhanced the bamboo culm production by 17%, 33%, 17% and 22% respectively in *B. balcooa*, *B. nutans*, *B. pallida*, and *B. tulda*.

Culm Harvesting

Selective harvesting of bamboo culms to meet the household needs is common in the Jorhat region. However, culms are harvested only after the end of Monsoon (August or early September) and only mature culms are extracted. Nath *et al.* (2009b) also reported similar practice of bamboo harvesting in Barak Valley. They have observed that bamboo culms are not harvested till they attain five years of age. It was also noticed that number of new culms produced after harvesting of culms during monsoon season is significantly less than those produced after harvesting of culms during winter season. Even the quality (in terms of culm height and girth) of new culms produced after the monsoon harvest was found to be poor.

Bamboo branch harvesting

Cutting of bamboo branches during winter season is also a common practice in rural Jorhat. The branches ((locally known as ‘Jeng’) are cut and used as climber support, tender twigs and leaves are used as feed for cattle and the remaining branches (locally known as ‘Jeng khori’) are used as fire wood. It was also recorded that although not a regular practice some farmers remove the old rhizomes (locally known as ‘Murha’) in the winter season so that new culms can emerge properly.

Clear felling of flowering culms

The villagers consider flowering of bamboo as bad omen and thus remove flowering clumps as soon as they are noticed. It is reported that one year after bamboo flowering, the sites were acidic with lower concentrations of exchangeable Ca and Mg and soil nitrogen compared to sites with living bamboo (Takahashi *et al.*, 2007). It was also noticed that the soil nutrient contents decrease considerably even when the roots and leaf litter were deposited on the site where bamboo clumps died after flowering, It may also be pointed out here that gregarious flowering of bamboo *Melocanna baccifera*, followed by famine, appears to occur in an established cycle in Mizoram, North East India (Lalnunmawia *et al.*, 2005). The tribal people fear a possible food crisis and epidemic due to rodent outbreak during bamboo flowering. Considering such adverse effects of bamboo flowering on soil health and nutritional status and possible impact on human food security, immediate removal of flowered bamboo can be regarded as a beneficial practice.

The study suggested that the traditional systems of bamboo management in Jorhat region of India have several ecological and socio-economic implications. Keeping in view the economic potential of bamboo, it is essential for farmers to understand the benefits of both traditional and scientific bamboo management systems which can contribute greatly towards the economic development.

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