Socio - cultural and Management Significance of Bamboos in Indian heritage and tradition

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Abstract: In India, bamboo, its growth and its usage for different day to day and other activities has been in existence since long. The importance of bamboo in Indian culture and region is also reflected in texts of Vedic age (1500 B.C. to 1000 B.C.) and other texts like Arthashastra. It is believed that it is only in the 4th century A.D. that cultivation of bamboos reduced. Its usage in medicines and food products have been highlighted in many of these texts. Socio cultural significance of bamboos have however continued to remain in many parts of India. These cultural significance have been highlighted in the study. They are a combination of empirical field work and literature review. Certain communities for instance have sacred bamboo groves either as a symbol that wards off evil spirits or as an integral part of their worship in West Bengal. They are an integral component of religious gratification in temples as in Kottiyoor temple located in Kannur, Kerala. While in certain locations of Maharashtra they are used during festivals, in other places in the state bamboo products are integral to their religious ceremonies like marriage. The traditional knowledge is not merely limited to its use, it also expands to better growth and management of bamboo. Khana (505 A.D. to 587 A.D) suggested to enrich the soils with paddy husk around bamboo clumps for better yield of bamboo along with many other suggestions, many of which have been reiterated in more recent scientific studies. Through this study, we have elaborated on these unorthodox but relevant aspects of bamboo from its use historically in medicine, a socio- cultural significance and traditional knowledge on growing bamboos, while simulaneously discussing its implication on conservation and management of this valuable bioresource in India.

Keywords: Ancient literature, bamboos, conservation, management, socio-cultural significance, traditional knowledge

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Introduction

Bamboos form an important group of tropical woody monocotyledons that have been traditionally used by people in Asia for a wide variety of purposes. It has been regarded as the major resource that meets the multiple requirements of common people and also a poverty alleviator (IFAD, 2014). For instance, today in India, it is estimated that that about 8.6 million people depend on bamboo for their livelihood (FSI, 2019). There is a growing trend in rural and urban sectors of the country for using bamboo as a widespread, renewable, productive, versatile, low cost or no-cost, easily accessed, environment-enhancing resource. Besides this, importance of bamboo as a resource for livelihood development and alleviation of both environment and social problems is increasing (Singh *et al*., 2017). However, enhancement and sustainable management of bamboo resource base in the country is a tremendously complex challenge (Blowfield *et al*.,1996; Tewari *et al.*, 2019). To succeed, we need to depend on insights and information originating from multiple knowledge

systems. Among different knowledge bases, indigenous or local traditional knowledge systems, developed through experimentation, adaptation, and co-evolution over long periods of time can provide valid and useful knowledge, as well as methods, theory and practices for sustainable resource management (Kimmerer, 2002; Hirsch Hadorn *et al*., 2008). Several such knowledge are unique and are locally or regionally maintained, adapted, and transmitted both orally and in practice (Nakashima *et al*., 2012). It may be mentioned here that the association of men with bamboo in India is as old as human civilization (Misra, 2001). However, our understanding of the cultivation and management of bamboo in ancient India and their relevance in the present context of bamboo resource base management are lacking. With this background, we made an attempt to collate some information and experiences related to the bamboo production-to-consumption systems in ancient India and presented in this paper.

It is a well-known fact that elderly people who involved in farming activities are in general considered as the 'information storage and processing unit' of a society (Dixit and Goyal, 2011). They also play an important role for passing down oral traditions and teaching and instructing younger generations. However, transfer of traditional practices and technologies from generation to generation does not necessarily mean that traditional knowledge is applied in its original form (Sumner, 2008). Very often, certain traditional practices are blindly followed without understanding their socio-cultural and/or ecological dimensions. As a result, practitioners may face the risk of following a practice as beneficial, that is in fact not true, or neglecting a practice by presuming that it is useless though in reality is useful had it been adapted (Tengo *et al.*, 2014).

As a consequence of this, many a times there is a certain degree of skepticism about the usefulness of traditional knowledge and practices in dealing with environmental and biodiversity conservational related problems (Usher, 2000). Thus, there is a great need to realize the 'science' behind each traditional practice and technology both by scientists and practitioners. For a better and comprehensive knowledge base of these traditional practices and technologies, it is ideal to utilize the participatory approach as the user communities or practitioners and researchers get benefited in multiple ways (Balazs and Morello-Frosch, 2013). It may be pointed out here that in recent years, the need of joint effort by multiple actors in conservation and management of ecosystems and resources has been recognized (Kueffer, 2006).

With this background, this study makes an attempt to collate some information and experiences related to the bamboo production-to-consumption systems in ancient India. In addition, the paper also tries to understand and correlate this traditional knowledge to conservation and management of bamboos. The present paper is also prepared to share learning from scientific validation exercises conducted on traditional practices related to management and utilization of bamboo in rural Kerala.

Materials and Methods

The methodology adopted for the study had two stages. The first stage of the study involved gathering data from different sources. This involved reading extensive published literature on significance of bamboos. The authors also read historical and other texts of ancient India to understand the historical role played by bamboos. It also involved gathering information on local signifincance of bamboo resources through informal interaction with a few local people during field visits to bamboo growing regions. The second stage involved the compilation, segregation and analysis of the collected data from secondary and primary sources and also analysis of scientific base of traditional knowledge and practices of conservation and management of bamboo in the country.

Results and discussion

Historical recorded uses of bamboo in ancient India: Mythological and historical texts, time and again mention bamboos and its usage for different purposes. This has been reiterated in many other texts subsequently. In this section we will explore some texts that have such mentions.

Atharva Veda, the fourth veda in the vedic scriptures of Hinduism, is regarded as the knowledge storehouse of atharvanas (or) the procedures of everyday life. Aiyer (1949), in his book referred to a part of a prayer in the Atharva Veda - *'I offer you dried sugarcane, white sugarcane, reeds and bamboos*'. This indicates that the bamboo was already regarded as one of the basic resources required by people of the Vedic age (1500 B.C. to 1000 B.C.). On similar lines, another book written by Gopal Sharma (2006) mentions about another hymn from Atharva Veda quoting '*The people who plant bamboos rise up from the mud and become rich. This truth is undisputed'.*

Traditional usage in health and well-being: The Arthasastra of Kautilya (4th Century B.C.), a treatise on state-craft, deals with wealth, revenue and other aspects of economic importance including bamboo resources (Sensarma,1993). In his book, Kautilya considered the bamboos as a distinct class of plants and named it as the class Venuvarga. He further classified Venuvarga into sub-groups, namely, Utaja, Chimiya, Chava, Venu, Vamsa, Satina, Kantaka, and Bhalluka ('*Utaja-cimiya-capa-venu-vamsa-satinakantaka-bhallukadir veṇuvargah'* – Kautilya Arthasastra: Chapter 2). While Utaja comprises bamboos with soft thorns, Cimiya comprises bamboos with thick bark and with no thorns. Very hard bamboos with very small central aperture were regarded as Capa-venu. Bamboos with thorns and long internodes were classified as Vamśa and bamboos similar to Vamsa, but with short internodes were grouped under Satina. Kantaka is a very big and long type of bamboo, bearing seeds like wheat and on the other hand, bhalluka is a big and long type of bamboo having no thorns.

Medicinal uses of bamboo: In ancient India, bamboo was also used for medicine to treat both human-beings and animals. According to Kautilya, the bamboo was useful in treating intoxication (madana dosa). A paste of the root of bamboo with algae, if mixed with the fat of frog, is said to cure burning (Arthasastra: Chapter, 14). In the Vishnudharmothara Mahasastra (500 A.D. to 700 A.D.), it is mentioned that barks of Nygrodha (*Ficus benghalensis* L.), Oudhumbara (*Ficus glomerata* Roxb.), Ashwatha (*Ficus religiosa* L.), Plaksha (*Butea monosperma* (Lam.) Taub.) and Vethasa (bamboo) are to be powdered and mixed with ghee to make a paste and this paste is effective in healing wounds of animals (Singh, 2008).

Traditional usage in habitations: Bamboo, by virtue of its availability and versatility, is closely associated with the life of people of India since time immemorial. It is considered as one of the oldest building materials used in different parts of India. For instance, it is reported that the plinth of the houses at Agatapura (present day Ahar near Udaipur), a key-site of the Harappan chalcolithic culture (2200 B.C. to 1600 B.C.), was built with roughly dressed slabs of schist while the walls were made of mud and mud bricks. The roof of these houses was sloping and thatched with bamboos, and additionally covered with grass and leaves (Vats, 1940). Excavation in a neolithic (1657 B.C. to 1443 B.C.) site in Navdatoli of the Narmada basin led to conclude that `the inhabitants built round and square or rectangular huts, raised on thick wooden posts. Around these were put bamboo screens, plastered with clay from outside and inside' (Sankalia, 1962).Similar pattern of houses is still seen in some tribal settlements of Karnataka and Kerala. A detailed investigation on pieces of charcoal collected from an archaeological site from Inamgaon of Poona district in Maharashtra led to conclude that these charcoal are of *Dendrocalamus* (Sankalia, 1962).

Cultivation and management of bamboo in ancient India: It seems that up to the 3rd century A.D., the people depended on forests for produces, such as, bamboo, jack-fruit, honey and tubers of *Dioscorea* (Sastri and Srinivasachari,1971). However, during the 4th century A.D. and afterwards cultivation of bamboo became common. For instance, Khana, the daughter-in-law of Varaha Mihira (505 A.D. to 587 A.D), advised cultivators in her Khanar Vachana: "*O worthy cultivator, for a vigorous growth of bamboo, give an infusion of powdered paddy to its roots*" (Bandyopadhyay *et al*., 2017). She also recommended for cultivating some tuberous crops as under-crops of bamboo clumps (Chaudhuri, 2008).

Kashyapa, a 9th century plant scientist, in his Krishi Sukthi advocated the king to encourage forestry. Among the plants suggested by him to grow

Fig 1A. The 'Gudhi' of Gudhi Padava

Fig 1B. The 'Gudhi' tied on *Dendrocalamus stocksii* culm in front of a rural household in Bhor, Maharashtra

on vast tracts of lands or with walled enclosures bamboo was also included. Kashyapa also suggested for preserving the seeds of bamboo and other plants for the betterment of people and birds (Randhawa, 1983). Sri. Misra Chakrapani, around 1577 A.D., under the patronage of Maharana Pratap (13th King of Mewar, Rajasthan) wrote his book Vishva Vallabha. In this book, he indicated that bamboo can be cultivated in dry lands. However, in Vrikshayurveda, possibilities of bamboo cultivation in wet soils are also discussed (Gangopadhyaya, 1932). Sri. Misra Chakrapani also suggested that either inside or near the dwelling places bamboos and other thorny plants or those with milky latex should not be grown and if they are present they should be removed for the happiness and health of household members (Gangopadhyaya, 1932). However, literature shows by 19th century, in some parts of India, homestead bamboo cultivation was common (Randhawa, 1981). For instance, in Assam and Orissa, during this period, the houses were usually conceded in dense groves of bamboo, plantain and jack-fruit. Similarly, the villagers of Bengal and Kerala live, more or less secluded, in detached homesteads, surrounded by a belt of fruit trees or bamboo thickets.

Cultural and religious significance of bamboo in contemporary India

***Bambusa vulgaris* var. *striata* in West Bengal:** In India, bamboos form an integral part of many communities. The different religious and socio-cultural diversity in bamboo utilization in country have also a significant bearing in its conservation and utilization. For instance, in the northern region of West Bengal, Rajbanshi tribes dedicate the northern end of their houses to their household deity "Bastu Thakur". In the centre of this dedicated room, they make a platform of about 3 cm height and on it erect a pole; the pole is always a yellow bamboo pole (*Bambusa vulgaris* var. *striata* (Lodd. ex Lindl.) Gamble) (Deb, 2015). The pole is typically covered by any bright coloured cloth. As is typical with worshipping God in Hindu community, the Rajbanshis worship this decorated pole with flowers and incense sticks along with lighting of an earthen lamp. Specifically leaves of bael (*Aegle marmelos* (L.) Correa) are used to worship this pole (Deb, 2015). The yellow bamboo (*Bambusa vulgaris* var. *striata*) also seems to be of paramount significance in Rajbanshi culture. The Rajbanshi Sacred Groves are distinctive in their exclusive composition of *Bambusa vulgaris* var. *striata,* whose distribution appears to be currently restricted to the Rajbanshi hamlets of Jalpaiguri District of West Bengal (Deb, 2015). There are omens, both good and bad associated with bamboo within the Rajbhanshi community itself, which also have conservation implications. For instance, it is a bad omen to see either a person cutting a bamboo culm or even a cut bamboo piece during any auspicious occasion. On the other hand, the same Rajbanshi community considers seeing a bamboo culm sprouting as a good omen.

Fig 2A. Oodapoove, made from *Ochlandra scriptora* culm pieces with clump in background

Fig 2B. Oodapoove strung up for sale for devotees of Kottiyoor temple in Kerala during festive season in June-July

***Dendrocalamus stocksii* in Maharashtra and Goa**: In the States of Maharashtra and Goa, 'Gudhi Padwa' is a spring-time festival that marks the traditional New Year according to the lunisolar Hindu calendar. The festival is observed with colorful floor decorations called Rangoli, a special Gudhi flag, street processions, dancing and festive foods. The 'Gudhi' flag which is usually a bright green or yellow cloth adorned with brocade (zari) is tied to the tip of a *Dendrocalamus stocksii* (Munro) M.Kumar, Remesh and Unnikrishnan (locally called Manga bamboo) over which gaathi (sugar crystals), neem leaves, a twig of mango leaves and a garland of red flowers is stringed together. A silver or copper pot is placed in the inverted position over this. The entire contraption is called as Gudhi (fig 1A). It is hoisted outside the house and prominently displayed in traditional Maharashtra households (fig 1B) to attract the attention of everybody (Subbanna *et al*., 2018). Though, the Gudhi Padwa is observed by Hindu community in different parts of the country in different names, eg. Ugadi, Yugadi, the fabrication of the Gudhi in this manner and its display on a bamboo pole is exclusive to Maharashtrians.

***Ochlandra scriptoria* in Kerala:** There is an interesting trivia about the ritualistic use of bamboo in temple ceremonies from Kannur district, Kerala. "Oodapoov" made from culm cuttings of *Ochlandra scriptoria* (Dennst.) C.E.C.Fisch., is symbolic of the offerings of famous Kottiyoor temple at Peravoor in Kannur district, Kerala (fig 2A and B). The culm pieces are beaten with stick to get the fibre size white hair like artefact which is given to the devotees as offering. This is strung on car mirrors and also in front of the deity at home. It is believed that the temple was built to commemorate the sacrifice of king Prajapathy Dakshan, father of Parvathi, consort of Lord Shiva. The 'Oodapoov' is symbolic of the beard of Dakshan who was beheaded by Lord Shiva (Subbanna and Viswanath, 2016).

***Dendrocalamus hamiltonii* in tribes of Assam:** Karbis are one of the important tribes scattered in northeast India with their major concentration in the central part, in the Karbi Anglong district of Assam and hence the name. Bamboos play a very important role in the lives of Karbi with them being involved in almost every ritual performances of these tribes in one way or another. One of the prime ways in which bamboo is used typically in all rituals of Karbi tribe is as "*Anghoi-Alankpong*" (sitting and drinking arrangement for the deities made with bamboo) (Singh and Timung, 2015). Though the Karbis use many species of bamboo for this ritual, *Dendrocalamus hamiltonii* Nees and Arn. *ex* Munro (local name: Kaipho) is the most common one. They also use bamboo for other reli-

Fig 3A

Fig 3B

Fig 3C

Fig 3D

Fig 3E

Fig 3. 'Valaga', 'Padda' and 'Topli', all made of bamboo, for using in marriage ceremonies. 'Valaga' filled with items for offering and taken to the temple using bamboo sticks (A); 'Padda' (B); Groom taking a bath with water flowing from 'Padda'(C); 'Topli' (D); Bride worshipping the 'Topli' in the marriage ceremony (E)

gious activities, such as, Bi-*Aput,* wherein a small bamboo stick is used to hold the goat during a sacrifice and *Methek,* in which a small bamboo piece used to keep the charcoal burning for incense at the time of any ritual (Teron and Borthakur, 2012).

Karbis also follow certain specifications while selecting bamboo for using in rituals, For instance, they do not use bamboo culms which are growing in a clumps with more number of dead culms. Similarly, bamboos culms broken and distorted during its young stage, but are showing normal growth subsequently are also not used by Karbi tribes for rituals. They, for any rituals, even do not use bamboos culms from clumps covered fully with creepers (Teron and Borthakur, 2012).

***Dendrocalamus strictus* in marriage ceremonies in Maharashtra:** In the central India, especially in the Vidharbha region close to Nagpur and adjoining areas of Maharashtra, bamboos, most commonly *Dendrocalamus strictus* (Roxb.) Nees are invariably used for several cultural and religious ceremonies. For instance, in this region, before the wedding ceremony, four bamboo poles are tied around a '*Valaga*' (fig 3A) or a bamboo woven basket. The basket is adorned with turmeric and vermilion powder and contains essential pooja items, along with food items that are first offered to God. In addition both the bride and the groom are involved in rituals involving bamboo products. For instance, '*Padda*' is a flat interwoven circular bamboo plate of large diameter (fig 3B). Before getting into the wedding venue, the groom takes a bath with water flowing from a '*Padda*' (fig 3C). Further, after the wedding rituals are completed, the bride is made to sit on the '*Padda*' and the groom brings her into the house carrying her in the '*Padda*'. To ensure that the weight is managed by the '*Padda*', eight bamboo pieces are intertwined in the base. Once the bride enters the house, '*Topli*', a small sized basket made form interwoven bamboo (fig 3D), is first worshipped by her for a happy married life (fig 3E).

These are but a few examples of bamboo from cultural and religious perspective. Needless to say there are many other perceptions on bamboo by native communities which have in turn given rise to a multitude of myths associated with it; which need to be documented and understand their pivotal role in conservation and management of bamboo resources.

Management of bamboo in traditional farming systems in India

Bamboo and Pine based agroforestry in Ziro Valley in Arunachal Pradesh: Over the last half a century or so, the indigenous Apatani tribe of Ziro Valley in Arunachal Pradesh in the Eastern Himalayan region of India have developed a unique bamboo (*Phyllostachys bambusoides* Siebold and Zucc.) and pine (*Pinus wallichiana* A.B. Jacks.) based agroforestry system (Tangjang and Nair, 2015). For developing this kind of farming system, they generally collect pine saplings with soil attached to roots from nearby plantations during February – March and plant them at a spacing of about 4m x 4m. Since farmers need straight and long poles of pines for construction purposes, plants are managed regularly by trimming lower branches for promoting upward growth and formation of straight poles. Four years after planting pine sapling, bamboo (*Phyllostachys bambusoides*), locally called Tanii bije, is inter-planted at a spacing of about 1.5m x 1.5m. This integrated bamboo and pine agroforestry practice is regarded as exceptionally valuable and extremely sustainable in the local ecological and socio-cultural landscape of Apatani tribe of Ziro Valley (Tangjang and Nair, 2015).

Bamboos in homesteads and farm boundaries in Konkan belt: In some villages, such as, Oras and Oveiye of Sindhudurg district located in Konkan belt of Maharashtra, traditionally, entire village communities have been engaged in cultivation of bamboo (*Dendrocalamus stocksii* (Munro) M. Kumar, Remesh and Unnikrishnan) for centuries. This could be seen either as scattered clumps in homesteads, or maintained as live hedges or even as compact block plantations (Rane *et al*., 2014; Viswanath *et al*., 2014).Traditionally the species has been propagated primarily by vegetative propagation using rhizome-offsets. There is a unique method used to rejuvenate clumps that have flowered which is called ‘clear felling and light burning practice’. The practice is locally called as '*dhaga-*

vani'. New sprouts start to appear within a month of following this protocol. The crop harvesting methods are also unique and traditional in nature. The harvesting is typically done so as to match with the lunar cycle. The belief is that the sap flow reduces if the protocol is followed leading to lesser pest attacks (Patil, 2017).

Bamboos in homegardens of Kerala: Bamboos are an important component of the rural landscapes of Kerala (Krishnankutty, 1990). Traditionally, farmers of Kerala, particularly in Thrissur and Palakkad Districts, prefer thorny bamboo (*Bambusa bambos* (L.) Voss) over thorn-less one as its branches are essential fencing materials (Chandrashekara *et al*., 1997). In the State, over time and with experience, several systems and practices have evolved for cultivation, management and sustainable utilization of bamboo and associated crops. Such knowledge and practices are locally or regionally maintained, adapted and transmitted both orally and through written books and other documents. For instance, Khana in her Khanar Vachana suggested for mounding of soil and spreading of paddy husk around bamboo clumps for better and vigorous growth of culms. These soil and bamboo clump management practices are still prevailing in rural Kerala. Several farmers in Kerala pointed out that a) trenching around bamboo would restrict horizontal spread of bamboo roots and in turn avoid competition between bamboo and other crops for soil nutrient and moisture, b) mounding of soil around clump is a useful practice both to stimulate the production of new culms and to manage soil fertility (Chandrashekara, 1996).

As indicated earlier, Sri. Misra Chakrapani advised not to cultivate bamboo and other thorny plants near the dwelling places. It may be noted here that cultivation of bamboo in corners of traditional homegardens of Kerala is a practice both for ensuring freedom of movement for gardeners within the garden and availability of more space to grow other crops.

It is mentioned in the Khanar Vachana that the land around bamboo clumps may be cultivated with tuberous crops like potato, ginger etc. Thus, on-farming experiments were conducted in Kerala to estimate the yield of ginger and turmeric cultivated as inter-crop with bamboo and to record farmer's opinion about the results of the study (Chandrashekara *et al.*, 1997). The estimated yield of turmeric under bamboo was 12.2 ± 0.3 kg per 4 m^2 (N=25) and it was significantly less ($p < 0.01$; N=25) than the yield obtained in an open farm land (16.2 ± 0.2 kg per 4 m^2). Similarly, significantly less yield of ginger ($p < 0.01$; N=25) under the bamboo shade (10.3 ± 0.5 kg per 4 m^2) than in an open farm land (21.3 ± 0.7 kg per 4 m^2) was recorded. The study also indicated that even when the yields under bamboo were significantly poor, many farmers were still pleased to note that yield can be obtained if crop is managed well. It was also recorded that under-cropping was possible with bamboo clumps itself was a pleasant surprise for many farmers. In addition, this on-farm rhizomatous cropping trial has encouraged the sample farmers to think more positively about bamboo- crop association. Some farmers also informed that de-topping of new culms is a traditional practice to minimize the shade of bamboo on crops and plants growing near bamboo clumps. When an on-farm experiment was carried by de-topping bamboo culms, it was noticed that the culm tip removal led to the production of significantly ($p < 0.05$) more number of lengthy branches (432.6 ± 31.2 cm against to 210.8± 34.6 cm in control culms) (Chandrashekara *et al*., 1997).Therefore, de-topping of bamboo culms, a traditional practice of bamboo management, serves two purposes, namely, reduction of bamboo shade and production of more number of lengthy branches which are required to farmers for fencing.

Conclusion

It may be concluded that since time immemorial, bamboo is the part of life of Indian people. The present study provided an insight into the historical significance of bamboos in day to day usage like food and medicine, its socio-cultural significance and traditional knowledge accumulated on bamboos over time amongst the farming community. Each of these, individually and combined, have an importance in conservation and management of bamboo. This socio-cultural diversity in bamboo utilization across various cultures and communities has played and will continue to play a vital

role in the conservation of bamboo biodiversity. The study also illustrated how traditional practices of management of bamboos have scientific base and relevance in maintaining sustainability of bamboo farming systems. Through collaborative exercises involving practitioners, natural and social scientists it is possible to pull back the veil that obscures our understanding on strengths and relevance of a rich traditional knowledge and practices prevailing in bamboo management in different ethnic groups of the country.

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