Indian Forester, 143 (9) : 846-851, 2017
http://www.indianforester.co.in

ISSN No. 0019-4816 (Print)
ISSN No. 2321-094X (Online)

SOCIO-ECONOMIC POTENTIAL AND MARKETING TREND OF BAMBOO IN MIZORAM: A CASE STUDY FROM AIZAWL DISTRICT

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ABSTRACT

Bamboo plays an important role in the socio-economic life of rural as well as urban people. Due to its varied uses including construction of houses, huts along the roadsides for selling agricultural produce, household articles, fencing, agricultural implements, cultural implements etc. The present study was done to evaluate the pools and fluxes of bamboo culms in Aizawl and its value added products obtained in the study area. Data were collected among the bamboo entrepreneurs in the local markets using PRA and survey was conducted in three strata *viz*. retailer, industry and consumer level. Among all bamboo species *Bambusa tulda* was the most common species found in the market although *Melocanna baccifera* dominates among bamboo species that contributes about 95% of the growing stock in the state. *Schizostachyum dulloa* being the most preferred species due to its long internode and flexibility for making export products. The price of one bundle of bamboo culms varies from ` 170-200/- whereas the price of *dap* (flattened bamboo) varies from ` 200-250/-. The total weekly turnover of bamboo culms market in the city was ` 487,250.00/- in which 2,685 bamboo culms supplied and 1,466 bundles sold weekly. The study also reveals that bamboo culm markets provide employment for 27 male and 25 female that gives a total of 52 persons in the study area. The findings of the study will help to assess the trends of bamboo culms in the market, its socio-cultural and economic importance provided by bamboo resource in Aizawl district and the state as a whole.

Key words: Bambusa tulda, Melocanna baccifera, Schizostachyum dulloa, bamboo culm, Socio-economic.

Introduction

Bamboos are fascinating plants, representing one of the greatest natural and renewable resources (Shanmughaval and Francis, 2001). They have been playing an important role in the life of the people of tropical countries because of their diversified uses (Liese, 2009). Bamboos are extremely well adapted to variety of uses, and therefore, they occupy a prominent place in the life and progress of the people of the tropical countries of the world. It plays a significant role in the national economy and in the development of rural areas to ameliorate an acute housing problem, furniture and other diverse needs. Bamboo is a way of live for the people of Mizoram and it provides employment for rural as well as urban population. It act as an indispensable resource for the state due to its varied used from agricultural implements to construction materials. Bamboo also plays an important role in social and cultural aspects of the Mizo (term used for tribe living in Mizoram) society. Different traditional uses, its products and species used for making specific implements are documented in this paper. It has been estimated that in the world market, the combine value of internal and commercial consumption of bamboo is ` 45,000 crores every year (Anon., 2010). Bamboo is also an important raw material for cottage and small scale industries, a large number of people from poorer section of the society depends on bamboo for their livelihood. Men, women and children of different ages were engaged in bamboo and bamboo crafts (Singhal and Gangopadhyay, 1999). Despite all the necessities that it provides, bamboo resource gets depleted which could be contributed to Shifting cultivation where a large chunk of forests as well as bamboo forests are cleared for cultivation of agricultural crops. Lack of scientific management and increasing demand for various social, commercial and industrial purposes have also led to the depletion of the growing stock of bamboo species (Tewari, 1992).

Bamboo distribution

Bamboo belongs to the sub-family Bambusoideae of the family Poaceae (earlier Gramineae). Bambusoideae is the giants of the family representing various species. It is reported that a total of 115 species belonging to 20 genera of bamboos are present in India. Among clump forming

The estimated weekly turnover of biomass of bamboo culm in market was 21.50 $Mgha^{-1}$

bamboos, *Dendrocalams strictus* accounts for 45%, *Bambusa bambos* 13%, *Dendrocalamus hemiltoni* 7%, *Bambusa tulda* 5% and *B. pallida* 4%, while a non-clump forming bamboo *Melocanna baccifer*a found in NE India accounts for 20% of the growing stock (Anon., 2010). A total of 35 species of bamboos belonging to 9 genera are reported in Mizoram of which 25 species occurs naturally in the state.

As a whole, the total growing stock of the State was estimated to be 24.014 million metric tonnes out of a total bamboo area of 7,091.66 km^2, which constituted 33.63% of the total geographical area of the State. The average growing stock was assessed to be around 3,386.25 metric tonnes per square kilometre. The total number of culms for the entire state was estimated to be 6,123.86 million. (Anon., 2010).

Material and Methods

Study area

Mizoram is a hilly state located in the North eastern part of India, sandwiched between Myanmar and Bangladesh. It lies between 92^{0}15' and 93^{0}29' East Longitudes and 21^{0}58' and 24^{0}35' North Latitudes and shares a common International boundary of 404 kms with Myanmar and 318 kms with Bangladesh.

Aizawl is the largest city as well as the capital of the state of Mizoram. The City is located north of the Tropic of Cancer in the northern part of Mizoram and is situated on ridge 1132 m (3715 ft) amsl, with the Tlawng river valley to its west and the Tuivawl river valley to its east. Summer temperature ranges from 20 – 30^{0}C, and winter 11 – 21^{0}C. The geographical area of the district is 3,576 km² and as per the 2011 census a population of 404,054 souls. The district has a bamboo area of 927.69 Km² which is 25.94% of the total geographical area of the district. Almost the major species of bamboo of the state are found in the district (Anon., 2010).

Data collection and analysis

Extensive surveys were conducted in various markets within the Aizawl City. For the present study, several bamboo retail outlets were chosen from different corners of the city. PRA was conducted among the bamboo entrepreneur in the local markets based on the regularity of their operation within the city. Survey was conducted in three different strata – Retailer, Industry and consumer level. The total bamboo biomass consumed and required through bamboo culm market was estimated by measuring the mean girth of the bamboo being stocked by the entrepreneur.

Age determination of bamboo culm was done based on the method explained by Banik (1993) with little modification. Depending upon the morphological characterisation, bamboo culms were categorised into three different age groups: Group 1 – 1 to 2 years; Group 2 – 3 to 4 years; Group 3 – 5 years and above (Table 1).

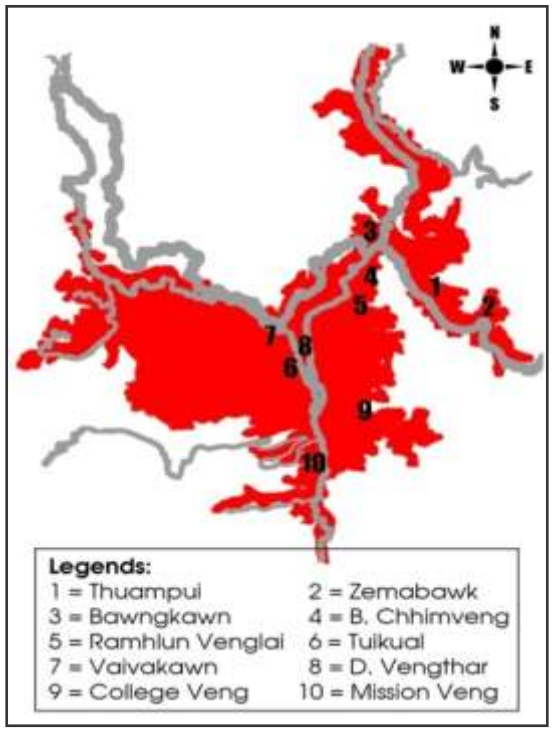

Fig. 1: Map of Aizawl city showing location of the study sites.

Results and Discussion

Trends of Bamboo culm market

A total of 12 bamboo culm retailers, from 10 localities/markets were observed to be regularly in operation throughout the year. In some market, the bamboo retailers were operating seasonally, depending upon the availability and demand of the items.

The bamboo culm retailers in each of the localities fixed their own rate; however the mean rate was ` 200.00 per bundle of 10 culms. All of the retailers followed a system of selling in bundle wise, in which 10 bamboo culms of different girth were bundled together. The standard length of each bamboo culm is 12 ft. (3.7m). However, unit wise selling was also practiced as per the convenience. The bamboo culms were normally put on sale for one to two weeks, after the green colouration deteriorates, they were then split and flattened, which is locally known as *'Dap.'* The rate of selling of '*dap'* varied upon localities whereas the system of selling is similar to that of the culm in each locality given in table. 2.

The study revealed that bamboo culms in the Aizawl city were supplied from six different sources which were located in the north western part of Mizoram. The concentration of bamboo retailers towards the north and

Table 1: Age determining factor in culms of a bamboo (Banik, 1993).

Morphological appearance	Inference		
	Group 1	Group 2	Group 3
Culm sheath	Present	Absent	Absent
Marks of Culm sheath	Yellowish tint on the nodes	Absent	Absent
Colouration	Green (*Mb*), Green with whitish bloom on the internodes (*Bt, Dl*)	Dull dark green (*Mb*), Dark green (*Bt, Dl*), yellowish stain at the basal area (*Bt*)	Light green to yellowish straw (*Mb*), Dark green (*Bt, Dl*)
Growth of fungi on the culm	Absent	Absent	Present

[*Bt = Bambusa tulda; Dl = Dendrocalamus longispathus; Mb = Melocanna baccifera*]

Table 2: Trends of Bamboo market in Aizawl City.

Sl. No.	Locality	Name of species	Source of supply	Supply	Sales	Rate of culms	Rate of *dap*
				bundles/ week	bundles/ week	` / Bundle	` / bundle
1	Thuampui	*B. tulda,M baccifera, D. longispathus*	Dapchhuah, Sairang, Muthi	360	90	200.00	200.00
2	Zemabawk	*B. tulda*	Dapchhuah, Sairang	10	5	200.00	200.00
3	Bawngkawn	*B. tulda, D. longispathus*	Sairang	120	30	170.00	200.00
4	Bawngkawn Chhimveng	*B. tulda, M. baccifera, D. longispathus*	Dapchhuah, Sairang, Lengpui	720	600	180.00	200.00
5	Ramhlun Venglai	*B. tulda, M. baccifera*	Sairang, Lengpui	30	6	200.00	200.00
6	Tuikual	*B. tulda, M. baccifera, D. longispathus*	Dapchhuah, Serzawl	780	130	180.00	220.00
7	Vaivakawn 1	*B. tulda, D. longispathus*	Sairang, Serzawl	240	240	170.00	250.00
8	Vaivakawn 2	*B. tulda, M. baccifera, D. longispathus*	Lengpui	60	40	180.00	220.00
9	Vaivakawn 3	*B. tulda, M. baccifera, D. strictus*	Lengpui	150	130	180.00	240.00
10	Dawrpui Vengthar	*B. tulda, M. baccifera, D. strictus*	Lengpui, Serzawl	50	30	180.00	250.00
11	College Veng	*B. tulda, M. baccifera, D. longispathus*	Lengpui, Serzawl, Mualkhang	45	45	170.00	220.00
12	Mission Veng	*B. tulda, M. baccifera, D. longispathus*	Dapchhuah, Serzawl, Lengpui	120	120	180.00	210.00

western end of the city may be attributed to the sources of supply. The amount of transaction of each retailer varies widely as shown in Table 2. *Bambusa tulda* (Rawthing), *Dendrocalamus longispathus* (Rawnal), *Melocanna bacciferra* (Mautak) and *D. strictus* (Tursing) were the species found in the market. Among which *B. tulda* was the most common. The rarity of other dominating species – *D. longispathus* and *M. bacciferra* may be attributed to the sporadic flowering and gregarious flowering of both the species in 2011 till date and 2006 – 2008 respectively.

The total weekly turnover of bamboo culms market in Aizawl city was ` 487,250.00, in which 2,685 bundles of bamboo culms were supplied and 1,466 bundles were sold weekly (Fig. 2).

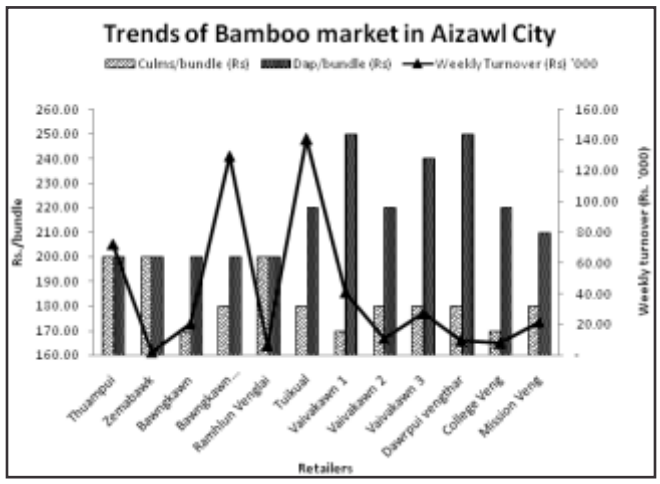

Fig. 2: Trends of Bamboo market in Aizawl.

Socio-economic aspects

The bamboo culm retailer in city functioned as a family business, in each of the case, therefore, does not generate much employment to others. Kattel *et al*. (2007) also reported the same findings from the study of eight different municipal towns and in the surrounding areas of Nepal. The 12 bamboo culm retailers of the City provide employment for 27 male and 25 female, summing up to a

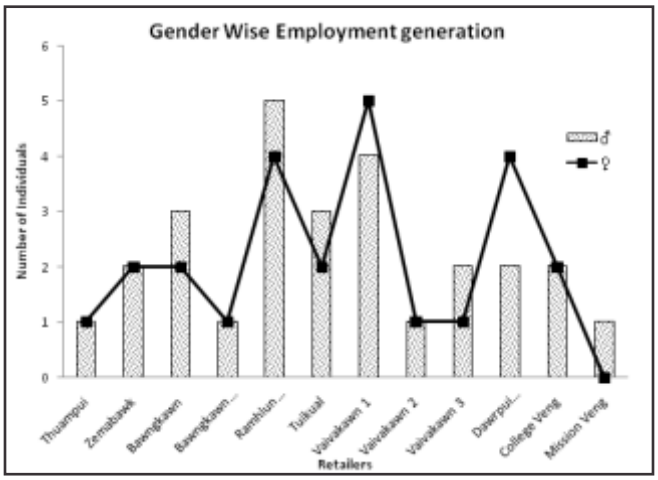

Fig. 3: The gender wise employment in bamboo culm market.

total of 52 persons (Fig. 3). The same findings are also prevalent in the study conducted by Das (1999) where both sexes worked together in eastern Nepal among poor women. FAO (1978 and 1990) has also reported the involvement of more women in forest- based enterprises in developing countries.

Uses of bamboos

Bamboo is a versatile plant, having multiple uses. It can be broadly grouped into two kinds of utilisation – (1) traditional uses and (2) contemporary or industrial uses. Contemporary or Industrial utilisation may include its utilisation in Industries as a raw material for pulping, bamboo composite board, constructional purposes (support pole and substitute of iron rod).

Traditional uses may include - raw material for construction of traditional houses and farm sheds, for making of traditional baskets, hats, pipe and other domestic and cottage industries products. The peel-off barks are also used as a traditional medicine against snake bite when applied on the wound.

Some species like *B. tulda, D. longispathus, D. hamlitonii, M. baccifera* etc. are of multiple uses, whereas species like *B. mizorameana*, *S. dulloa* are limited to specific uses. Advances in technology and skills, however brought, about several contemporary or industrial uses of indigenous bamboo species of Mizoram given in Table 3.

Introduced exotic species, believed to be superior in all aspects, however could not still replace the native species in terms of versatile utilisation. Some entrepreneur reported the inferiority of these species – less vinegar yield, softness of the inner walls and difficulty

Table 3: Taxonomic description and uses of indigenous bamboo species found in Mizoram.

Sl.No.	Botanical Name	Vernacular name	Uses	
			Traditional	Contemporary
1	*Bambusa mizoramena*	Talan	Di-Chum (Purlin)	-
2	*Bambusa tulda*	Rawthing	Hnang, em, kho, arbawm, aiawt, gutter, pole, fuel-wood, construction, agricultural implements, cooking of rice and other vegetables, tuium, tuikawhna etc.	Flower Vase, cup, bamboo vinegar, Bamboo mat board, pulp
3	*Dendrocalamus hamiltonii*	Phulrua	Hnang, gutter, pole, fuel-wood, construction, agricultural implements, tuikawhna, tuiumetc	Photo frame, Flower vase, Bottle holder, Bamboo vinegar, pulp
4	*Dendrocalamus hookeri*	Rawpui/ Rawlak	Construction, pole	Construction, pole, ash-tray, flower vase, pulp
5	*Dendrocalamus longispathus*	Rawnal	Hnang, êm, kho, arbawm, aiawt, ngha-awt, thlangra, bawmrang, mau-thei, meichher, tuium, tuikawhna, construction etc.	Tea coaster, Hanger, bamboo vinegar, Bamboo mat board, Bamboo vinegar, pulp
6	*Dendrocalamus manipureanus*	Rawchhia	Construction, pole	Construction, pole, ash-tray, flower vase
7	*Dendrocalamus strictus*	Tursing	Vaibel, construction	Pipe, pulp
8	*Dendroclamus sikkimensis*	Rawmi	Construction, chhuat dap, tuidawn, tuium, pum (forge)	Construction, pole, ash-tray, flower vase
9	*Melocalamus compactiflorus*	Sairil	Khumbeu, hnang	Rings, Hair clip, earrings
10	*Melocanna baccifera*	Mautak	Arbawm, hnang, be ngul, thlangra, bawmrang, construction etc.	Pen stand, Cup, Tea Coster, Tray, Ash tray, Earrings, Bamboo mat board, pulp
11	*Schizostachyum dulloa*	Rawthla	Khumbeu, Thlangra	Cut-pieces (exported)
12	*Schizostachyum fuchsianum*	Rawngal	Thlangra, bengul	Ring, earring, Hair Clip

in breaking the thick internode. Zonun-Mat Ply Industry, the biggest bamboo industry in the state, prefers only *M. baccifera* and *D. longispathus.* The bamboo vinegar industries in the state prefer the *D. hamlitonii* due to its high vinegar yield. For cut pieces of export quality, *S. dulloa* is the preferred species, due to its long internode and thin wall. Das (2004) and Stapleton (1994) have also highlighted the preference of species for specific purposes in their study.

In the traditional uses of bamboo, mostly the bamboo culms were finely split into thin pieces, which were then, weaved to form the articles they required. Depending upon the article to be produced, the bamboo culms were processed accordingly. Sometimes the whole culms were used as it was, in the case of purlin, pole etc, while splitting into two equal halves and removal of the internodes were required for articles like gutter. On the other hand, the basal portion of the culm along with the rhizome was excavated for making handles of tools and implements. Many native authors and folklorist reported that split bamboo were often used as a blade for cutting meat and weeds.

Estimation of biomass

By adopting the allometric equation developed by Vanlalfakawma *et al*. (2014), the weekly turnover of biomass of the bamboo culm market of Aizawl city was estimated to be 21.5 Mg ha^{-1}. The estimated weekly turnover of biomass represents the biomass supplied to the bamboo culms market.

Age determination

In each of the localities, more than 50% of the stocks were in the age group of 1-2 years. Only very few aged culms (more than 5 years) were observed. This clearly indicated that the system of harvest is very unsustainable.

Conclusion

The outcome of the study reveals that there is highest concentration of bamboo retailers in the north western end of the city. The study also reveals that majority of the bamboo culms sold in the market comes from Lengpui which is on the north western part of Mizoram. This indicates that the climatic conditions of north western parts of the city are favourable for growing bamboos and more afforestation programme as well as bamboo nursery needs to be set up to have adequate supply of bamboo seedlings in and around the adjoining areas and to provide raw materials for livelihood income of weaker sections of the society. Out of the total 12 indigeneous bamboo species used traditionally for different purposes in the state, *Bambusa tulda*, *Dendrocalamus longispathus, Dendrocalamus hamiltonii* and *Melocanna baccifera* has multiple uses. The estimated weekly turnover of biomass of bamboo culm in the market is as 21.5 Mg ha^{-1}. Among all the bamboo culms sold in the market, age group of 1-2 yrs occupies the highest stock indicating that the harvesting of bamboos in the state is unsustainable. Inspite of its multiple uses and its potential source for income, the methods of harvesting technique employed at present needs to be revised.

मिजोरम में बाँस की सामाजिक-आर्थिक क्षमता एवं विपणन रूझानः आइजोल जिले से एक अध्ययन

पॉल लालरीमसेंग, डेविड सी. वनलालफेक्वामा एवं एस.के. त्रिपाठी

सारांश

बाँस घरों के निर्माण, कृषि उपज बेचने के लिए सड़कों के किनारे झोपड़ी निर्माण, घरेलू सामानों, बाड़, कृषि उपकरणों, सांस्कृतिक उपकरणों सहित अपने विविध उपयोगों के कारण ग्रामीण साथ ही साथ शहरी लोगों के सामाजिक-आर्थिक जीवन में एक महत्वपूर्ण भूमिका अदा करता है। आइजोल में बाँस नालों के पूलों एवं निरन्तरता और अध्ययन क्षेत्र से प्राप्त इसके उपयोगिता परिवर्धित उत्पादों का मूल्यांकन करने के लिए वर्तमान अध्ययन किया गया। पी.आर.ए. का उपयोग करके स्थानीय बाजारों में बाँस उद्यमियों से आँकड़े एकत्र किए गए और तीन संस्तरों, यथा- फुटकर, उद्योग और उपभोक्ता स्तर पर सर्वेक्षण किया गया। सभी बाँस प्रजातियों में *बम्बूसा टूल्डा* बाजार में पाई गई सबसे आम प्रजाति थी यद्यपि *मीलोकेना बेसिफेरा* बाँस प्रजातियों में प्रधान रही, जो राज्य में वर्धमान स्टॉक का करीब 95% तक योगदान करती है। *स्किजोस्टिकीयम डुलोया* अपने दीर्घ पर्वान्तर और निर्यात उत्पादों को बनाने के लिए नमनीयता के कारण सबसे पंसदीदा प्रजाति रही है। बाँस नालों के एक बंडल की कीमत रुपये 170 से 200/-तक होती है। जबकि डैप (सपाट बाँस) की कीमत रुपये 200 से 250/- तक होती है। शहर में बाँस नाल बाजार का कुल साप्ताहिक बिक्री रुपये 487,250.00 थी, जिसमें से 2,685 बाँस नालों की आपूर्ति की गई और 1,466 बंडल साप्ताहिक बेचे गए। अध्ययन से यह भी ज्ञात हुआ कि बाँस नाल का बाजार 27 पुरूष और 25 महिलाओं के लिए रोजगार उपलब्ध कराता है, जो अध्ययन क्षेत्र में कुल 52 व्यक्तियों को रोजगार देता है। अध्ययन के परिणाम बाजार में बाँस नालों के रूझानों और आइजोल जिला एवं कुल मिलाकर राज्य में बाँस संसाधनों द्वारा उपलब्ध कराए गए इसके सामाजिक-सांस्कृतिक एवं आर्थिक महत्व का मूल्यांकन करने में सहायता करेंगे।

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