# Bamboo Status and Trade Vulnerability: A Central Himalayan Case Study

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## Abstract

World over bamboo forms an important resource for livelihood of rural communities. India has maximum area under bamboo and the second richest country in terms of bamboo genetic diversity. The country produces nearly 4.5 million ton of bamboo annually, which is mainly consumed for pulp, housing, rural uses, fuel and packing purposes. In Central Himalaya using bamboo is an age-old practice as a source of livelihood. Despite of that the social situation of bamboo artisans is quite bad and they are at the bottom of social hierarchy; similar situation prevail in various developing countries. These artisans have the expertise and skills for processing bamboo and making diverse utility items, however they do not get the full price for their labour due to unavailability of markets. In this paper an attempt has been made to provide status of bamboo in selected countries along with a detailed situational analysis of bamboo artisan of Uttarakhand state in Central Himalaya. In the State available Bamboo resources are also depleting due to overexploitation. Information has been provided on status, species used, and craft development from bamboo along with skill appraisal and gap area identification of communities involved in this trade. A possible approach for sustainable development of bamboo sector and people involved with this trade has been suggested.

## 1. Introduction

Bamboo is an important resource in many countries particularly for rural poor (Frith 2008, Ram and tendon 1997, Kumar 2009). It is the fastest growing plant on the earth and characterized by woody, mostly hollow culms with internodes and branches at the culms nodes. India has over 8.96 million hectares area underneath bamboo that forms 12.8% of the total net forest cover (Anonymous 2005a, b). Bamboo plays an important role in the socio-economy of tribal and rural people and has been intimately associated with mankind since ancient time (Anonymous 2007). All governments committed to upgrade the livelihood of their people along the conservation of natural resources. In general in the Himalayan region the dependence of traditional craftsmen on bamboo resource is under high stress because of dwindling bamboo habitats and resource, high labour cost and low returns; a situation much similar to many parts in India as well as other developing countries (Sastry 2001, Saxena 2004, Lovovicov et al. 2007). Government of India has launched a National Mission on Bamboo Technology and Trade Development (NMBTTD) (Anonymous 2006) with a focus to adopt a holistic and integrated approach for using Bamboo as the engine for development of the country. Accordingly various state governments have started

working in this direction, and the Govt. of Uttarakhand is no exception to that. It has initiated a program on bamboo and taken step for plantations of selected species by establishing the Uttaranchal Bamboo and Fibre Development Board. However, despite of diverse efforts the status of the livelihood of bamboo artisan is highly discontented, which clearly highlights that appropriate and participatory approach is required to target the real problems of the trade and people involved in it. The state government is looking for strategic information/approaches to develop bamboo sectors and people involved with this trade. Considering this, the present work has been undertaken to assess status, species used and dependence on bamboo resources along with a rapid skill assessment and gap area identification of artisans for development of bamboo sectors in the state. It is expected that the information on ground level situation of marginalized bamboo craftsmen and resource will not only provide sufficient recognition and basis for accommodation of the artisans' concerns in various government run programs, but also strengthen bamboo conservation in the state. The finding of the study can also be applicable to other developing countries as well.

## 2. Methods

### 2.1 Study area

The methods employed in this investigation were designed in order to provide baseline information on the use of bamboo in the local system. Information on bamboo area, species, utilization and developmental sectors for bamboo in selected developing countries was gathered from different sources and published materials. To assess resource utilization patterns and the socio-economic status of bamboo-artisans, the Central Himalayan state of Uttarakhand, which comprises a total area of 53483 $km^2$ and a population above 110 lakhs, having 24637 $km^2$ area under reserved forest, 9883 $m^2$ as protected forests and 131 $km^2$ as private forest, was taken for detailed study. In the State the bamboo forests are dominated in lower hills areas in Siwalik hills though the bamboo species were found growing all over different elevations zones in the state (Sundriyal & Sundriyal 2011).

### 2.2 Study design

The information on bamboo resource in terms of area, species, and utilization was gathered from secondary information. Central Himalayan region i.e. Uttarakhand was taken as a case study for this study. The total area under bamboo in the state was obtained from the records of the Forest Department (Anonymous 2005c). Documentation of the community indigenous knowledge system (IKS) on bamboo artifact was done through standard questionnaire surveys and formal-informal interviews with the local people. A total of 20 villages covering four districts of the state (viz. Almora, Bageshwar, Uttarkashi and Nainital) and comprising 132 bamboo- and 560 ringal-artisan families were surveyed for the study. Selection of the districts and villages were made with the help of discussion with the experts, NGOs, BFDB and other resource persons. Detailed information were gathered with reference to species used, areas and mode of collection, quantity of raw material used for different products, design used and finishing of the product, and mode of selling of the product. The cost: benefit analysis was done using all cost involved in material purchage, labour in collection, processing and product making and net sold prices for different items. The socio-economic status of the artisans was assessed by gathering information on the net income from bamboo and other productive resources, monthly expenditure on procuring different household items, and net saving if any. Discussions also held with the artisans about their ways and means for bamboo resource management and conservation, the demand and supply status of the resource, and the community need of the products. To assess trade related

problems a rapid skill assessment and gap area identification exercise was conducted with artisans with the help of subject experts during a training session. The important segments of rapid skill assessment comprised artisans skills on processing of bamboo, resource ownership and social hierarchy, commercial know-how and awareness related to policy/programs. Accordingly, the skills were ranked as poor, low, moderate and high. Vulnerability of the trade was ranked based on the total scores obtained. All the data and information were crosschecked at various levels and analyzed statistically.

## 3. Results

### 3.1 Bamboo Status in Developing Countries

India comprised maximum area underneath bamboo, China harbors maximum bamboo species, whereas other countries have intermediatory range (Tab. 1). Bamboo is used for so many different purposes in various developing countries. In India it is used in pulp industry, in housing, for rural uses, furniture and for packaging (Tab. 1). In each developing country some major sectors have been identified for the development of the bamboo. In India resource plant management, genetic improvement and socio-economic development are identified as a major sector for development (Tab. 1). In India maximum standing stalk of bamboo is in North eastern region which includes 7 states. Arunachal Pradesh is having maximum standing stalk of bamboo (350000 $m^3$) with 53 species, followed by Assam and Meghalaya. For Central Himalayan state of Uttarakhand total area under bamboo is estimated 0.139 million hectares. In rural areas it is mainly used for making baskets, handicrafts, for fodder and in other household courses.

Table 1: Bamboo area, species, utilization and developmental sectors for bamboo in selected developing countries (Source- secondary information)

| **Country** | **Area (x$10^3$ ha)** | **Species/ genera** | | **Sector for development**** |
|---|---|---|---|---|
| | | **Genera** | **Species** | |
| India | 8960.00 | 23 | 124 | RPM, GI, SE |
| Indonesia | 5000.00 | 11 | 49 | RPM, SE |
| China | 4400.00 | 39 | 500 | RPM, SE |
| Malaysia | 420.00 | 10 | 50 | RI, RPM, SE |
| Bangladesh | 199.60 | - | 33 | PC, RPM, GI |
| Nepal | 62.89 | 11 | 53 | PO, SE |
| Thailand | - | 14 | 60 | RPM, SE |
| Myanmar | - | 17 | 100 | RI, PR, RPM |
| Philippines | 39.21 | 17 | 62 | RPM, SE |
| Chile | 4000.00 | 1 | 14 | RI, PR, PC |
| Kenya | 152.00 | 3 | 3 | RI, PR, GI |
| Tanzania | 123.00 | 3 | 3 | PR, PO |

** Major Sector for development: RPM= Resource & plantation management, GI= Genetic improvement, SE= socio-economic development, PO=processing, PR= propagation, RI= resource inventory, PC= pest control,

### 3.2 Status of Bamboo in Central Himalaya

An inventory of bamboo species for entire Indian Himalayan states (12 states) was prepared that revealed a total of 79 species in 22 genera. In Uttarakhand state bamboo is broadly categorized

into two broad groups, viz. bamboo (thick, slender like bamboo) and ringal (thin, reed like, spine less bamboo), and communities dependent on them are called *Baruree* and *Rudia,* respectively. A total of 8 bamboo species in 5 genera were recorded that grow naturally in the state, viz. *Dendrocalamus strictus, D. somdevai, Dendrocalamus patellaris, Bambusa bambos* (all bamboo species), and *Arundinaria falcata, Thamnocalamus falconeri, T. spathiflorus*, *Chimonobambusa jaunsarensis* (all ringal species). *D. strictus* grow in low elevation areas and has been categorized as most revenue earning species for the state. *D. somdevai* is much similar to *D. hamiltonii* except for the wall thickness thus often confused with for later species. The other two species (*D. patellaris, B. bambos*) show restricted distribution. Among ringal-bamboo species, *Thamnocalamus falconeri* was most commonly used species. *T. spathiflorus* recorded at highest elevation among all. *A. falcata,* and *C. jaunsarensis* are other two ringal species. The local people identify most of the bamboo and ringal species with their local names and they are used for different purposes. Besides, being used for making diverse utility items, the leaves of bamboos and ringals are collected to feed animals. The elevational distribution of these species reveals that one species occur at low-hills (< 1000 m), four species at mid-hill (>1000- 2500 m) and two in high-hills (>2500 m elevation). Ringal species grow at mid and high hills areas. Besides, a large number of bamboo species are planted in recent times for pulp and other commercial needs particularly in Civil Soyam and Van-panchayat forests of state. An analysis of area under bamboo revealed that the state has 66000 ha and 15620 ha area under ringal and bamboo, respectively. Of the 13 districts of Uttarakhand, Champawat, Haridwar and US Nagar districts had only (1-3 spp.) bamboo species, while Bageswar, Chamoli and Uttarkashi comprised only ringal species. In all other districts, both bamboo and ringal species are found.

Bamboos found growing as an associated species in forest areas and most of the forests located at low-hills that were under the control of Forest Department. The bamboo artisans, however, live at mid and high hills. The requirement of the bamboo artisan in mid hill is met from the privately owned bamboo grooves by villagers. Such grooves comprising 3-5 clumps of bamboo maintained in wastelands, gorges and stream banks. The cost of bamboo culm varied from Rs. 20-30 in different villages. There is no specific management done for maintaining and increasing the area under bamboo by these owners. It is because bamboo being a socially unaccepted species in Uttarakhand, therefore not adopted by the villagers in plantation activities. A greater awareness is desired for plantation of various bamboo species by local communities. Most of the bamboo and ringal habitats fall under Reserve forest, Civil-soyam and Van-panchayat areas owned by the Forest Department, Revenue Department and Village Forest-council, respectively. The villagers collect the ringal on nominal charges for their domestic need. However the additional requirement is met on the permit basis by paying a royalty to the Forest department. In areas where collection of ringal is banned, it was being collected illegally.

## 3.3 Diversity of Bamboo article and income

Analysis of 20 villages revealed that the craftsmen make over 65 articles from different bamboo species that are used in local system. However, only 14 articles are widely used at present and also marketed within the villages as diverse agricultural utility items (Table 2). Generally most of the items are made equally from bamboo and ringal showing that both the groups have equal use in making different products. Basket making of different shapes and sizes was very common that are used for diverse purposes, from storing small minor items in house to carry agricultural produce and other items. The craftsmen spend 2-6 hrs for collection of bamboo and 6 hrs to 2 days for collection of ringal. These data revealed that the quantum of bamboo and ringal used is scarce, therefore the trade is run at subsistence level. Most of the ringal growing areas have shrunken to far-flung areas from villages, which increased cost and time of raw material

collection. Making baskets of different shapes and sizes is very common that are used for storing food and agricultural produces and minor items/products in a house, transport farm produces, and in various ceremonial works (Tab. 2). The self-life of the product also varied with the type of items made. The cost of raw material differs from place to place in villages and in towns. At village level most of the items sold at cheap prices that are affordable to villagers (Tab. 2). Only grain-storage baskets cost over Rs. 100, though its popularity has decreased in recent times. It is estimated that the total selling cost of the items at village level is 10-30% higher when they are sold in the markets in comparison to villages. Despite of that the craftsmen prefer to sell items in the villages because taking articles to the market involves cost of transportation, labor from village to road head and time of selling in the market involving significant cost in all these activities. It was also recorded that selling of the products in villages involves returns in cash and/or kind. Most of the time manufacturing of the items is demand driven to meet the need of the villages. It is also interesting to note that the bamboo artisans have been making these items for generation.

Table 2. Selected Bamboo Crafts of used in household in Central Himalaya

| **Items** | **Local name** | **Market cost (Rs)** |
|---|---|---|
| Big basket | *Tokri* (Big) | 40-50 |
| Winnowing tray | *Supa* | 30.0 |
| Small basket | *Dalia* (small) | 30-45 |
| Big basket with handle | *Kandi* (Big) | 40-50 |
| Small basket with handle | *Kandi* (small) | 25-30 |
| Round basket | *Chapri* | 25-30 |
| Small round basket | *Chapri* (small) | 20-25 |
| Food grain storage basket | *Topra* | 130-150 |
| Round basket for sleeping small baby | *Choura (Jhuger)* | 160-175 |
| Carrying basket | *Doka* | 125 |
| Carrying basket | *Solta* | 100.0 |
| Mat | *Moste or Bishal* | 700-800 |
| Hat | *Topi* | 100.0 |

Marketing is done independently, mostly in villages and sometimes in towns. Often the items are sold on lend basis or in kind basis as substitute to the products. It was more prevalent in the areas where small shop owners act as the middlemen, who purchase the bamboo items from artisans as a replacement of the grocery items. There was no use of other material with bamboo except for use of ghingaroo (*Pyracantha* sp.) stems for tying basket by some artisans. That means use of bamboo and ringal was high, which otherwise would have been used for making more articles if some fibers, wood or metal etc. used with bamboo. In overall, the market for bamboo has shrunken, some cheaper or more durable items have replaced the traditional ones, and therefore a large number of bamboo-items are disappeared.

3.4 Bottlenecks of Bamboo Trade

An assessment of the artisans' skills, resource ownership, commercial knowledge and access to govt. policy was done (Tab. 3). It was interesting to note that artisans possessed moderate levels of skills for bamboo/ringal processing and their major marketing is limited to villages. They however, had poor control on resource and its management. Because of small land holding sizes, they are solely dependent on bamboo trade. Furthermore most of the artisans showed their dependence on bamboo trade that clearly shows a low level of alternate livelihood skill. Status of their commercial knowledge and potential revealed that most of the artisans had poor knowledge for new tools, designs and market oriented products. As the overall trade is labor intensive, the new generation has least interest to continue it. Because of low socio-economic status the investment ability of artisans is very poor. The situation is further worsening because of their lack of awareness for govt. schemes, loans and other policies. No artisans groups and co-operative was seen that could negotiate with govt. or other agencies for their benefit. The artisans however showed good response to capacity building and skill development courses. The overall assessment of the ongoing trade revealed that it is run at subsistence level, which is not profitable. To improve the status of traditional artisans, strengthening of resource ownership and its management, developing commercial potential, awareness on policies along with capacity building, and their orientation for co-operative development are key sectors that need to be addressed simultaneously.

**Table 3.** Rapid Skill Assessment and Gap Area Identification of Bamboo Artisans

| | Category | A | B | C | D |
|---|---|---|---|---|---|
| | | **Poor** | **Low** | **Moderate** | **High** |
| | | **1** | **2** | **3** | **4** |
| ***i.*** | ***Skills and processing of resource:*** | | | | |
| a) | *Traditional product making skill-* | | | | |
| 1 | Identification of proper culms for use | | | | √ |
| 2 | Bamboo splitting skills | | | √ | |
| 3 | Interlacing skill | | | √ | |
| 4 | Products finishing skills | | √ | | |
| b) | *Product marketing-* | | | √ | |
| 5 | Village markets | | | √ | |
| 6 | Town/ city markets | √ | | | |
| ***ii.*** | ***Resource ownership and social hierarchy:*** | | | | |
| 7 | Land ownership | | √ | | |
| 8 | Resource (bamboo) ownership | √ | | | |
| 9 | Plantation and management skills | √ | | | |
| 10 | Social status | √ | | | |
| 11 | Alternate livelihood skill | | √ | | |
| ***iii.*** | ***Commercial knowledge and policy:*** | | | | |
| *a)* | *Information and skills for new products-* | √ | | | |
| 12 | Knowledge on new tools | √ | | | |
| 13 | Use of modern designs and new product | √ | | | |
| 14 | Interest of new generation | | √ | | |
| *b)* | *Investment potential-* | | | | |
| 15 | Investment ability | √ | | | |
| 16 | Access to govt. schemes in remote places | √ | | | |
| 17 | Loan facilities | √ | | | |
| *c)* | *Policy information-* | | | | |
| 18 | Policy awareness | √ | | | |

| | | | | | |
|---|---|---|---|---|---|
| 19 | Existing government schemes | | | √ | |
| 20 | Training/capacity building interest | | | √ | |
| | Column total | **11** | **08** | **18** | **04** |
| | Grand total (A+B+C+D) | | | | **41** |
| | Less than 20: highly subsistence trade (prone to extermination) | | | | |
| | 21-60: Subsistence (loss making) | | | | |
| | More than 61: Economically-viable (profitable) | | | | |

## Discussion

Building on local knowledge and resources is the key for regional development as it would reduce the chances to de-skill people or increase their dependence on external resources. Consistence supply of specified quantity bamboo is the key to growth to the artisans along with value addition. An understanding of the concept of 'problem' and 'problem solving' from local perspective would be helpful to embed the training of the participants to build their knowledge & experience. This is required to enhance effectiveness of any problem.

Bamboo has been an important resource for rural people in many developing countries (Sarkar & Sundriyal 2002 Singh et al. 2003). All governments are trying hard to develop sector so as to make it an important source of rural area development. India is also trying to develop bamboo sector. In Central Himalaya Uttarakhand state exhibits substantial area under bamboo and selected bamboo artisans have been involved in this trade for generations. It is important to assess the knowledge and constraint of bamboo artisan to develop this sector and are dependent on bamboo resources for generation and they used to collect it free of cost from forest areas until British Government introduced a permit system charging a levy fee for procuring material from forest areas. Unfortunately the same practice prevailed even after the independence, and in recent times the status of bamboo has deteriorated in forest areas. At mid-hills the bamboo is now restricted to the individual holdings in the form of a few grooves only (Sundriyal &Sundriyal 2009, 2011).

As this material is very limited, to think of running a profitable enterprise on this resource does not seem to be realistic, thus deserve a strong policy to be formulated for these artisans. The major clients as bamboo users for Forest Department are paper mills and other non-artisan users. Only a small share of bamboo (only ringal in case of Uttarakhand) goes to artisans. The paper mills get bamboo on highly subsidized rates on long term price (Saxena 2004). Artisan has to apply for a permit to procure bamboo from forest, which is time taking procedure, therefore people collect the bamboo from the forests. The procedural delays are also need to be looked into to ease the process of permit applications. The benefit of government run schemes for the benefit of such marginalized communities often do not yield positive results because of various reasons including lack of organizing power, risk taking capacity, and awareness of artisans about the policies. Another major constraint is that bamboo is considered as a tree and not as minor forest produce by the Ministry of Environment & Forests, Govt. of India, therefore banned for the extraction. Furthermore the artisans require green bamboo whereas there is a ban on the green felling all over. The rules are desired to be amended for bamboo to include it as non-timber forest produce along with streamlining the procedure for making this resource available to the local craftsmen.

The status of the bamboo in private land is also not up to the mark as such clumps are subjected to grazing and other misuses, again increasing the pressure on the resource. No cleaning of clumps is practiced. There are huge areas nearby all the artisans' villages that are devoid of any forest cover, such areas should be targeted for planting bamboo saplings so that the bamboo-artisans could take its benefit in long run.

The situation of the artisans described here is also similar to most parts of India and other developing countries. Therefore a people centered approach is required for development through which artisans can be involved in a process to learn, mobilize and manage resources in order to produce sustainable and equitably distributed improvements to their quality of life (Korten 1990). There is a need to ensure resource availability to the artisans, and their link need to be increased with market for high trade. As the traditional articles made are limited to agricultural utility items that are big in size with rough finish and sharp edges, poor in strength, non-uniform in texture and shape, and low in durability; the product range is limited to various types of baskets for storing and carrying household items, and some other utility items, which are not market-friendly as they need lots of space for carrying; there is a need to orient the trade towards market-demanding items. For this purpose artisans are used to be trained for use of new tools, designs and new products. Community is need to be organized to form cooperative to get the benefit of government loans and other schemes. Use of other material along with bamboo can also save some material. There is also a need for large scale plantation of bamboo species so that the future demands of the material could be met from farmers' fields only. If some of these approaches can be implemented the resource and people involved can earn a sustainable livelihood from bamboo sector.

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