

Bamboo growing and its market development potential for sustaining rural livelihoods and poverty reduction in eastern Nepal

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The Eastern Nepal is rich in bamboo resources due to favourable climate. The decreased supply of forest products as a result of increased forest degradation has considerably raised interest of rural households towards bamboo growing. The multiplicity of uses has made bamboos one of the most widely cultivated families of plants both in the Terai and Middle Hills of eastern Nepal. Bamboo and its products are readily sold and bought in markets. Bamboo is an important source of income and sustaining livelihoods for bamboo grower households, craftmakers and traders, many of whom are socially and economically disadvantaged. The development of bamboo resources and their commercial utilisation aspects are not yet fully explored to its potential. The development of bamboo resources that includes its marketing and wise use can help reduce poverty in Nepal. This paper explains recent trends of bamboo use, marketing trends, economics of bamboo growing, income generating aspects, and its development potential in eastern Nepal.

Keywords: Bamboo, Terai, Middle Hills, Private farmlands, Eastern Nepal, Market channels, Bamboo growers, Craftmakers, Traders, Livelihoods, Poverty reduction

The Ninth Five Year Plan (1997-2002) of His Majesty's Government of Nepal (HMGN) has given high emphasis to poverty alleviation programmes. The Tenth Five Year Plan under preparation is also expected to be focused on poverty reduction. The HMGN aims to reduce this level to 21% by 2015. Bamboos are one of the important renewable natural products that can help reduce poverty if grown and managed on sustainable basis.

Bamboo has intimately been associated with human being since ancient time in Nepal. Bamboos are an important component of rural farming system, as they play critical role in rural economy and help sustain livelihoods of many rural households, that include socially and economically disadvantaged groups (Das 1992; Thapa *et al.* 1998; Das 1999). Bamboos are mostly grown on private farmlands and also occur in natural forests. They are also now increasingly introduced in community forests. Fifty species of bamboos are already recorded in Nepal (Das 2001).

The establishment of bamboo-based cottage industries can be one of the important means of

improving the income level of poor people in Nepal. To make bamboo-based handicrafts, very basic tools are needed and can be made locally. The raw materials are locally available all over Nepal. Bamboo crafts are readily saleable and therefore directly contribute to the household economies of craftmakers family. Bamboo craftmaking is often important to many poor women in Nepal as it can often be done at home in harmony with domestic tasks. However, the information on marketing and income generating potential of bamboos is lacking in Nepal. The study is an attempt to provide necessary information on marketing aspects and developmental implications of bamboos that includes its role towards poverty reduction in Nepal.

Methodology

Study Area

A detailed socioeconomic study was conducted in 1996 on bamboos in eastern Nepal in which household survey was conducted in altogether 13 villages and market survey at major urban centres

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and market places in Morang, Sunsari and Dhankuta districts of Koshi Zone. A repeat field visit is made to the study area in April 2002 to monitor any significant changes in prices and marketing trends of bamboo and its products.

Research Methods

A multi-faceted research approach was adopted, combining techniques used in the social sciences such as RRA/PRA and those more familiar to biological scientists such as ranking, diagramming, and formal surveys. The use of different methods such as surveys with semi-structured interview, focus group meetings, key informant interviews and personal diaries of some served as a crosscheck (triangulation) on the reliability of information obtained from one method against another to collect the qualitative and quantitative information.

Fifty-one producers who sold bamboo were interviewed. Altogether, 144 craftmakers were interviewed of which 50 were based in the Terai towns, VDCs and weekly market places; 84 in Dhankuta district, and 10 from Homtang VDC in Bhojpur district who came to sell products at weekly markets in the Terai and Dhankuta. Altogether, 58 Bamboo traders located in Biratnagar, Dharan, Itahari, Duhabi and other market places were interviewed.

Findings and Discussion

Findings on existing utilisation pattern of bamboos, marketing channels and the marketing potentials of bamboos, cost benefit analysis of bamboo plantation and income generation aspects in eastern Nepal will be discussed.

Bamboo utilisation pattern, its marketing and income generation potential in eastern Terai and Midhills

Bamboo is commonly used in eastern Nepal for house construction, walling of huts, thatching, roofing, grain storage (*Bhakar*), scaffolding, walking sticks, basket making, furniture, fencing material, agricultural implements, and tool handles. Bamboo leaves are an important source of fodder. Many of the bamboo species produce edible shoots, which are very popular as food and pickles. Bamboo also has many small but important uses such as pots and pipe for

homemade millet beer (*tongwa*), fishing rods, fishing traps, handicrafts, packing cases for tea and fruits, poultry cages, pipes for water supply and irrigation, cradles, cart yokes, bullock carts, ladders, winnows, and sieves for cleaning grains. Besides that, bamboo has been widely used for soil conservation and road stabilisation works in eastern Nepal.

The scarcity of timber due to increased forest degradation has made it too expensive to afford and a luxury item for many people. The wide distribution and natural occurrence of bamboos coupled with low cost and easy availability have increased its popularity in house construction. Bamboo-based furniture has increasingly become a common item both in rural and urban areas. As the urban centres are expanding, the demand of bamboo for scaffolding and construction purposes has significantly increased in recent years.

Bamboo is increasingly an important source of income and sustaining livelihoods for many households in the eastern Nepal as it is readily bought and sold both in the rural and urban areas. As demand increases, so do the increase in number of bamboo traders and craftmakers. The demand is outstripping supply and hence the price of bamboo has sharply increased in recent years. Bamboo culms and crafts are also exported to India where price is even higher.

Bamboo shoots are considered a delicacy by the people of hill ethnic origin and are increasingly popular among the Terai ethnic groups. Bamboo shoots are also readily bought and sold and its market has expanded considerably in recent years.

There are some villages where many people are making woven products, handicrafts and furniture for income. In the Terai, there are some socially and economically disadvantaged ethnic groups such as *Dom* and *Mahali*, whose main source of income was income from making woven products.

Market channels for bamboo products in eastern Nepal

Marketing channels for culms and branches in eastern Nepal

The marketing channels for bamboos, *i.e.* movement of bamboo culms and branches from the homegarden to the end user are illustrated in Figure 1. Almost all

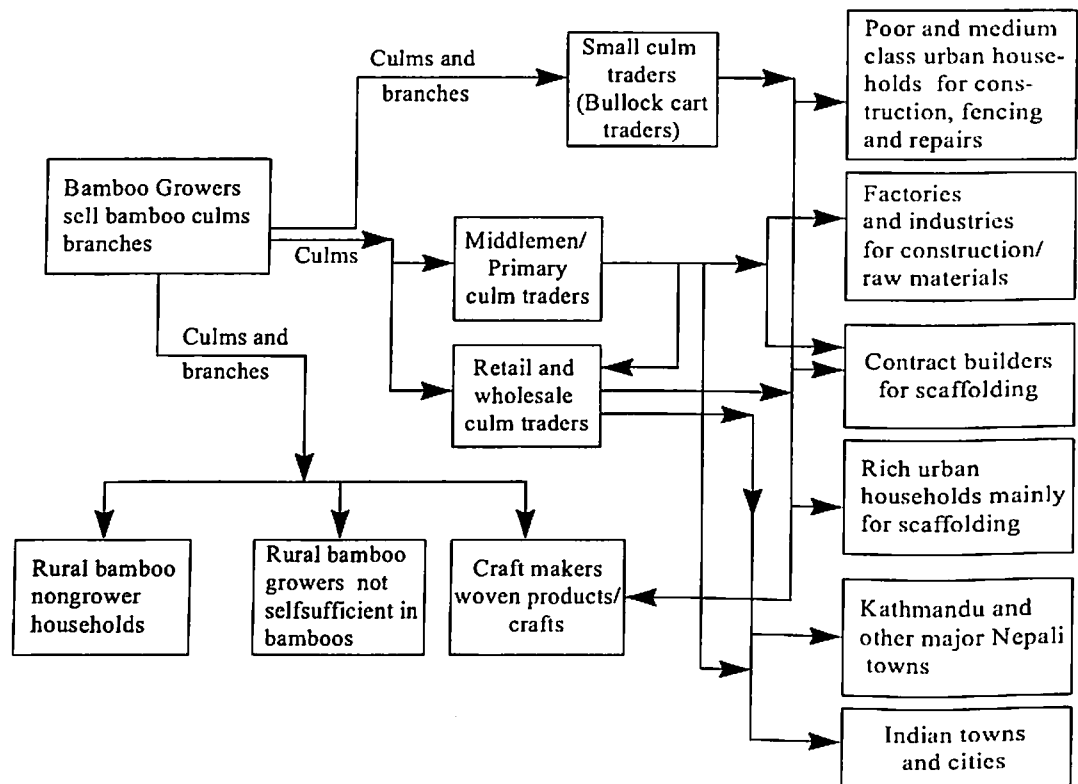


Fig 1 : Marketing channels for Bamboo culms and branches in Eastern Nepal

bamboo culms marketed and consumed in the study area were from homegardens. The major urban centres such as Biratnagar, Dharan, Itahari, Duhabi and small market centres on the roadside between Biratnagar and Dhankuta and East-West Highway are consuming a considerable number of bamboo culms. Besides that, newly established bamboo flooring and panelling industry at Hetauda have started consuming bamboos of eastern Nepal. Similarly, bamboo matboard industry at Butwol is purchasing bamboo mats from eastern Nepal for secondary processing.

The major sources of supply of culms at the major market centres are the rural villages of Morang and Sunsari districts. Bamboo growers, both small and large, in these villages sold bamboos to the traders (Figure 2). Culms are also transported from roadside villages on the Dharan-Dhankuta road and Chatara.

Bamboos from midhills through Sapta-Koshi River at Chatara

In Chatara, a small but the main market centre on the bank of Sapta-Koshi River, bamboo culms are transported from hill villages of Udaypur, Khotang,

Dhankuta, Bhojpur, Sankhuwasabha and Okhaldhunga districts which lie on the side of its main tributaries. The bamboo culms were also occasionally transported to Koshi Bridge on the East-West Highway from where they are exported to India through the Indian border town of Bhimnagar. The sailors (*Majhi* or *Rai*) in groups of four buy culms from these villagers and transport 300 culms in one trip by making two bundles of 150 culms each. The culms are stacked together and tied with ropes for rafting. 2 sailors floated each bundle. It takes 2-3 days to bring the culms to Chatara. The culms are purchased by the Chatara middlemen and retailers who then mainly sell to retailers in Dharan, Kathmandu and other urban centres. In 1996, there were four main middlemen/stockists in Chatara who between them stocked about 50,000 poles per which has reached up to 75000 culms annually in 2002.

Mode of purchase and harvest

In most cases, bamboo growers perform very limited marketing services. The value added by these services is captured by the middlemen or traders who often have the capital and the necessary facilities. Most

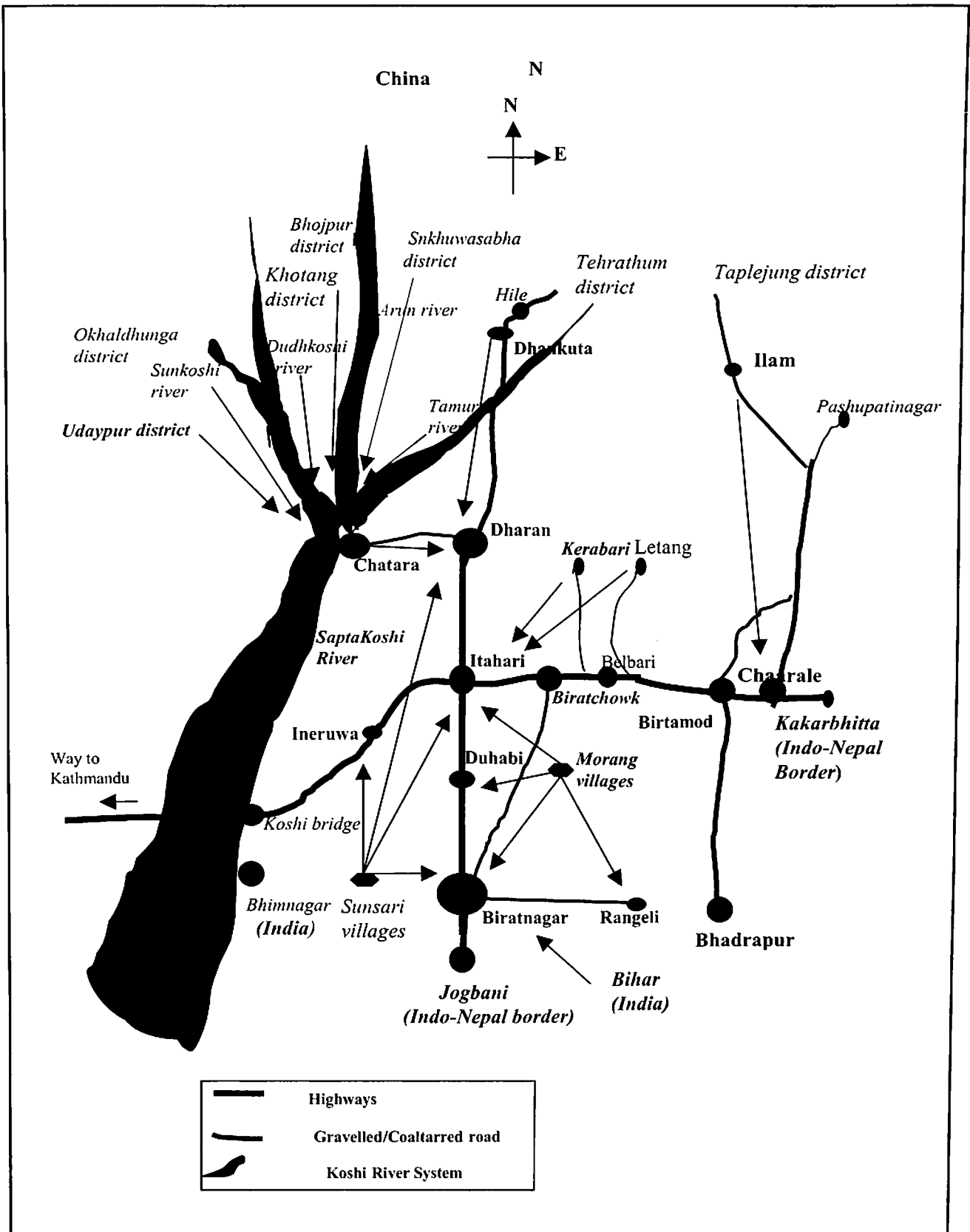


Fig 2 : Sources of Bamboo Supply at the Main Market Centres in Eastern Nepal

growers do not take bamboos to the market themselves. The traders and/or the middlemen come to the villages and talk preferably with large bamboo growers and also occasionally with small bamboo growers, and enter into an agreement with a single large bamboo grower or a number of small growers in a village. The labour to fell, load and reload is carried out by persons who are either family members or labourers from the trader's native village. In some cases, local labourers are also employed. The price is paid for the whole bamboo culm including branches whether the traders take branches or not. The small traders/middlemen who use bullock carts also transport branches but is not done when trucks are used.

Socioeconomic profile of traders and buyers

Most of the trade is carried out by small traders who take them to the town and major market centres on bullock carts and sell them directly to local home builders, contractors and factories who buy them generally for construction and scaffolding. A considerable number of households, which includes poor, landless slum dwellers, and middle class households in these towns, buy bamboo culms and branches for house construction, fencing and repairs. There are very few middlemen involved in the bamboo trade. Unlike in Kerala, India (Krishnakutty *et al.* 1995), and in South-east Asian countries. Bamboo trade is still in a developing stage where most of the traders are newcomers to the profession.

Bamboo stacking

Bamboo poles are stacked usually on land rented from landowners or on Municipality owned land. In most cases, retail traders rented one or two rooms near the storage site for office and living. Some retailers in Dharan have their own house as the office and have open place for storage on their own land.

Bamboo trade at major market centres and their sources of supply

In Biratnagar, bamboos are mainly brought from VDCs of Sunsari such as Dewanganj, Rajganj, Belaha, and Siswani (Fig 2). Bamboo culms are also brought from VDCs in Morang. Sometimes, bamboos also come from Indian villages bordering Nepal. Most

of the bamboo culms transported to Biratnagar were by bullock carts. The bullock cart traders, nicknamed *Belgaadinwala*, move bullock carts carrying culms and bundles of branches around residential areas or stay at some well known places where bamboos are bought and sold. Almost all *Belgaadinwala* were of Terai ethnic origin. Four main places where bamboo are permanently displayed for sale are: (1) Bijuli Adda Chowk, (2) Tintoliya, Roadsesh, (3) Haatkholra and (4) Arun Cinema. The *Belgaadinwala* bamboo traders also take them around weekly market places (*haat/hatiya*) in Biratnagar and market centres on the Biratnagar- Itahari road.

In Itahari and Dharan, bamboo culms come from several villages near national forest in Morang and Sunsari districts such as Letang, Kerabari, Gothgaon, Danghihaat, and Panmara. Bamboo culms are also transported from Chatara Bazaar and Dhankuta by road. In the past, bamboo also used to come from Ilam and Jhapa but this is very rare now due to constant demand of bamboo in Bhutanese refugee camps in Jhapa. Unlike in Biratnagar and Itahari, *Belgaadinwala* are not involved in bamboo trade in Dharan.

Market channels for Bamboo crafts in eastern Nepal

Almost all craftsmakers in the Terai marketed their bamboo crafts themselves. The crafts marketed in the Terai were different types of baskets (*dhakiya*, *daliya*, *koniya*), winnows (*nanglo/soop*), Sieves (*chlain*), grain store pots (*Kotba*), hand fan (*pankha*), chicken cage (*mohala*), stools (*mudha*). The *doko* (a basket commonly used in the Midhills to carry goods) was also made and marketed and largely used by people of hill ethnic origin in the Terai. *Dhakiya* was the replacement of *doko* among the Terai ethnic groups. The winnows (*nanglo*) made by the craftsmakers of Bhojpur district are very popular and have replaced locally made winnows. The winnows are marketed by the craftsmakers themselves or traders involved in the spice trade and are from the same village. Bamboo crafts in Dhankuta district are mostly marketed by craftsmakers themselves and also occasionally sold to local middlemen or traders who market these products in the cities or sell them to other city traders. The bamboo crafts marketed are baskets (*doko*, *dalo*), mats (*mandro*), umbrella (*ghum*), stools (*mudha*), *mohala* and *perungo* (cages to carry chicken and piglets), small tea packing boxes (*phipi/bokti*), furniture and handicrafts.

Marketing channels for Bamboo shoots

New bamboo shoots as vegetables (*tama*) were sold mainly by bamboo growers of the Midhills (Udaypur, Dhankuta and Ilam districts) in eastern Nepal. The most commonly used species is Tama bans (*Dendrocalamus hamiltonii*) and occasionally Kalo bans (*D. hookerii*), *D. strictus* (Kath bans), *D. giganteus* (Dhungre/Rachhasi bans) and *B. tulda* (Japhta Bans). Bamboo growers sold them to the visiting traders or they took it to the traders in Dharan and other major market centres. In Dhankuta, *tama* was marketed by the bamboo growers themselves.

Most commonly traded bamboo species in eastern Nepal

The most commonly traded bamboo species in the eastern Nepal is *Bambusa nutans* subsp. *cupulata* (Mal/Makla bans). In the eastern Terai, *Bambusa tulda* (Japhta bans) and *Bambusa balcooa* (Bholka/Harouti bans) were other important species. In the Midhills, *Dendrocalamus hamiltonii* (Tama bans), *Dendrocalamus hamiltonii* var. *undulatus* (Choya bans) and *Dendrocalamus hookerii* (Kalo/Bhalu bans) were other important species.

Farmgate price of bamboos

The increase in farmgate price is approximately threefold in the Tharu villages in Morang between 1992/93 and 2001/2002 (Table 1). The average farmgate price of small to medium size culms (7-9 cms diameter) of *B. nutans* and *B. tulda* increased from Rs 20 in 1992/93 to Rs 55 in 1995/96. Bholka bans

fetched higher prices than Mal bans and Japhta bans due to bigger diameter and length and higher strength and its farmgate price increased from Rs18 to Rs75 in the same period. The farmgate price has also considerably increased in the rural area of Dhankuta district.

The factors that affect farmgate price are socioeconomic conditions of the household, willingness to sell and awareness of its demand in the local and urban areas. The distance from the urban area and its accessibility are other important factors. In the Terai, many bamboo grower households keep bamboo for emergency needs. The middlemen/traders in the Terai pay Rs5-10/culm less of normal price as they pay half of the amount in advance or buy in bulk quantity. Bamboos are not harvested annually but in alternate years or at longer intervals. However, such trends are not common in the Midhills but are increasingly evident at the roadside. If there is no immediate cash need, higher prices are sought by growers. The farmgate price is Rs 5-10/culm higher in rainy season due to growers' unwillingness to sell as new shoots emerge during the season and harvesting can damage them.

Perception about the difficulty faced by the growers in selling bamboos

Bamboo grower's responses on difficulty in selling bamboos varied from very difficult to very easy (Table 2). In general, selling bamboo was not considered very difficult. Lack of good roads, distance from the market centres and lack of transport facilities were the main problems.

Table 1: Average farmgate price in the study area between 1990/91 and 1995/96

Item	Diameter	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
Terai	8-10 cm	20	25	30	35	38	40	45	48	50	55
	> 10 cm	30	40	45	50	55	60	65	68	70	75
Dhankuta	Roadside	12	14	17	20	22	25	28	30	35	40
	Villages	6	7	8	10	12	14	15	18	21	25

* Price of *B. nutans* (Mal bans) is given, other available species have lower prices in Dhankuta

Table 2: How difficult is to sell bamboos? Perception of growers who sell bamboo culms

How much difficult	Responses (N=51)	
	Nos.	% of sample
1. Very difficult	7	13.7
2. Difficult	14	27.5
3. Not difficult	14	27.5
4. Easy	11	21.5
5. Very easy	5	9.8

Bamboo purchaser in the study area

The bamboo was mainly purchased by local villagers (Table 3). The other major buyers were households from neighbouring VDCs and the traders or retailers residing in the city and market centres. The role of middlemen as a link in-between bamboo growers and traders was insignificant. Grower households prefer to sell their bamboo culms to local villagers or consumers as they get a better price for culms. The bamboo growers get a better price for bamboo culms when the middlemen or traders approach them rather than the other-way around.

Table 3: Who buys bamboo culms and branches from the growers with surplus bamboos

Item	No. of responses (N=51)
1. Local villagers	46
2. Households from neighbouring VDC	17
3. Bamboo Traders from the city or other VDC	17
4. Local Middlemen	6

Income of the bamboo grower households from the sale of bamboo culms

The income from the sale of bamboo culms is one of the many important strategies that rural households take to maintain their livelihoods. Even though grower households can annually harvest mature bamboo culms on sustainable basis, they do not do so and usually sell bamboo culms in alternate years. The number of culms sold by households in the Terai varies between 6 to 1000 culms and in the Midhills between 15 to 900 culms and income also varies considerably.

Table 4: Income from the sale of bamboo culms in eastern Nepal (present value)

Item	Morang (N=42)	Dhankuta (N=9)
Average no. of culms sold (Range)	125 (6 - 1000)	179 (15 - 900)
Average income from the sale (Range)	Rs. 6250 (Rs300 - 50,000)	Rs. 6265 (Rs 525 - 31,500)

Perception about farm gate price of bamboos

The level of satisfaction from the price received for bamboo culms varied. Most households thought that the price they received was satisfactory (Table 5). However, Dhankuta households were not satisfied with the price that they received from sale, as the access to the road and markets is not good and hence the price is poorer.

Table 5: Perception about farmgate price of bamboos

Satisfaction level	Responses (N=51)	
	Nos.	%
1. Very good	4	7.8
2. Good	5	9.8
3. Satisfactory	32	62.8
4. Not so bad	2	3.9
5. Not good	5	9.8
6. Very low.	3	5.9

Interest towards bamboo planting and location for planting

All the households who sold bamboos were interested towards further bamboo planting to earn extra cash and/or to meet their increased household demand.(Table 6). The most common place where households would like to plant was bunds and the margins of their land, which were still without vegetation.

Table 6: Level of Interest for further Bamboo Planting and the Place where they wanted to plant

Item	No. of responses (N=51)
• Interested in additional bamboo planting	51
The most common place where they would like to plant bamboos	
1. Bunds or edge of the land	39
2. Uncultivated/ barren land.	21
3. Land adjoining irrigation channels.	15
4. Gullies/ riverside land	8
5. Home garden	5
6. Non irrigated land	5
7. <i>Bansbitti</i> (bamboo garden).	1

Financial aspects of Bamboo planting in eastern Nepal

A simple financial analysis was carried out to find out whether bamboo is a financially viable option or not (Table 7). Bamboo planting can be one of the most profitable options for both small and large farmers provided there is a good link with the market and access to the road. The cost of establishment and maintenance is quite low in comparison to the return on investments. The cost of establishment will reduce by 40% if single node culm cuttings will be used for propagation, as 10-30 cuttings can be obtained from a culm (vary with species). If protection is required, the establishment cost will be quite high as fencing and a watcher will be required. The most limiting factor for planting in the Terai was lack of land, non-availability of planting stock and the difficulty in protecting bamboo clumps against theft and livestock damage, especially in the early stages of establishment. In the Midhills, the limiting factors were the non-availability of market, poor transport infrastructure and high transport cost.

Contribution of craftmaking in the household economy of craftmakers

Income from the sale of woven products and crafts is the main source of livelihood for many craftmakers in eastern Nepal. A considerable number of new craftmakers came into the profession because they found the income attractive.

Bamboo craftmakers in the Terai work on an average for 9.9 months per year and earned on an average about Rs 19,800. The other family members are also involved in craftmaking as full or part time professionals. The total income from the sale of bamboo crafts is Rs 45,000 which is around 74% of the total annual household income. The other income sources were farming, pig rearing, livestock, manual labour, fruits and vegetables. All *Dom* and *Mabali* households except one were not involved in farming. The average food sufficiency was 1.56 months. The *Mabali* households do not own any pigs whereas *Dom* households with higher income keep some pigs. One of the main sources of income for some *Dom* households was waste disposal and burial of dead animals which other ethnic groups did not like to do at all. The average annual income of the *Dom* and *Mabali* households from craftmaking was higher than other ethnic origin craftmakers as they worked for longer periods and almost all the members including women and children were involved.

Table 7: Financial viability of bamboo planting in eastern Nepal

Item	Terai (Morang/Sunsari)			Midhills (Dhankuta)		
	Per unit	250 m ² (0.025 ha)	1 ha	Per unit	250 m ² (0.025 ha)	1 ha
• Cost of establishment						
1. Planting stock (culm with rhizomes, nos.)		10	400		10	400
2. Cost of planting stock/unit (Rs)	70	700	28,000	40	400	16,000
3. Labour cost for digging plants (Rs)	25	250	10,000	25	250	10,000
4. a. Pitting (pit size 45cmX45cm) and planting, nos.		10	400		10	400
b. No of mandays		0.75	30		1	40
c. Cost of labour (Rs)	100	75	3000		100	4000
Total cost (sum of 2,3 and 4c)		1075	41,000		750	30,000
• Fencing Cost (Rs) Depends upon the individuals requirements, materials used, labour, transport etc.		1000 (bamboo fence)	50,000-200,000		usually not required	usually not required
• Post establishment cost (Rs) Soil should be added each year and in hills, soil retention dam made of bamboo may be needed.		100	4000		200-500	8000-20000
• Estimated income from well managed clumps						
1. Period of establishment (years)		5-10	5-10		5-10	5-10
2. Sustainable annual culm production (,000)		0.1-0.3	4-10		0.1-0.3	4-12
a. Optimistic Value (Rs. in '000s)	0.05	15	500	0.35	10.5	420
b. Realistic Value (Rs. in '000s)		10	300		7	210
c. Pessimistic Value (Rs. in '000s)		5	200		3.5	140

Note. Labour requirements is based on HMGN standard norms, author's own experience, information from bamboo growers.

The bamboo craftmakers of Dhankuta district worked 5.6 months income of the main craftmaker was Rs 4200. The average annual household income from the weaving was Rs 5500 which is 30% of the total annual household income. In sharp contrast to the Terai, almost all craftmaker households were also involved in farming. The other income sources were livestock, pig rearing, manual labour in farming or as porters, fruits and vegetables, and pension after job retirement. Out of 84 craftmakers interviewed, 11 were self-sufficient in food and the average food sufficiency was 7.1 months, which is very high in comparison to the Terai. Making woven products is not the main source of income but is very important for craftmaker households to sustain livelihoods. *Rai* craftmakers of Ankhisalla VDC were more enterprising and have better craftmaking skills with longer working months and higher income from weaving than craftmakers from other villages, the large majority of whom were also of different ethnic origin. In general, 2 household members were involved in basket making among Ankhisalla households. The number of people including women, having basket making as a full time profession is increasing.

The winnow (*nangho*) makers of Homtang, Bhojpur earn more income than the craftmakers of Dhankuta district. They were more enterprising and hardworking than the craftmakers of Terai and Dhankuta district. These winnow makers worked for 5.5 months with an average monthly income of Rs 2200. In general, more than one household member was involved in making winnows. The average annual household income from winnows was Rs 18,000 that is 56% of the total annual household income. The other sources of income of these households were farming, pig rearing, livestock, and manual labour. The food production on average was sufficient for only 7.6 months.

It seems that there is some relationship between food sufficiency and craftmaking. Those craftmaker households who are less sufficient in food production are more likely to adopt bamboo craftmaking as a full time profession than those who are self-sufficient in food production.

Level of bamboo trade and the income of the bamboo traders

Most of the trade was carried out on a small scale with family members involved. The bamboo trade has significantly expanded in recent years. There were only four traders who sold more than 10,000 culms annually and these traders were located at Chatara, Dharan and Itahari (Table 8). Most of them were selling bamboo culms in the range of 2000 to 5000 culms/year.

On average, culm traders collected 5214 culms (Table 9). About half of them (*Belgaadinwala* traders) also sold branches. In Biratnagar alone, 57,900 culms were sold by regular traders and if irregular traders were also included, the figure is about 80,000. The estimated total number of culms traded at all other towns and small market places in Morang and Sunsari districts is 340,000 culms/year. This does not include direct trade i.e. bamboos sold by growers directly to local consumers. The profit to traders from the sale was Rs 5-10 per culm. The annual income of traders sharply varied (Rs 5000-75,000). The net margin for culm traders was between 10-20% of the price that consumers paid for bamboos and is higher than in Kerala where it was 6.6%.

On average, bamboo craft-traders sold 2080 winnows. The other most popular items for sale were baskets (*doko*, *dalo* and *dhakija*) and mats (*mandro*) of variable sizes which was difficult to quantify. Households replace bamboo crafts every 2-3 years. The average income of the trader from the sale of bamboo crafts/woven products was Rs 13,129. Bamboo stools, racks and handicrafts were also readily marketed in eastern Nepal but no information was collected on this aspect.

On average, 8,750 kg. of bamboo shoots was sold by vegetable traders which were collected and sold for four months (June-September). Bamboo shoots were marketed by at least 6-7 vegetable vendors in Dharan from where they were also exported to Kathmandu, Biratnagar and other major towns. There were at least 2-3 traders selling bamboo shoots at every weekly market places. There is a considerable

Table 8: Distribution of culm traders by trade size

Level of trade (No. of culms sold)	No. of traders	%
1. Culms 2000 or less	6	17.14
2. 2000-5000 Culms	18	51.43
3. 5000-10000 Culms	7	20.00
4. More than 10000 Culms	4	11.43

Table 9: Level of bamboo trade and the income of bamboo traders in eastern Nepal

Item	Quantity/Rs
Culms	
a) Average number of culms sold (Range)	5214 (1000- 19,500)
Woven products	
a) Average number of winnow sold (Range)	2080 (1000- 4500)
Other woven products	Variable depends upon the basket type (difficult to quantify)
Bamboo Shoots	
a) Average quantity of bamboo shoots sold (Range)	8750 Kg (6000-15000 Kg)
Bamboo stools	144
Average Annual Income of traders from bamboo sale	Profit Rs 5-10 per culm
A. Poles only traders/retailers	
Average Income (Range)	Rs 23316 (Rs 5000- 75000)
(Profit Rs. 5 per culm on average)	
B. Culms and branches bullock cart traders	
Average Income (Range)	Rs 24544 (Rs 7200- 60000)
(Profit Rs 5 or more, even up to Rs 10 as branches are also collected and sold)	
C. Woven Products	
Average Income (Range)	Rs 13129 (Rs 2500- 35000)
D. Bamboo shoots	
Average Income (Range)	Rs 8750 (Rs 5000- 17500)
E. Bamboo stools	
	Rs 1000

demand for bamboo shoots and is not difficult to sell. Consumers demand bamboo shoots even during the off-season but are not available. The traders usually get a profit of around Rs 1-2 per kg and sometimes even higher. The average annual income from the sale of bamboo shoots to the trader is Rs 8,750, quite good by Nepalese standards.

Income generation through bamboo trade

Each bamboo culm trader on an average employs 2.63 labourers and generates 296 mandays of work. In many cases, the labourers were family members of the traders (Table 10). Labourers employed per trader were even higher among the *Belgaadiwala* who on average employed 2.75 labourers/trader generating 538 man days of work.

In case of craft traders, the work generated per trader was 62.8 man days. In bamboo shoot trade, on an average job generated per trader is 15 man days annually. In future, as bamboo trade is expanding rapidly, more people will get employment.

Conclusion

For many resource-poor farmers in eastern Nepal, bamboos are like a savings banks which often appreciate in capital value much more rapidly than bank deposits and provide reserves that can be cashed to deal with contingencies, such as cost of medical treatment, marriage expenses, a large purchase, or any sudden or large need for money. Findings are similar to study by Chambers and Leach (1989) and Raintree (1991). Arnold (1987, 1990, 1994) has made exhaustive

Table 10: Employment generation through bamboo trade

Item	No. of people employed
Additional employment through bamboo trade per traders (Mostly family labour used)	
A. Bamboo culms	
a) Average no. of labourer employed/trader (Range)	2.63 (0-10, some themselves works)
b) Average no. of mandays/trader (Range)	296.3 (0-900)
B. Bamboo culms and branches	
a) Average no. of labourer employed/trader (Range)	2.75 (0-10)
b) Average no. of mandays/trader (Range)	538 (0-1800, some themselves work)
C. Woven products	
a) Average no. of labourer employed/trader (Range)	0.44 (0-2)
b) Average no. of mandays/trader (Range)	62.8 (0-600)
D. Bamboo shoots	
a) Average no. of labourer employed/trader (Range)	0.5 (0-2)
b) Average no. of mandays/trader (Range)	15 (0-60)

studies on private tree planting and has identified five factors that influence the adoption of any trees on farms: land, labour, capital, marketing and risk. Recently, Arnold (1995) suggests that trees grown on farms need to be looked at from a perspective of balancing household needs and market opportunities. Tree growing can be considered as the dynamics of the farmer's economic responses to changes in demand and supply and to scarcity and abundance. To understand why farmers grow trees, one has to use the concepts of livelihood security and induced innovation as a starting point. Case studies from India, Nepal, Pakistan, Kenya and eastern Africa indicate that with reduction in off-farm supplies, growing demand, declining site productivity and increased exposure to risk, farmers plant trees and land use becomes more intensive. Gregersen *et al* (1987) have identified two important factors that motivate farmers to plant trees on their farms: (i) the relative perceived net benefit (i.e. the difference between perceived costs and benefits), and (ii) the relative security or risks involved in tree growing. The increased interest towards bamboo planting can be seen in this context. Raintree and Hoskins (1988) and Pabuayon (1990) suggest that market development and its increased efficiency and other necessary support are important factors for encouraging farmers towards tree planting that includes bamboos and is also necessary to target poverty reduction.

inability of many buyers (traders and/or middlemen) to penetrate remote bamboo producing areas due to poor roads increases the opportunity for the buyer/trader to exercise monopsony power at the expense of the bamboo growers. The poor road conditions directly raise transport costs to the consumers' disadvantage. On the other hand, capital constraints for bulk procurement and purchase of facilities, and lack of infrastructure serve as barriers for potential market entrants leading to a less competitive market environment. The study found that a considerable amount of money is spent on the transport of bamboo and its products by traders and have made bamboo growers reluctant to market bamboo culms and its products themselves. This has particularly affected the small bamboo growers. The bamboo growers in the Midhills are constrained by problems such as the inability to find alternative market outlets and low prices. Such disincentives limit farm output and commercialisation. Taking the bamboo and its products to market outside the Midhills would result in high transport costs. The oligopsony control of merchants based in the Terai towns dictates price through a form of informal collusive agreement. In many developing countries including Nepal, farmers are assured of minimum support price for some agricultural commodities. The extension of such a practice to bamboo will be very helpful in promoting bamboo planting even on a larger scale in the Midhills and Terai.

The issues associated with marketing and the supports that will require for improvement are presented in Fig 3. The marketing system in rural areas of Nepal is considered inefficient and overall impact is low producer prices, high consumer prices, and large marketing margins. The high marketing costs are also due to operational inefficiencies, poor transport systems and traditional post harvest losses (e.g. drying of culms during transport and poor storage facilities). The above normal profits of middlemen result from inefficient price formation as a result of poor communication and transportation facilities, highly segmented markets, lack of access to market outlets, and highly unequal bargaining power between buyers and sellers.

The market is flooded with bamboos during the peak of its harvesting season in winter and the bamboo growers receive a lower farm gate price than they can receive in the off-season (rainy season). The marketing of bamboo culms during the off-season

The lack of market information by the bamboo grower households, the majority of whom are small-scale farmers and the

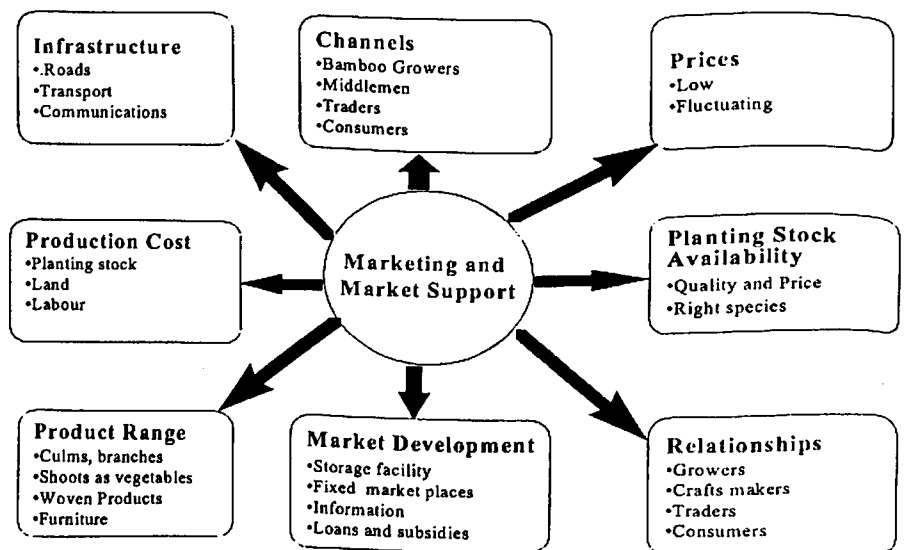


Fig 3 : Issues associated with marketing and market support

on a smaller scale will help growers get a better price for the bamboos without affecting the future production of new bamboo shoots. Correct information about the demand, well established direct links between the producers and traders or consumers can reduce the cost of stocking, multiple handling, transport and avoid the middlemen. The formation of farmers cooperatives and government assistance will not only help farmers get a better price but also promote bamboo planting in rural areas.

Bamboo is already providing an important source of income and sustaining livelihoods to thousands of households. The development of new products such as fancy furniture, parquets, ply-bamboo, handicrafts made of bamboo has a growing international market. The consumption of such products will also increase in Nepal. The skills to make such products are lacking. There is scope for establishing bamboo shoot processing industries, of which there are none in Nepal. Training to make high value products and establishment of new industries will help generate additional employment and can help reduce poverty in Nepal.

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