A SOCIO-ECONOMIC CASE STUDY OF THE BAMBOO SECTOR IN ETHIOPIA:

An analysis of the Production-to-Consumption system

BY

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Needless to say, only the authors bear responsibilities for any errors in interpretations or conclusions made in this report.

Note: This interim report has been edited from the original form in which it was delivered to INBAR.

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Ethiopia

Ethiopia in East Africa is located between 15^0 and 3^0 North and 33^0 and 48^0 East. It is completely landlocked and covers a total area of 1, 127, 127 sq. km, of which only 7, 444 sq km is covered by water. Ethiopia has 5, 311 km of land boundaries and borders Djibouti (337 km) in the northeast, Eritrea (912 km) in the north, Kenya (830 km) in the south, Somalia (1, 626 km) in the east and Sudan (1, 606 km) in the west.

Topography and climate

Much of Ethiopia is high plateau with a central mountain range divided by the Great Rift Valley. The lowest point is Denakil at 125 m below msl and the highest point is Ras Dashen Mountain at 4, 620 m. The terrain is more rugged in the north and flatter in the south. The principal river is the Blue Nile which arises in T'ana lake in the northwest, flows south east for 150 km and then turns completely on itself and flows north east out of the country into Sudan. Ethiopia has small reserves of gold, copper, platinum, potash and natural gas. Ethiopia has a tropical monsoon climate on the plains and a temperate climate in the central highland region.

Land use

Forty percent of the land is permanent pasture, twelve percent is arable and permanent crops are grown on one percent. One thousand nine hundred square kilometres of the land is irrigated. Historical sources indicate that about 42 million hectares or 35% of Ethiopia's land area was once covered with forest. With the inclusion of savannah woodlands, some 66% of the country was covered with forest and woodland. In the early 1980s, the coverage was reported at 3.6%, and in 1989 it was estimated at only 2.7%. Some 5 million hectares of savannah woodlands were remaining, giving a total forest and woodland area of about 7%. A rapidly growing demand for fuel wood and land for cropping and grazing cause this rapid deforestation, which is accompanied by a variety of other environmental problems (EFAP, 1993), and recently clearing forest to plant coffee and tea in the name of investment have contributed.

The Ethiopian Forestry Action Program (EFAP) classifies Ethiopia's forest and woody vegetation into: natural high forests, woodlands, bush, plantations (include industrial, peri-urban, community wood lots, protection plantations) and trees on farms (farm forestry). The natural high forests are classified into 58 National Forest Priority Areas totalling an estimated 2.3 million hectares. The woodlands and bush, which cover 5 million and 20 million hectares respectively, are being depleted by the spread of farming, the growing livestock population and by the demand for firewood and charcoal. Industrial plantations and peri-urban plantations are government owned; though recently, the latter have been distributed to and put under the ownership and management of regional administrations. Community wood lots/protection forests comprise 20,000 hectares and 50, 000 hectares respectively. The total area of farm forestry is unknown. All perform various purposes, including production, protection and conservation. The management of the various forest resources faces a number of constraints, and almost everywhere there is a conflict with local communities, including extensive encroachment on forests and plantations (EFAP, 1994).

After the decentralisation policy of the existing government in 1994, the regional bureau of Agriculture, and the Departments of Agriculture at Zone and Woreda level respectively govern forest resources management.

Bamboo and Its Socio-economic Importance

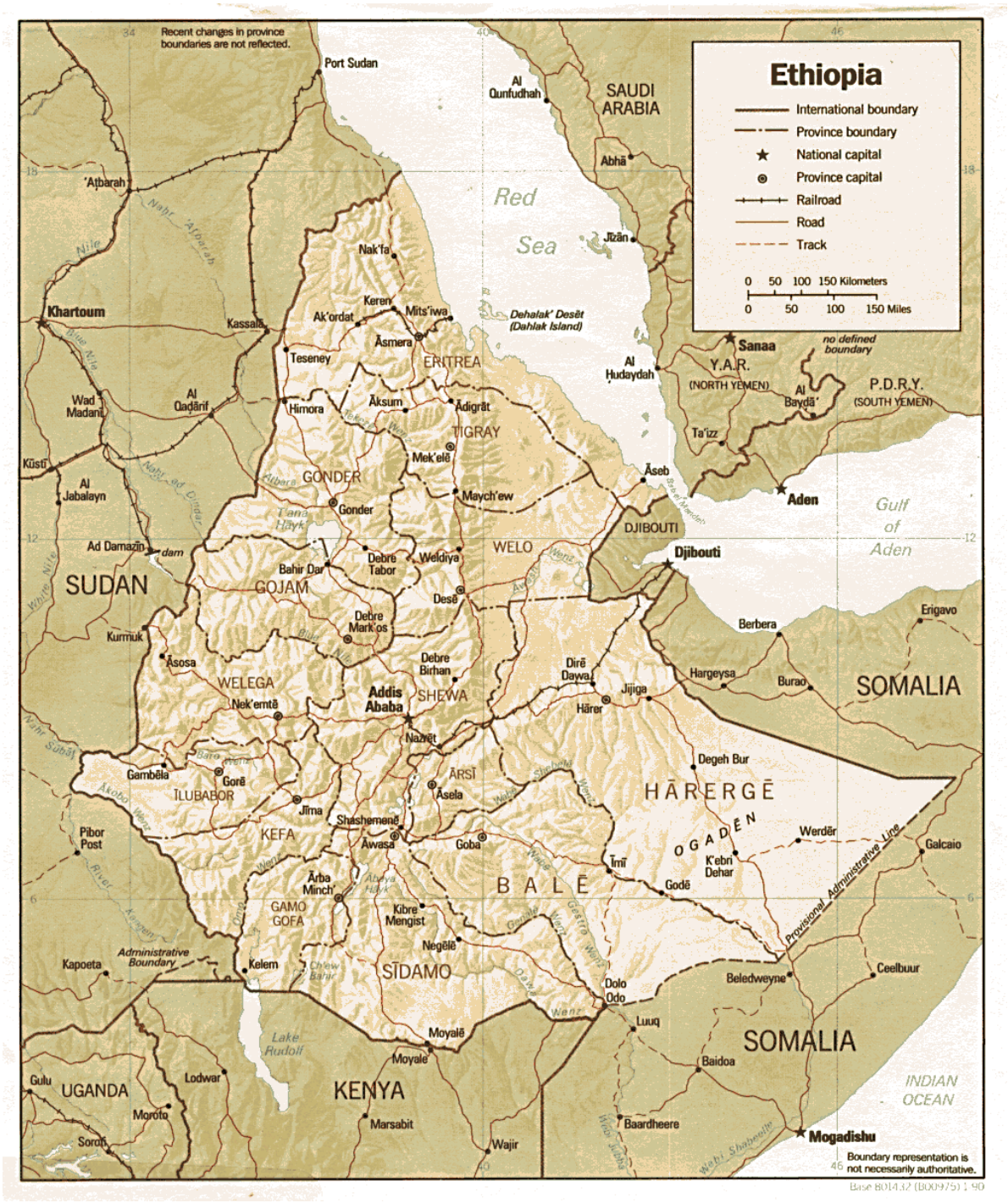
Occurrence and Distribution of Bamboo Resources in Ethiopia

Africa has about 43 species of bamboo covering about 1.5 million hectares (Kigomo, 1988). Forty of these species are mainly distributed in Madagascar while the remaining three species are found in mainland Africa. Ethiopia is one of the countries in Eastern Africa that possess considerable bamboo resources. There are two indigenous species of bamboo in Ethiopia i.e. the highland or African alpine bamboo (*Arundinaria alpina* K. Schumach.) and a monotypic genus, lowland bamboo (*Oxytenanthera abyssinica* (A. Rich.) Munro. These species are found in some other African countries, but no where else outside the African continent. The highland bamboo is distributed in Cameroon (Mt. Cameroon), Zaire (Kivu), Rwanda, Burundi, the Sudan and the mountains of Uganda, Kenya, Tanzania and Malawi (Nyika Plateau), while the lowland bamboo is wide-spread, occurring westwards to Senegal and southwards to Zimbabwe (Phillips, 1995). They are indigenous to Ethiopia and endemic to Africa, confined to the sub Saharan region.

Ethiopia has over one million hectares of highland and lowland bamboo resources (Anonymous, 1997). The coverage of lowland bamboo is estimated to be 1,000,000 hectares (Woldemichael Kelecha, 1980), while the highland bamboo is estimated to be 300,000 hectares (LUSO CONSULT, 1997). This means that 86% of the African bamboo resource is found in Ethiopia.

Lowland bamboo in Ethiopia grows only in the western part along major river valleys and in the lowlands bordering Sudan. It occurs between 1100-1700 m.a.s.l. The species grows in savannah woodland, mainly in river valleys and often forming extensive stands.(Phillips, 1995). The lowland bamboo has enormous importance for the rural society. Because of the shortage of proper woody plants for construction in the lowlands, the lowland bamboo is commonly used as an alternative for timber in house construction, fences and also as fodder for cattle, human food and as an energy supply. Of the total estimated lowland bamboo coverage about 480,510 hectares have been mapped (LUSO CONSULT, 1997).

The highland bamboo (*Arundinaria alpina*) on the other hand grows naturally in the south, south-west, central and north-west highlands of Ethiopia at altitudes ranging from 2200 to 4000 m.a.s.l. Out of the total area covered by highland bamboo, 130,000 hectares have already been mapped (LUSO CONSULT, 1997). The highland bamboo grows in montane forest, often on volcanic soils and forms extensive pure stands, occurring in *Afrocarpus falcatus* (= *Podocarpus falcatus*) rainforest and with *Juniperus procera* in drier forests (Phillips, 1995).


Recent changes in province boundaries are not reflected.
Ethiopia
International boundary
Province boundary
National capital
Province capital
Railroad
Road
Track
0 50 100 150 Kilometers
0 50 100 150 Miles
Port Sudan
Al Qunfudhah
SAUDI ARABIA
Abhā
Red Sea
Jīzān
'Aṭbarah
Nahr 'Atbarah
Nile
Nak'fa
Khartoum
Kassalā
Keren
Ak'ordat
Mits'iwa
Āsmera
Dehalak' Desēt (Dahlak Island)
Teseney
ERITREA
Sanaa
no defined boundary
Y.A.R.
(NORTH YEMEN)
Al Ḥudaydah
Al Baydā'
P.D.R.Y.
(SOUTH YEMEN)
Wad Madanī
Al Qaḍārif
Himora
Āksum
Ādigrāt
TIGRAY
Ta'izz
Kūstī
Mek'elē
GONDER
Āseb
Al Jabalayn
Gonder
Maych'ew
Aden
Gulf of Aden
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Weldiya
WELO
Djibouti
SUDAN
GOJAM
Desē
Berbera
Erigavo
Kurmuk
Debre Mark'os
Āsosa
Debre Birhan
Dirē Dawa
Hargeysa
Burao
SOMALIA
WELEGA
Nek'emtē
Addis Ababa
SHEWA
Jijiga
Härer
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Jīma
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KEFA
Āwasa
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Pibor Post
OGADEN
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Galcaio
Īmī
K'ebri Dehar
Ārba Minch'
BALĒ
Godē
GAMO GOFA
Kibre Mengist
Negēlē
Administrative Boundary
Kapoeta
Kelem
SĪDAMO
Beledweyne
Ceelbuur
Dolo Odo
Luuq
Moyalē
Lake Rudolf
SOMALIA
Baidoa
UGANDA
Lodwar
KENYA
INDIAN OCEAN
Gulu
Moroto
Marsabit
Baardheere
Mogadishu
Sorotī
Wajir
Boundary representation is not necessarily authoritative.
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Table 1. Major Highland Bamboo Areas in Ethiopia.

No	Bamboo Area	Region	Natural Stand(Ha)	Plantation (Ha)	Total area (Ha)
1	Injibara	Amhara	30	2350	2,380
2	Agaro	Oromiya	-	1500	1,500
3	Bale Mountains	Oromiya	56,851	-	56,851
4	Shenen/Jibat	Oromiya	1,774	2561	4,335
5	Gera	Oromiya	36,000	1250	37,250
6	Bore/Hagereselam	Oromiya	-	2460	2,460
7	Chencha/Arbaminch	South	2,460	3250	5,710
8	Indibir/Jembero	South	-	1850	1,850
9	Jima/Ameya	Oromiya/South	-	900	900
10	Mizan Teferi/Kulish	South	-	1850	1850
11	Debresina/Wofwasha	Amhara	35	-	35
12	Wushwush/Bonga	South	-	1120	1120
13	Bonga/Ameya	South	7,997	-	7997
14	Masha	South	18,652	-	18652
15	Munesa Shashemene	Oromia/South	4,183	-	4,183
	TOTAL	-	**127,982**	**19,091**	**147,073**

Table 2. Major Lowland Bamboo Areas in Ethiopia.

No	Bamboo Area	Region	Natural Stand(Ha)	Plantation (Ha)	Total Area (Ha)
1	Hinde/North of Nekemte	*Amhara*	8,670	-	8,670
2	Asossa	Benshangul Gumuz	77,947	-	77,947
3	Bambasi	"	64,245	-	64,245
4	Begi	"	21,509	-	21,509
5	Nejo	Oromiya	27,612	-	27,612
6	*Dibate*	Benshangul Gumuz	14,200	-	14200
7	Guba	"	7,757	-	7,757
8	Kemashi	"	33,723	-	33,723
9	Pawe	"	53,830	-	53,830
10	Gimbi	Oromiya	29,125	-	29,125
11	Guten	Oromiya	6,044	-	6,044
12	Metema/Dansha/Humera	Tigray/Amhara	425,000	-	425,000
13	Didessa Valley	Oromiya	135,000	-	135,000
14	Dangur	Benshangul-Gumuz	27,350	-	27,350
15	Bulen	"	16,780	-	16,780
16	Galesa	"	10,870	-	10,870
	TOTAL		**959,662**	**-**	**959,662**

People

The population of Ethiopia is 64 million and is estimated to be growing at a rate of 2.76% per annum. Fifty percent of the population is between the ages of 15 and 64 and the

male/female ratio of this age group is 1.01. Forty-seven percent of the population is under 15. Two ethnic groups dominate Ethiopia. The Oromo (40%) and the Amhara and Tigre (32%). Other groups include the Sidamo (9%), Shankella (6%), Somali (6%), Afar (4%) and the Gurage (2%). Between forty-five and fifty percent of the population is muslim, mostly in the south and 35-40% is Ethiopian Orthodox, mostly in the north. Twelve percent are animist. The Official language is Amharic but Tingrinya, Orominga, Somali, Arabic, English and French are also used. Forty five percent of the male population and one quarter of the female population over 15 years of age are literate.

Importance of Bamboo

Although bamboo is not an integral part of the economy of Ethiopia, it plays a very important role socially, economically and ecologically in areas where it occurs naturally and where it is planted. Both the highland and lowland bamboos are such a versatile type of resources that they can be used in many ways. Their paramount importance and multifaceted use in different parts of the country are reported.

Bamboo culms in Agew-Awi Zone of the Amhara Region are used as construction material for housing, fences, and beehives in the villages. More importantly, a market for bamboo culms and bamboo products has developed in the past years. Many of the landless men buy bamboo from farmers and engage in producing mats, and furniture e.g. chairs, sofas, and baskets that they produce and sell along the roadside. For these households bamboo is the major source of income (LUSO CONSULT, 1997).

The major use of bamboo in Kafa-Shaka Zone in the Southern Nations, Nationalities and Peoples Region for construction of houses, especially the structure of the roofs. Because of the freely grazing cattle, bamboo is used for making fences in order to protect crops. Bamboo is the principal raw material for making beehives that are hanged in the particular trees for honey production. Other uses of bamboo are the production of household utensils like cups, local pipes, jugs and Jerry cans to carry water (LUSO CONSULT, 1997).

Bamboo is the main material for the construction of houses, animal sheds, fences, fuel and beehives in Asossa Zone in Benshangul-Gumuz Region. For the Jeblawi people in the Zone, the shoots of bamboo are very important for their nutrition. Bamboo provides most of the fodder for the livestock in the area (LUSO CONSULT, 1997).

In general, in different parts of the country such as Gamo Gofa, Kefa, Illubabor, Welega, Gojam, Gonder and Tigray, the former provinces, the economic uses of bamboo are very numerous. On account of its easy workability, highland bamboo is used for fences, rafts, vessels for carrying and storing water, water pipes, splits for baskets, beehives, hats, mats, furniture, poles, masts, sporting goods, needles, nails, handles, gutter, floats, walking-sticks, flutes, household utensils, and agricultural tools. Split bamboo, with edges trimmed sharp are used as raw meat cutters in areas where there are no knives available. The silica stored in the stem is used as a medicine for many diseases. The lowland bamboo is mainly used for construction and for fences (Woldemichael, 1980).

Bamboo processing and marketing in Addis is proliferating in recent years. Mainly two groups conduct the processing. The first group is traditional processors who came from Injibara or Kosober and settled in Addis Ababa, and produce low quality products aimed at low-income customers. The other group is modern workshops in Addis Ababa that are producing high quality products.

Current Management of Bamboo Resource

In Ethiopia there are both natural and planted stands of bamboo, and can be treated separately.

Natural Stands

Inventory: According to the natural bamboo stand inventory result of LUSO CONSULT (1997), there is 130,000 hectares of highland and more that 480,000 hectares of lowland bamboo in the country. One hectare of the highland bamboo forest has an average of 5869 culms whereas that of a lowland bamboo has an average of 8124 living culms and 4185 dead culms. The average biomass of the culms of the highland bamboo amounts to 51.3 tons/hectare whereas that of the lowland amounts to 70.3 tons/ha. The mean annual increment of oven dry culms is 8.6 tons/hectare for highland bamboo and 10.1tons/hectare for lowland bamboo (LUSO CONSULT, 1997).

Flowering: Flowering, seeding and dying back in highland bamboo (*A. alpina*) occurs gregariously in Kenya (Kigomo, 1988). For the lowland and highland bamboo in Ethiopia the flowering age is not precisely reported. Sporadic flowering for lowland bamboo is estimated to occur after 7 years of growing (Woldemichael, 1980). So far the highland bamboo is more endangered by its mass flowering. When flowering occurs, always a bigger part of the more homogenous bamboo stand will be concerned (LUSO CONSULT, 1997). Mass flowering has been observed in Jibat area during this investigation where an estimated 75% of the bamboo populations have died out.

Cutting Intensity, Cutting Cycle and Regeneration: Clear cutting depresses the rate of recovery of bamboo after cutting (Wimbush, 1945 cited in Kigomo, 1998). Information on rate of recruitment of culms and rate of recovery of a clump to full size should be able to provide useful guidelines for cutting intervals. Cutting cycles will be governed by the recovery period. Recovery after fire will be larger since new shoots after fire are much smaller in diameter and shorter than those shoots appearing before fire (Phillips, 1961). The effect of fire on the rate of recovery of culms to full size therefore seem similar to the effect of clear-cutting (Kigomo, 1988).

In Ethiopia, it is remarkable that a high proportion of dead biomass characterises the highland bamboo stands. Nearly all the culms reach their full age, and after the end of the life cycle the dead culms remain in bamboo stands, start to rot, and finally collapse (LUSO CONSULT, 1997). This may be attributed to a prolonged cutting cycle and low cutting intensity.

Almost the entire lowland bamboo area examined in Asossa is annually burned sometimes even more than once per year. The frequent fire has resulted in thin leave litter and left the area with young shoots. However, the occurrence of fires in the highland areas was not observed (LUSO CONSULT, 1997).

Cultivation

As a result of lack of serious interest in bamboo, East African foresters and farmers have been slow in promoting cultivation of indigenous bamboo and where necessary introducing new ones. In Tanzania and Uganda, some attempts were however made in 1940s (Kigomo, 1988).

In Ethiopia there is a planting experience of the highland bamboo by individual farmers and rural communities. But there is no information concerning the planting experience of the lowland bamboo. The areas of Hagereselam, Chencha, Hosaina, Shenen-Inchini and Injibara are typical sites for individual farmer bamboo use. With the exception of Hosaina and especially Injibara (also Shenen-Inchini in Jibat, personal observation) where

one can observe bamboo plots planted by farmers, bamboo stands occurring in the other sites seem to be remnants of natural bamboo (LUSO CONSULT, 1997).

Research and Development on Bamboo Resource

The government has given priority to bamboo and reed research and development (EFAP, 1994). There is a plan by the government to strengthen the management and use of the native bamboo and reed species. The programme focuses mainly on assessing the market for bamboo and reeds as raw materials for export, manufacturing and marketing of artefacts, and use in the paper and pulp industry. In the programme an extension service to the local communities would be piloted to promote improved bamboo and reed resource management and a sustainable supply of raw material.

However, there is still little baseline information on the situation of bamboo as a source of livelihood. In the absence of such information, effective intervention strategies can hardly be formulated. This study is, therefore, an attempt to address the need for baseline information on production and use of bamboo.

ISSUES

STUDY OBJECTIVES AND METHODOLOGY

Rationale for the Study

Development Objective

The study seeks to contribute to the sustainable management and use of the bamboo sector.

Immediate Objectives

a. To provide a picture of the supply and use patterns of highland and lowland bamboo.
b. To design an appropriate intervention model in support of increased income and employment benefits to those engaged in the supply and processing of bamboo.

Methodology

The production to consumption system (PCS)

Bamboos are one of the most important Non-Timber Forest Products (NTFPs). They are renewable, yield annually and are readily accessible to rural peoples. As a resource they have enormous potential to fuel rural development and this has long been recognized in many parts of the world. However any bamboo development program exists within the context of the society in which it is implemented and is subject to pressures and limitations (constraints) from many factors within that society not apparently directly related to growing, processing and selling bamboo. In order to develop a successful development program an understanding of all these factors (their effects, their magnitude and their potential (beneficial or detrimental)) is required. This necessitates investigations far more detailed than can be conducted at country or regional level.

Carefully focussed case studies do allow such detailed analyses to be made and can be very useful if they are chosen to be truly representative. Such case studies are often based in specific geographical locations, primarily due to the nature of the bamboo resource. However because of the huge variety of raw material-management systems and processing techniques to which bamboos are subjected, and end products into which they are made, it is necessary to use a reliable and standardized tool for analyzing all the processes involved, and all the factors impacting upon them. Thus the International Network for Bamboo and Rattan adopted the concept of the Production-to-Consumption System (PCS) (Belcher, 1995). This involves the entire chain of activities to which the bamboo is subjected, from the production of raw material (including the input market, where one exists) through the various stages of intermediate sales and processing, to the consumer of the final product. The system includes the technologies used to process the material as well as the social, political and economic environments in which these processes operate. These are all covered in the case study.

Subsequently analysis of the PCS enables identification of all the constraints limiting bamboo management and use, and highlights opportunities that, if taken, would promote bamboo-based development. Development programs can then be planned which utilize and develop the opportunities whilst circumventing, or even eliminating, the constraints. In ideal environments these programs may be limited to the bamboo PCS itself. In less favorable

environments they may include policy shifts, infrastructural changes and even legal changes (for example relating to land tenure). In all cases the emphasis is on community-led development (by the community, for the community) with the maximum possible benefit remaining within the community. The Production to Consumption System analytical framework utilized for this study is based on that explained in INBAR working paper Number 4 (Belcher, 1995).

2.3. Scope and Methodology

The study is based on production to consumption system (PCS) concept as an integrative framework and assesses the nature and scope of the production, processing and utilisation of bamboo in selected geographical areas of the country. With respect to the stakeholders involved in the system, the study examines the experiences and views of rural householders, community elders, enterprise operators, urban dwellers as well as representatives from government organizations and NGOs in the study areas.

Six study areas were first purposefully selected taking into account the opportunity they could provide for capturing as much socio-economic information as possible on the chain of operations pertaining to the supply of raw bamboo, both cultivated and natural stands, at one extreme to the manufacturing and consumption of bamboo products on the other. The study areas consisted of villages, small towns and a major urban centre. Resource persons including community elders and key informants were then identified and samples of bamboo cultivators /collectors, enterprise operators and consumers were randomly selected from the study areas to solicit qualitative and quantitative information on activities relating to the supply, manufacture and consumption components of the PCS (Table 3).

Table 3. Study Areas and Sources of Information

Survey Area	Survey area covers:	Information source
1. Hagereselam	Villages in Southern Nations, Nationalities & Peoples Regional State	Resource persons Bamboo cultivators
2. Injibara	Villages & a big town in Amhara Regional State	Resource persons Bamboo cultivators
3. Jibat	Villages & a small town in Oromiya Regional State	Resource persons Bamboo cultivators Bamboo collectors
4. Pawe	villages in Benshangul-Gumuz Regional State	Resource persons Bamboo collectors
5. Bambasi	villages in Benshangul-Gumuz Regional State	Resource persons Bamboo collectors
6. Addis Ababa	A major urban centre	Enterprise operators

Following the completion of preparatory activities of the study including undertaking a reconnaissance survey, the development of survey instruments, training of enumerators and field testing of questionnaires, the full scale survey was carried out using a set of three instruments: focused group discussions, semi-structured interviews and structured interviews. Analysis of the quantitative data involved the use of simple statistics such as ratios, the mean and the median.

RESULTS

The Bamboo Resource Base

Although crop and livestock farming is the major source of subsistence for the inhabitants of the villages in the survey areas, they also attach a great deal of importance to bamboo as a source of employment and income. In the course of focus group discussions, community elders were unanimous in indicating that the wellbeing of households in their communities has been, and still is, dependent on bamboo as a raw material for housing, fencing, and household amenities. Moreover, a large number of local inhabitants including farm and non-farm households are gainfully employed in cultivating, collecting and primary processing of raw bamboo.

A number of suggestions and recommendations were made at community level toward the sustainable use of bamboo resource. In particular, emphasis was put on the development of an appropriate policy and legal framework to regulate the supply of raw bamboo; and on the provision of technical assistance including skill training to target beneficiaries who are engaged or wish to engage in bamboo-based income earning activities.

Raw Bamboo Supply

Farm households engaged in the supply of raw bamboo either from homestead cultivation or from natural forest were considered as separate units of analysis.

Of the households cultivating bamboo on homesteads, all household heads who were interviewed were married males between the ages of 23 and 85 years (Table 4); half of them being below 45 years of age and nearly half of them (49%) could read and write.

Table 4. Household Heads Cross-classified by Age Group and Literacy Status.

Age group of	**% HHs who were**		
HHs	literate (N=29)	Illiterate (N=30)	Total (N=59)
20 –29	10	0	10
30 –39	48	11	28
40 –49	22	23	22
50 –59	10	33	22
60-69	10	20	15
$\geq$ 70	0	13	13
Total	100	100	100

On average, there were five own children living in each household of whom four were ten years of age or older and two were going to school at the time of the interview (Tables 5, 6).

Table 5. Households Distributed by Number of Own Children.

Number of children	% households (N=59)
0	5
1 – 2	12
3 – 4	25
5 – 6	29
7 – 8	17
$\geq$ 9	12
Total	100

Table 6. Distribution of Households by Number of Own children Who Are Ten Years or Older and Who are Going to School.

	% Households with own children who were:	
Number of Children	≥10 years old (N S=59)	going to school (N = 59)
0	19	27
1 – 2	60	44
3 – 4	19	20
5 – 6	2	5
7 – 8	0	2
≥ 9	0	2
Total	100	100

Looking at the overall profile of households engaged in bamboo cultivation, it is apparent that major intra-household decisions regarding the production and disposal of bamboo are made by male spouses; the average household size is seven members including parents and children; and a significant level of literacy prevails among households in the survey areas.

Table 7 shows the factors that motivate the farm households to engage in homestead cultivation of bamboo. Respondents were asked to rank the bamboo cultivation in terms of its relative importance as a source of livelihood for their household. Four-fifths (79%) of respondents replied that bamboo cultivation comes next to farming in terms of its contribution to the wellbeing of their households; while to the remaining one-fifth bamboo cultivation apparently was of primary importance to their household. This is hardly surprising considering the multiple uses of bamboo as reported by the cultivators. It becomes readily apparent from Table 7 that bamboo is cultivated primarily for domestic use by the operators themselves. In this respect, only one social group is involved in the PCS - the producers.

Table 7. Distribution of Households by Reported Uses of Cultivated Bamboo To Operators.

Uses	**% Households (N = 59)**
For Domestic Use	**34**
♦ source of household energy	
♦ Raw material for construction, containers & household amenities	
♦ both for household energy & raw material	
For Domestic Use and For Sale	**66**
Total	100

It is significant to note, however, that well over three-fifth of the households were cultivating bamboo for the market.

The data summarised in Table 8 suggest that inhabitants of the survey areas have a long standing tradition of homestead bamboo cultivation. At the time of the interview, slightly more than one-half of the households heads interviewed reported that the bamboo plots they were cultivating at the time of the interview are the very same plots, or fragments thereof, that have been under bamboo cultivation for more than 30 years.

Table 8. Distribution of Households by Age of Bamboo Plantation.

Age of Plantation (yr.)	% Households (N=57)
≤ 10	9
11 – 20	19
21 – 30	23
31 – 40	30
41 – 50	16
> 50	3
Total	100

Data on the reported size of bamboo plantations cultivated by the sample of households in the survey areas in terms of number of standing culms is shown in Table 9. The households were characterised by high variability in the size of their bamboo plots between a minimum of 30 to a maximum of a little under 20,000 standing culms. On the basis of 5870 culms/hectare, the average plot area under bamboo cultivation was nearly 0.5 hectare per household interviewed.

Table 9. Distribution of Households by Size of Bamboo Plantation.

Size of plantation (culms)	**% Households (N=58)**
≤ 1000	30
1001 – 3000	55
3001 – 5000	1
5001 – 7000	6
7001 – 9000	3
≥ 9001	5
Total	100

Not unexpectedly, the survey results indicated that home stead bamboo cultivation in the survey areas is a traditional production system which does not involve the use of purchased inputs such as commercial fertilisers and hired labour. As such , the raw bamboo output (Table 10) essentially constitutes the return to family labour which, on average, consisted of roughly 3 persons, often males, in each household (Table 11).

Table 10. Distribution of Households by Volume of Raw Bamboo Harvested (culms/year).

Number of Culms	% households (N = 51)
≤ 100	29
101 – 500	41
501 – 1000	12
1001 – 1500	4
1501 – 2000	8
≥ 2001	6
Total	100

Table 11. Distribution of households by Number of Family Members Engaged in Bamboo Cultivation.

Number of household members	% Households (N = 59)
1 – 2	64
3 – 4	24
5 – 6	7
≥ 7	5
Total	100

As noted above, a large majority of the households use raw bamboo both for domestic consumption and as a source of cash income. Table 12 presents data on the estimated income of the households from raw bamboo sales during the year preceding the interview. Sales income figures were calculated by multiplying sales volume of raw bamboo during the year by the reported average price per culm of Birr 0.90. Although Table 12 reflects a bimodal distribution, it is clearly apparent that the overwhelming majority of households were concentrated in the lowest end of the sales income bracket. Since it was not possible to get information on how much labour time was spent in the cultivation of home stead bamboo, little if at all can be said about the size of household income from the sale of bamboo. Assuming, however, that the opportunity cost of labour in the survey areas is likely to be zero, it may be concluded that home stead bamboo cultivation undoubtedly provides a source of employment and supplementary income to farm to farm households in the survey areas.

Table 12. Distribution of Households by Annual Income From Sale of Raw Bamboo

Sales Income (Birr)	% Households (N = 36)
90.00 - 179.00	53
180.00 – 269.00	11
270.00 – 359.00	8
360.00 – 449.00	6
450.00- 539.00	6
≥ 540.00	16
Total	**100**

Bamboo-based handicrafts or manufacturing enterprises producing for the market are not as widespread in the rural communities as would be expected. Of the sample of 59 bamboo cultivators who were interviewed, for example, only 9 reported that, during the year preceding the interview, they earned incomes between Birr 20.00 and 200.00 from the sale of bamboo products in the local market.

Turning now to the socio-economic issues involved in the supply of raw bamboo from natural stands, the survey results are presented below. The results are based on information obtained from two groups of farm households engaged in the collection of raw bamboo using a similar interview schedule which was administered on bamboo cultivators.

For the sake of brevity, the survey results on the household profile of bamboo collectors are presented as they compare with corresponding results on bamboo cultivators (Table 13).

Table 13. Comparative Analysis of Household Profiles of Bamboo Cultivators and Collectors.

Criteria			Number of own children							
	Age		Total		≥ 10 yrs old		Going to school		Literate	
	cult..	coll.	Cult.	coll.	cult.	coll.	cult.	coll.	cult.	coll.
Minimum	23.0	20.0	0.0	0.0	0.0	1.0.	0.0	1.0.	.	.
Maximum	85.0	66.0	14.0	5.0	14.0	5.0	14.0	4.0		
Mean	48.0	38.6	5.2	0.9	2.8	1.0	1.9	0.9		
Median	45.0	35.0	5.0	0.0	2.0	0.0	1.0	0.0		
%									**49**	**26**

According to the interview results, households engaged in bamboo collection, similar to those engaged in bamboo cultivation, were headed by men who were married. Nevertheless, Table 13 suggests that bamboo collecting households have younger and illiterate household heads; are smaller in size; and have fewer children aged 10 years and above and fewer children going to school. Such differences between the two household groups might be a reflection of the difference in the socio-cultural setting of the survey areas. Households operating home stead bamboo cultivation have existed in the survey area for generations while those engaged in bamboo collection from natural stands belong to communities of settlers who were moved to the survey area in the mid 1980s.

Responding to questions about the importance of bamboo, all household heads replied that raw bamboo is an essential commodity as they were almost entirely dependent on it as a raw material for construction, household furniture; porterage and storage utilities; and as a source of domestic energy. All household heads except one stated that raw bamboo collected by household members is entirely used for own domestic consumption. Thus, basic needs fulfilment rather than commercial interest appears to be the push/pull factor for rural households in the survey area to engage in the collection and processing of bamboo.

The survey results made it apparent that, on average, one or two male members of an household were engaged in arduous tasks of collecting and carrying 10 culms per trip; making at least one or two trips per week (Table 14); and walking a distance of 8 kilometres to and from the forest (Table 15).

Table 14. **Distribution of Households by Frequency of Collecting Bamboo**

Days/week	% Households (N = 40)
1 - 2	57
3 - 4	30
≥ 5	13
Total	100

Table 15. **Distribution of Households by Distance Travelled to Collect Bamboo**

Travel Distance (Km.)	% Households (N= 54)
1 – 5	46
6 – 10	37
11 – 15	6
16 – 20	7
> 20	4
Total	100

Overall, despite their proximity and free access to bamboo forest resource, households in the survey areas appear to be unwilling or more likely unable to operate bamboo-based and market oriented value adding enterprises toward increased income and employment.

In order to capture information on rural households engaged both in homestead bamboo cultivation and collection of bamboo from natural forest, the survey was administered on a rural community in which both activities of bamboo supply are commonly practised (Table 3). The survey included face-to-face interviews with a sample of 30 household heads. The survey results showed that, on the whole, this survey area was not significantly different from the other four whose inhabitants were engaged either in homestead cultivation or in collection of bamboo.

It is worth noting, however, that the reported average age of bamboo plantations in Jibat is 19 years which contrasts sharply with the corresponding figure of 30 years for plantations in Hagereselam and Injibara. Moreover, more than a third of cultivators in Jibat reported that they have been operating homestead bamboo cultivation only for one or three years; while nearly one-half of their counterparts in Hagereselam and Injibara were reportedly engaged in bamboo cultivation for more than thirty years. Bamboo cultivation in Jibat is, therefore, relatively a recent phenomenon; and more significantly, increasing numbers of households are being attracted into bamboo cultivation both for the market and own domestic use.

Manufacturing with Bamboo

The survey results on bamboo manufacturing are based on information and subsequent analysis of the socio-economic issues pertaining to two groups of manufacturers; one operating from a small town Injibara) and the other from a major urban centre (Addis Ababa). The results are presented in a way that provides for comparison both within and between the groups.

Data on selected personal characteristics of the operators reveal some significant differences between the two groups in the survey areas.

Table 16. Enterprise Operators Crossclassified by Age and Sex

Age	% Operators					
	Injibara (N = 23)			Addis Ababa (N = 16)		
	Male	female	Total	male	female	total
≤ 25	78	0	78	31	6	38
26 - 30	9	0	9	38	0	38
≥ 31	13	0	13	19	6	25
Total	100	0	100	88	12	100

As Table 16 shows, bamboo manufacturers operating in Injibara were all males of whom a far greater proportion were 25 years of age or younger; while only slightly more than a third of those operating in Addis Ababa including two females fall within the corresponding age group (Table 16).

Table 17. Enterprise Operators Crossclassified by Marital and Literacy Status

Marital/Literacy status	% Operators	
	Injibara (N = 23)	**Addis Ababa (N =16)**
Married literate	35	19
Married illiterate	22	0
Single literate	35	69
Single illiterate	8	12
Total	100	100

From Tables 17 and 18, more than one-half of operators in Injibara were married and about one-tenth of them had at least one child of their own. In contrast, less than one-fifth of operators were married and none of them had children. Significantly between 70 and 80 per cent of operators were able to read and write; many of them were, in fact, dropouts from various grades of the school system.

The findings summarised in Tables 16, 17 and 18, therefore, provide evidence to conclude that, generally, bamboo manufacturers in both towns are among the large number of men and women entrepreneurs in the country struggling to overcome the consequences of unemployment.

Table 18. Enterprise Operators Categorised by Total number of own Children, Number of Own Children Aged 10 Years or More, and Number of Own Children Going to School.

Number of children	% Operators					
	Injibara (N =23)			Addis Ababa (N = 16)		
	total children	Children $\geq$ 10 yrs old	Children going to school	total children.	children. $\geq$ 10 yrs. old	Children going to school
0	14	19	21	16	16	16
1 - 2	7	3	2	0	0	0
$\geq$ 3	2	1	0	0	0	0
Total	23	23	23	16	16	16

According to the interview results presented in Table 19, the manufacturing units in Injibara were entirely family-operated while those in Addis Ababa used both family and hired labour (Table 19). Further, over three-fifths and two-fifths of operators in Injibara and Addis Ababa respectively reported that they used family labour on a full time basis.

Notwithstanding the differences between the two groups of operators, therefore, it would appear that the bamboo-manufacturing units in both survey areas were generally micro-enterprises providing self-employment for owner operators and their family members.

Table 19. Enterprise Operators Categorised by Size and Type of Labour Used.

Number of Workers	% Operators							
	Injibara (N = 23)				Addis Ababa (N = 18)			
	Family labour		Hired labour		Family labour		Hired labour	
	FT	PT	FT	PT	FT	PT	FT	PT
1	61	39	0	0	22	5	5	11
2	0	4	0	0	22	0	0	11
≥ 3	0	4	0	0	0	5	39	0

An attempt was made to assess the extent to which skilled labour was used in bamboo manufacturing in the survey areas. Although over 60 and 80 per cent of operators in Injibara and Addis Ababa respectively reported that there was at least one skilled family member working for the enterprise, all operators but one in Injibara and nearly one-half of those in Addis Ababa mentioned that the skill of their family labour in bamboo manufacturing was acquired through experience rather than through training. This is perhaps not unexpected considering that skill training opportunities are most likely to be far greater in Addis Ababa than in Injibara.

A production factor which is perhaps as important as skill of labour both in affecting the quality of bamboo products and the work safety of the operators is the extent to which appropriate tools are used in manufacturing.

The tool types most frequently mentioned by the operators in the survey areas were axe, sickle saw and chisel. However, as Table 20 suggests far more tool types (which included mentions of driller, grinder and clamp) were mentioned by manufacturers in Addis Ababa than in Injibara.

Table 20. Distribution of Enterprise Operators by Tool Types Used.

Number of tool types	% Operators	
	Injibara (N = 23)	Addis Ababa (N = 18)
≤ 4	61	11
5 – 6	26	33
≥ 7	13	56
Total	100	100

An additional indicator of the degree to which the enterprises are capitalised is the value of manufacturing tools and equipment. The enterprise operators in Injibara and Addis Ababa estimated the mean value of tools and equipment of their enterprises at Birr 64 and Birr 5333.00 respectively. Thus, manufacturing enterprises in Addis Ababa were using a broader range of tools and equipment This is hardly surprising given that effective market demand for quality products prevails in Addis Ababa which can only be met through the use of a variety of processing and manufacturing tools.

The nature and scope of effective market demand as a distinguishing feature between the two survey areas also has an important bearing on the range of bamboo products manufactured. The survey results indicated that the greater majority of operators in Injibara

(60%) were manufacturing only one type of product to serve the limited local market; while a comparable proportion of operators in Addis Ababa (61%) were manufacturing two or more types of products.

With regard to raw bamboo supply, operators in Injibara had the comparative advantage due to their close proximity to the source of cultivated bamboo and hence lower transportation costs than their counterparts in Addis Ababa who use raw bamboo originating from the south, south-west and northwest of the country. The difference between prices of raw bamboo reportedly paid by manufacturers in Injibara (Birr 1.50/culm) and Addis Ababa (Birr 5.50) is certainly, at least in part, due to the cost of transporting raw bamboo.

According to the respondents, the average annual consumption of raw bamboo by manufacturers in Injibara was 500 culms; while the corresponding figure for those in Addis Ababa was more than five times as much (2690 culms). Information on the quantity of raw bamboo apparently bought by the operators in the survey areas during the year preceding the interview is summarised in Table 21.

Table 21. Distribution of Enterprise Operators by Annual Consumption of Raw Bamboo

Number of culms	% Operators	
	Injibara (N =23)	Addis Ababa (N =18)
≤ 1000	96	55
1001 – 2000	0	17
2001 – 3000	0	17
≥ 30001	4	11
Total	100	100

Annual Manufacturing Costs and Returns. In the present context, costs of hired labour, raw bamboo, and rented land/shed constitute manufacturing costs; while profit margin is sales income minus manufacturing costs. The enterprises in Injibara are operated by family members and within household premises. As such their operators pay neither wages for hired labour nor rent for use of land or shed. Accordingly, cost of raw bamboo is the only manufacturing cost element for operators in this survey area .

Table 22. Distribution of Enterprise Operators by Annual Manufacturing Profit Margin

Profit Margin (Birr)	% Operators	
	Injibara (N = 23)	Addis Ababa (N = 13)
≤ 500	31	61
501 – 1500	43	8
1501 – 2500	22	8
2501 - 3500	4	23
Total	100	100

Manufacturing profit margins for the year preceding the interview were calculated by subtracting manufacturing costs incurred from gross sales income received during that year. Two things become readily apparent from the Table. Firstly, for a large proportion of manufacturers in both survey areas, the estimated mean annual profit margin was less than the minimum government wage rate of Birr 1800.00/year. Secondly, there is a larger concentration of operators at both extremes of low and high profit margins in Addis Ababa (std. dev. 1222) than in Injibara (std. dev. 748); suggesting that the number of manufacturing enterprises generating high profit margins to their operators is likely to be significantly greater in Addis Ababa than in Injibara.

Constraints and opportunities

Resource-poor homestead bamboo cultivators in the survey areas do not use modern inputs and are engaged in this activity as a supplementary source of household income. Harvesting of cultivated bamboo is often a year-round activity carried out as and when the need arises. Similarly, unregulated use of natural stands of bamboo both by local inhabitants primarily for own domestic uses and government-initiated settlement schemes were mentioned as factors aggravating the problem of increased depletion of bamboo resource in the survey areas.

More often than not, only axes and/or sickles are used for harvesting and primary processing of raw bamboo; resulting in reduced chances of regeneration, increased wastage and increased likelihood of physical damage to the operators.

There only exists a very limited local market for bamboo handicrafts, which is not further developed or organised. Lack of a regular raw bamboo supply poses a serious bottleneck to manufacturers operating in Addis Ababa. The gravity of the problem is such that manufacturers apparently spend several days or even weeks in search of suppliers and supply points in rural areas.

Only a portion of cultivated bamboo is sold by the plantation site at an average price of roughly Birr 1.00 to local buyers for own use or resale to bamboo manufacturers; whereas raw bamboo collected from natural stands is, according to the respondents, almost entirely used for own domestic consumption or at best limited to rudimentary manufacturing of products for the limited local market. These findings indicate that generally bamboo cultivation and/or collection is far from being market-oriented and, paradoxically, bamboo areas are characterised by the absence of bamboo-based value adding activities for increased income and employment.

The survey results suggest that the overwhelming majority of bamboo manufacturers in the two survey areas are young male entrepreneurs; presumably school dropouts. It also becomes apparent from the survey results that family members who have not received any skill training constitute the sole or the major work force of bamboo manufacturing enterprises. The little knowledge of these groups means that basic training on bamboo techniques for harvesting and processing can result in large improvements.

SUMMARY AND CONCLUSIONS

Ethiopia has the greatest bamboo resources in Africa, measuring over half a million hectares and representing a significant proportion of Africa's total natural bamboo resources. The use of this abundant resource is resricted to the household level, where people consider bamboo as their second-most important source of livelihood after agriculture. The primary use of raw bamboo material is for housing, fencing and household amenities. The majority of the interviewed rural families are entirely dependent on raw bamboo for construction, household furniture and as a source of domestic energy.

A small number of people earn money by cultivating, collecting and processing the bamboo. Collectors cut bamboo from natural forests and some households grow small amounts of bamboo on their land and sell bamboo poles that fetch 10 to 20 US$ per year for the poorest strata. No harvesting regulations presently exist and cutting is seriously depleting the resource base in the areas where extraction is concentrated.

The handicraft sector is poorly developed and concentrated in the cities of Addis Ababa and Injibara . Family-based enterprises produce household utensils for a small urban market.

RECOMMENDATIONS

1. General Awareness Raising and Advocacy. Bringing about a meaningful change in the production and utilisation of bamboo resources in the country requires a concerted effort of all relevant stakeholders. In particular, bamboo cultivators and collectors need the organisational capacity to be able to advocate for regulating the development and use of bamboo through an enabling policy and institutional framework.

2. Interventions that focus on assisting rural households engaged in bamboo cultivation to improve their production practices provides the greatest potential for success firstly because the very basis for the development of bamboo industry is the source of the raw material itself; and secondly, rural-based interventions lie within the overall national development strategy.

3. In partnership with cultivators, the Department of Agriculture/Forestry and NGOs operating at local level extension packages need to be developed and applied to improve cultural practices of bamboo cultivation.; including timing and methods of harvesting, propagation, use of productivity-enhancing inputs , drawing up business plans and keeping records and accounts.

4. The establishment of bamboo seedling nurseries should be considered as a priority area of intervention. Apart from ensuring adequate local supply of seedlings for individual and community bamboo plantations, the establishment of such nurseries would ease the pressure on natural bamboo stands which are currently used by bamboo cultivators as the only source of planting material.

5. There is an urgent need to address the shortcomings pertaining to the type of tools used particularly for bamboo processing and manufacturing. A promising venue may be a collective arrangement for the use of appropriate tools and equipment; whereby operators who cannot afford to buy their own tools can have access to such a pool of tools and equipment desirably on a nominal fee basis.

6. Establishing and developing formal linkage arrangements between groups of cultivators/collectors and manufacturers might be the best way forward to alleviate this situation.

PCS COMPONENT	Data/Findings	Constraints	Opportunities	Likely causes of Constraints	Proposed intervention	Expected output
PRIMARY PROCESSORS	(1) Result from focus group discussions	(1) Lack of appropriate processing tools; wastage; Health hazard	(1) Primary processing of bamboo is a community wide activity for basic needs fulfillment	(1) Lack of knowledge of or access to appropriate tools and equipment	(1) provide information on available tools; provide access to working capital needed to buy such tools	(1) Better working facilities; wastage reduced; increased work safety
MANUFACTURING	(1) The survey results indicate that most if not all enterprise operators have had no skill training; preliminary "consumers" survey results indicate manufactured products have much to be desired in terms of quality particularly finishing (2) Focus group discussion with manufacturers	(1) Inadequate skill in bamboo manufacturing (2) Unreliable raw bamboo supply .	(1) Most operators are school leavers who can be trained with relative ease Enabling policy problems for SME development	(1) Lack of skill training opportunities particularly in small towns (2) Organizational incapacity	(1) Skilled training provision in the design and manufacture of good quality bamboo products (2) Formation of groups of suppliers and manufacturers; and developing formal linkages between suppliers and manufacturers	(1) Manufacturers who are able to manufacture better quality bamboo products (2) More effective and predictable market in place.
GENDER	Survey results show that women (girls) are invisible in the entire PCS	Apparent marginalisation of females from the use of bamboo		Inappropriate survey method	Undertake an in-depth participatory research to verify situation	Reliable information on the role of women in the PCS as a basis for action

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ANNEX . SURVEY QUESTIONNAIRE

I. COMMUNITY LEVEL QUESTIONNAIRE

A. FOCUS GROUP DISCUSSION .

Information to be solicited from community elders and craftsmen/craftswomen through focus group discussion (40-60 minutes).

1. Changes in bamboo resource situation over the last 5-10 years (historical mapping):

_____
_____
_____
_____
_____

2. What are the problems with regard to bamboo production, collection and processing?

_____
_____
_____
_____
_____
_____
_____

3. **Suggestions/recommendations** to develop bamboo resources production, collection and processing (SWOT analysis). Probe into:

3.1. Protection & management of natural bamboo stand:

Protection:

_____
_____
_____

Management:

_____
_____
_____

3.2. Harvesting and collection systems:

Harvesting:

_____
_____
_____

Collection:

_____
_____
_____

3.3. Processing & small-scale enterprise development for livelihoods:

Processing:

_____
_____
_____

Small-scale:

_____
_____
_____

3.4. Trading and sales of bamboo raw materials and products.

Raw material:

_____
_____
_____

Bamboo products:

_____
_____
_____

IDENTIFICATION:

1. Name of: Survey Area _____
   Community/village _____
   Interviewer/facilitator _____
2. Date /Month/Year: ____/____/_____.
3. Time : From _____ a.m./p.m. to _____ a.m./p.m.

B. RESOURCE PERSONS

Information to be solicited from resource persons (DAs, School masters, etc.) through semi-structured interviews {40-60 minutes}.

1. Estimated number of HH's: _____
2. Estimated population (1998 or 1999): _____
3. Number of primary and secondary schools: _____, _____.
4. Major occupation of community members:
    a. _____
    b. _____
    c. _____
    d. _____
5. Number of enterprises and industries by type:
    a. **Micro**: _____
    b. **Small**: _____
    c. **Medium**: _____
6. Total land area currently under use by the community, other than home stead (in ha): _____
    a. Privately owned: _____
    b. Community owned: _____
    c. Open access: _____
7. Total land area under bamboo resource (in ha): _____
    7. 1. Estimated land area under wild/natural bamboo (in ha): _____.
    7.2. Estimated land area under cultivated/private bamboo (in ha): _____.
    7.3. Estimated number of bamboo culms collected per year from communityforest: _____.
8. Community established fees or charges, if any, for collecting of bamboo from wild: _____.
9. Season (s) of bamboo collection: _____.
10. Does Forestry/Agriculture Department issue permit for bamboo collection? (Y/N)
    10.1 If 'Y' for Q10, what is the cost for a permit? Birr ____/_____unit (number of bamboo, season, year, etc...)
    10.2 Does forestry /Agriculture Department operate check post to regulate bamboo supply? (Y/N)
    10.3. If 'Y' for Q10.2, how much does a collector pay per trip? No. of culms/head-back-load/animal load/small-truck/heavy truck.
    Birr _____/_____.
    10.4. Has the Department of Agriculture /Forestry planted bamboo? (Y/N)
    10.5 If 'Y' for Q 10.4, how much? (Ha) _____, and when? (Year planted) _____.

Is bamboo planted for the purpose of soil conservation? (Y/N)

10.6 If ' Y' for Q 10.6, how important is bamboo relative to other woody plants? (Better/inferior/comparable); In what respect (s)?

a . _____b. _____ c. _____.

IDENTIFICATION:

1. Name of: Survey Area _____
   Community/village _____
   Interviewer/facilitator _____
2. Date /Month/Year: ____/____/_____.
3. Time : From _____ a.m./p.m. to _____ a.m./p.m.

II. HOUSEHOLD LEVEL QUESTIONNAIRE

Information to be solicited from household heads in the survey area pertaining to their own personal background, family situation and experience in bamboo supply and use patterns {60 minutes}.

A. EXPERIENCE IN BAMBOO SUPPLY AND USE

1. Is any member of the HH including yourself, engaged in bamboo Collection (Y/N), Cultivation (Y/N), Processing? (Y/N)

2. How important is (are) this (these) activity (ies) to the HH relative to other sources of livelihood? (Primary/Secondary), or explain:
   _____
   _____
   _____

QUESTIONS 3-13: Solicit information on bamboo collection practices by members of the HH **(bamboo collecting family)** during the year preceding this interview.

3. What for was raw bamboo collected? (Own use/sale/both for own use and sale).
4. If raw bamboo was collected for own use, specify whether it was used as: (fuel-wood/raw material for further processing/both).
5. How many HH members were engaged in bamboo collection?
   Male _____, Female _____, Total _____
6. On average, for how many days was a HH member engaged in bamboo collection?
   _____days/week._____(note if seasonal).
7. On average, how many bamboo culms did a HH member collect per day?
   _____ culms.
8. Where was bamboo collected from? (Natural stand/plantation/both)
9. What was the minimum and maximum distance usually travelled to collect bamboo?
   Minimum: _____ km, maximum _____ km.
10. Of the estimated total bamboo culms collected/week, how many were:
    10.1. Used at home: _____ culms.
    10.2. Sold _____ culms.
11. Rank the types of bamboo collected by your own preference and preference by traders/users.

Bamboo type			Preference ranking		
No.	**Local name**	**Scientific name**	**Own**	**Others**	**Remarks**
1					
2					
3					
4					

12. What type/kind of tools were used for bamboo collection?

    a. _____ b_____ c. _____d. _____
    e. _____ f._____ g._____

13. If bamboo collected was partly or entirely sold, to whom was it sold? Local traders/agents/others _____.

QUESTION 14 and 15: Solicit information on cultivation of bamboo by the HH.

14. Does the HH have home stead or farmland (bamboo plantation)? (Y/N)
15. If ' Y' to Q14:
    - 15.1. Year first planted: _____.
    - 15.2. Type of bamboo: _____.
    - 15.3. Size of plantation: (hectares/number of culms) _____
    - 15.4. Seedling/stolon cost: (Birr):) _____
    - 15.5. Labour cost of planting (Birr): _____/day
    - 15.6. Labour days spent in planting:) _____ man-days.
    - 15.7. Number of culms harvested:) _____ /month/year.

QUESTIONS 16-22: Seek information on collecting and transporting for sale by HH (**bamboo selling family)** members during the year preceding this interview.

16. Where did HH members usually sell bamboo? (Door-to-door/by the street side/market place/more than one outlet.
17. How many bamboo culms did the HH sell? _____/(last) year.
18. How was bamboo transported from collection site to selling point (s)? (Back/head load/animals/small truck/heavy truck).
19. What was the marketing cost of bamboo for:
    - 19.1. Transport _____ Birr
    - 19.2. Lodging _____ Birr
    - 19.3. Other cost _____ Birr
    - 19.4. Total costs _____ Birr
20. What was the selling price of bamboo? Birr _____/culm.
21. Is bamboo trading a profitable business compared to other sources of income? (Y/N)

QUESTIONS 22-25: Seek information on processing of bamboo and selling products by HH members.

22. Was any member of the HH engaged in processing activity of bamboo for own domestic use (Y/N), or for sale outside (Y/N), or for both? (Y/N).
23. If ' Y' to Q 22, what type of processing activities were carried out? (Tick one or more).
    - 23.1 Detopping/debranching/cutting into smaller pieces.
    - 23.2 Splitting/Slicing/Smoothening/Sizing.
    - 23.3 Weaving to make roofs, baskets, trays, lamp sheds, etc. _____.
    - 23.4 Furniture/handicrafts making, etc. _____.
    - 23.5 How many people were involved in processing?

      Male _____ Female _____ Total _____

    - 23.6 How many labour days (man-days) were required for processing?

	Family labour	**Hired labour**
Permanent labour		
Temporary labour		

    - 23.7 If hired labour was used, how much was paid in wages? Birr __/day

23.8 What was the price of tools used in processing?

	Type of tool used	Price in Birr
1		
2		
3		
4		
5		
6		
7		

23.9 What processing costs were incurred other than costs for wages and tools?

	Cost item	Amount Birr
1		
2		
3		
4		
5		

23.10 Bamboo products are produced by the HH partly/entirely/not at all for sale.
23.11 If produced for sell:
23.11.1. To whom were the products mainly sold? (to consumers directly/to wholesalers/to retailers).
23.11.2. How much did the HH earn from sale of bamboo products? Birr _____

24. Is bamboo processing a profitable business? (Y/N)
25. If 'N' to Q 24, what are the problems?

_____
_____
_____

B. PERSONAL PROFILE

1. Sex of the respondent (M/F)
2. Age _____
3. Marital status of the respondent (married/widowed/divorced/separated/single)
4. Can you read and write? (Y/N)_____level.
5. How many children of your own do you have living with you?

	Male	**Female**	**Total**
Under 10 years			
10 years & above			

6. How many children do you have temporarily living outside the village?

	Male	**Female**	**Total**
Under 10 years			
10 years & above			

7. How many members of your HH go to School?

	Male	Female	Total
Self			
Spouse			
Children			
Other relatives			

IDENTIFICATION:

1. Name of: Survey Area _____
   Community/village _____
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2. Date /Month/Year: ____/____/_____.
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III. MANUFACTURERS LEVEL QUESTIONNAIRE

Information to be solicited from manager or owner-manager.

A. THE ENTERPRISE:

Refers to the year preceding the interview

1. Labour force: Size.

Type	**Number**		
Family labour (including self)	Male	Female	Total
Full time			
Part time			
Hired labour			
Full time			
Part-time			

2. Labour force: Skill

Type	**Number**					
	Unskilled		Skilled			
			Through Experience		Through training	
Family labour (including self)	M	F	M	F	M	F
Full time						
Part-time						
Hired labour						
Full time						
Part time						

3. Labour force: Wage rates

Type	**Daily wage rates (Birr)**			
	Unskilled		Skilled	
	M	F	M	F
Family labour (including self)				
Full time				
Part time				
Hired labour				
Full time				
Pat time				

4. Labour force: Total wages

	Estimated number of work days/week		**Wages paid to/month**		
Family labour (including self)	Skilled	Unskilled	Skilled	Unskilled	Total wages
Full time					
Part time					
Hired labour					
Full time					
Part time					

5. Work space: Facilities

	Owned		Rented
	Size/number	Size/number	Amount paid per year
Land			
Shed			

6. Tools and equipment

Item/type	**Quantity**	**Unit value**	**Total value**
1			
2			
3			
4			
5			
6			
7			

7. Sales profit

Type	Quantity sold	Unit price	Gross income	Manufacturing cost	Profit margin
1					
2					
3					
4					
5					
6					
7					

8. Row Bamboo supply

8.1. Place (s) of origin: _____ (name (s))
8.2. Type (s) of bamboo: _____ (local name (s)
8.3. Type (s) of supplier: _____ collector/trader/both

8.4. Quantity bought: _____ (number of culms)
8.5. Average price/culm by type: _____type _____ (Birr)
_____type _____ (Birr)
_____type _____ (Birr)
8.6. Average price/culm
by supplier: _____Birr (collector)
_____ Birr (trader)

9. Prices of finished products by type in urban big towns/cities

Type of product	Price per unit	
	Wholesaling	Retailing

10. Please give your **suggestions/recommendations** to improve bamboo processing.

10.1. Row material supply:
_____
_____

10.2. Training & technology transfer:
_____
_____

10.3. Marketing of finished products:
_____
_____

10.4. Expansion of business/industry:
_____
_____

B. PERSONAL PROFILE

1. Age: _____(years)

2. Sex: ☐ M ☐ F.

3. Marital status ☐ Single ☐ Married ☐ Divorced
☐ Separated ☐ Widowed

4. Number of children living in HH.

Age	Male	Female	Total
Under 10 years			
10 years & above			

5. Literacy status: I[ ] [ ]ate

6. Number of HH members going to school:

HH member	Male	Female	Total
Spouse			
Self			
Children			
Other relatives			

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IV. TRADERS LEVEL QUESTIONNAIRE

EXPERIENCE IN TRADING

1. How long have you been trading bamboo products? _____ Year (s)
2. Do you operate other trading/business (s) other than bamboo products? Y/N
3. If 'Y' to D.3. What other trading business (s) do you operate?
4. List the bamboo products you are trading in:

Type of product	**Source (s) of supply**		
	Manufacturers	***Agents***	Ones own

5. Product prices & profit margins

Type of product	***Unit selling price***	***Unit price***	***Profit margin***

6. What proportion of your annual income comes from trading in bamboo products? _____ (proportion)

7. Please provide your **suggestions and recommendations** to improve you trade in bamboo products.

7.1 Finished products supply:

_____
_____

7.2. Storage facilities/method:

_____
_____

7.3. Market information & facilities:

_____

_____

7.4. City council support:

_____
_____
_____

B. PERSONAL PROFILE

1. Age: _____(years)

2. Sex: ☐ M ☐ F.

3. Marital status ☐ Single ☐ Married ☐ Divorced ☐ Separated ☐ Widowed

4. Number of children living in HH.

Age	Male	Female	Total
Under 10 years			
10 years & above			

5. Literacy status: I☐ ☐ate

6. Number of HH members going to school:

HH member	**Male**	**Female**	**Total**
Spouse			
Self			
Children			
Other relatives			

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V. CONSUMERS LEVEL QUESTIONNAIRE

A. AT MARKET PLACE

1. Type of bamboo product (s) being purchased: _____
   _____
   _____
2. Have you ever bought bamboo products? Y/No.
3. If ' Y' to E.1.2, what other bamboo products have you bought before?
   a._____b._____c._____ d _____

AT HOUSEHOLD

1. What bamboo products do you have in your home?
   a._____b._____c._____ d _____
   e._____f._____
2. How do you compare bamboo products to similar products made from other materials?
   2.1. *Attractiveness*: Inferior/comparable/superior.
   2.2. *Durability*: Less/comparable/more
   2.3. *Price*: Less/comparable/more
   2.4. Others: _____
3. What other products would you like to be made from bamboo?
   a. _____ b. _____c._____
   d. _____e. _____ f. _____
4. As a consumer, what improvements in bamboo products do you think would be beneficial?
   a. _____
   _____
   b. _____
   _____
   c. _____
   _____
   d. _____
   _____

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