

**Bamboo in Abra:
An Investigation of the Production-to-Consumption System**

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PCS Photographs

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Executive Summary

In Abra, bamboo has always been an abundant natural resource. Because of this, a base of bamboo craft skills has evolved over the last several decades. A wide variety of bamboo products such as baskets, trays and placemats are crafted in the province and sold in the domestic and export markets today. Round poles have also been harvested for years and sold to markets outside the province for use primarily in fishpens, but also in the making of crafts in nearby provinces. Although there are significant numbers of individuals (over 400) involved in the bamboo industry of Abra, the system remains fairly static in growth, and poverty remains a way of life in Abra for most of these people.

In the late 1980s, a group of local individuals came together and formed the InHand Abra Foundation. Together, they began a project intended to augment the bamboo industry and increase the livelihoods of those involved in bamboo craft production. A plyboo factory was established from which boards were sold for use in architectural design, and from which high quality furniture pieces for export were produced. The factory had a solid start, achieving sales of P503,424 pesos in 1991 and P1.95 million in 1993, and directly and indirectly employed over 200 people. Unfortunately, Abra was then hit by a major earthquake causing destruction to the roads which enabled easy access to raw materials, and also caused the bamboo to flower and die. Abra was next hit with a typhoon which severely damaged the factory structure. Despite this devastation, the support direly needed to save what had been started was not forthcoming, nor has there been any initiative to spearhead other economic development in the area.

Today in Abra there are still no major industries and therefore, little by way of economic opportunity for those living in the province. However, the historical and traditional significance of bamboo in Abra merits a close examination of the bamboo industry as it currently functions and impacts the lives of those living there. Given the abundance of this resource and the related skills-base amongst hundreds of community members, there is considerable economic potential for bamboo in Abra. With the expected growth in the international market for bamboo based products, Abra is in a position to meet this market demand while at the same time, creating opportunity and increasing income generation for those living in the area.

From May 1999 through November 1999, a study of the Abra bamboo production-to-consumption system was carried out. The study covered the 2 systems existing in Abra - one for round poles, and the other for crafts. The results are presented within the body of this report, problems and constraints to the systems are identified and discussed, and recommendations are outlined for development interventions in the bamboo industry with the goal of improving the lives of the people of Abra through increased income generation.

List of Acronyms

DAR	Department of Agrarian Reform
DENR	Department of Environment and Natural Resources
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DRIVE	Developing Rural Industries and Village Enterprises
DTI	Department of Trade and Industry
INBAR	International Network for Bamboo and Rattan
PCS	Production-to-consumption System
SMEs	Small and Medium Sized Enterprises
TESDA	Technical Education and Skills Development Authority

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1.0 Introduction and Background

The province of Abra lies in the Cordilleras Mountain range and is said to be the last frontier of the island and the primary watershed and ecological zone of Northern Luzon. However, despite the fact that this area is rich in natural resources, poverty has been a way of life for the people of Abra. Due to a lack of vision and coordination on the part of local government units and lack of support for non-governmental organizations, little development has taken place in Abra. Local entrepreneurship for the development of small, medium or large scale industries from which to garner livelihood has not been enabled. This has caused an emigration of managerial and technical know-how from the area. What little industry has existed has been primarily bamboo woven articles and poor quality wooden furniture which have typically been subcontracted to farmers on a per-piece basis resulting in earnings of approximately 25 pesos per day.

Not surprisingly, lack of development initiatives caused apathy among the people. However, with the onset of the People Power Revolution in 1986, the Abraeans derived hope that they themselves could instigate change in their community. Carrying forward the momentum of the People Power Revolution, they united and formed the InHand Abra Foundation in 1988, and together with InTechDev Systems - a technology transfer and marketing organization, made a move towards self-reliance. In 1988, the two organizations began a livelihood project in Abra, with bamboo as the basic raw material.

Through the implementation of two key concepts developed by InTechDev, called "Industrialized Handicrafts" (see Appendix E), and with the abundance of *buhô* bamboo and a base of traditional bamboo craftmaking skills, the organizations successfully began production of plyboo boards with loans from the Development Bank of the Philippines and the National Livelihood Support Fund. Unfortunately, on July 16, 1990, a major earthquake struck the area, crippling the project due to road destruction which prevented access to upland sources of raw material. Additionally, the earthquake caused flowering to occur in the upland bamboo stands. The project was faced with more devastation when in October 1991, Super Typhoon Trining hit the area destroying the main factory building and some of its equipment. The setback in raw material harvesting, lack of funds for reconstruction of the roads and lack of cooperation between government agencies have left the project with inadequate assistance in problem solving.

Since then, the project has taken a turn in character from being a development project to a private endeavor of applied research by InHand Abra Foundation and InTechDev. High end products for local and international markets have been the focus. However, due to infrastructural deficiencies, the operation has remained small and functional only during the dry season.

1.1 National Significance

In 1995, the export market for bamboo in the Philippines totaled US\$24.3 million and had an average growth rate of 9.25% during the previous 15 years. This represents roughly one quarter of total production, the rest being for domestic sales. Clearly, these facts demonstrate the significance of bamboo to the country's economy. Nationally, the demand for bamboo comes in the form of furniture and handicrafts, fishpens, agriculture, food, paper and pulp. Internationally, exports consist primarily of basketry. However, recent statistics have indicated a growth in the international market for a wide variety of bamboo-based products, much beyond basketry.

Bamboo is a fairly abundant natural resource found in the Philippines. Sixty-two species have been identified in country, of which 21 are endemic, and which span up to 52,000 hectares of area all over the country (see Table 1.) The most commonly used species are *Bambusa blumeana* (*kawayan tinik*), *Bambusa vulgaris* (*kawayan kiling*), *Dendrocalamus merrilianus* (*bayog*), [climbing bamboo] (*bikal*), *Gigantochloa aspera* (giant bamboo), and *Gigantochloa levis* (*bolo*).

Table 1. Location of Bamboo Resources

Land Classification	%
Forested Lands	68%
Natural Stands	24%
Private Plantations	5%
Government Plantations	3%

Source: Development of Bamboo

The basic process for bamboo production in the Philippines is as follows:

Raw material > cutting > scraping > splitting > slitting > slicing > sizing > chamfering > dyeing > weaving > chemical treatment > drying > finishing

Although the statistics show that a significant bamboo industry exists, the problem is that with the exception of traders and manufacturers, annual income for participants in the bamboo industry is low. Bamboo gatherers earn on average less than P5,000 annually; raw material producers and furniture workers earn between P5,000 and P10,000 annually; and raw material traders and handicraft workers between P10,000 and P15,000 annually. If one were to compute how much is needed today to have a decent life for a family of five, it would amount to about P30,000 per month. Yet, this is far from reality for a great many people in the Philippines. It is already a struggle for many to earn P180 per day (P5400 per month).

Philippine government policy encourages the private sector to carry out developmentally critical activities in which the target beneficiaries are the unemployed and the underemployed. Hence, the promotion of small and medium enterprises (SMEs), particularly those exhibiting strong export potential and high labor absorption is the primary strategy. The current presidential administration has chartered a nationwide initiative via the Department of Trade and Industry (DTI) entitled "Developing Rural Industries and Village Enterprises" or "DRIVE". The vision of the program is "growth in equity and prosperity for all" and the goal is creation of jobs for the poor. For Abra in particular, the DRIVE program has identified bamboo as one of three focal points for development.

Despite past research in the Philippines regarding the significance of bamboo to the Philippine economy, little development activity with a focus on bamboo has taken place since. The bamboo community development project of InHand Abra Foundation and InTechDev Systems is the first of its kind in the country, with its innovative approach to addressing poverty alleviation. The socioeconomic implications for the community are considerable via the development of a province-wide bamboo industrial estate which includes the following: handicrafts, the plyboo panel factory, fire cracker stick factory, pulp factory, power generating unit from bamboo waste, pulp board, cabinetry, and handmade paper. With the establishment of a province-wide industry, the balance of trade can be reversed from one of import orientation to one of export orientation.

Implementing training and educational programs in which the methods and standards are made meaningful to daily living, the potential socioeconomic impact of such an endeavor is high -- directly impacting at least 2300 skilled and unskilled workers. The development of a full-fledged bamboo industry would stimulate economic activity, and reverse the trend of emigration, and encourage improved and greater interaction between uplanders and lowlanders.

Management of natural resources is a fundamental element of success. Through bamboo agroforestry and industrialization, the rational and wise conservation of the area's natural resources can be ensured. Moreover, due to bamboo's growth characteristics, planting schemes could help preserve this critical watershed area by via the mitigation soil erosion and siltation and enhancing the land's natural capacity for water retention.

Finally, the programs and methods developed to augment the Abra bamboo industry can be easily expanded and transferred nationally into other regions where bamboo livelihood schemes can be further developed to assist the unemployed and underemployed as part of the national rural development program.

2.0 Rationale for the Study

Notwithstanding the current problems, the potential of a province wide bamboo initiative to meet the needs of the province is considerable. Given that the InHand project in its attempt to spearhead community economic development has met several obstacles and setbacks, a comprehensive evaluation of the entire production-to-consumption system is warranted, with the goal of identifying the most appropriate interventions to allow the people of Abra, via its community organization/business enterprise - the InHand Abra Foundation, to successfully transcend their socioeconomic status and overcome what environmental, policy, institutional, and technological constraints exist to development in the province.

The proposed research project will provide the basis for forming a nucleus to spearhead development in the area. Ultimately, primary producer capacity to generate income and profit will be strengthened via employment and ultimately, push the Abraeans out of poverty while sustaining the natural environment surrounding them.

The study will document the present bamboo resources in the Province of Abra and their utilization, the production processes employed, the present marketing and sales practices of the traders / manufacturers in the Province and the relation to the market demands -- both local and international, and finally, annual earnings yielded. The objective is to draw a picture of the present bamboo industry which can be used as a planning tool for enhancing the present handicraft industry. Through concrete mapped out interventions jointly undertaken by government and the private sector, the socioeconomic benefits that result will be important not only the province, but the entire region and country as a whole.

The bamboo industry in the Philippines, like many other rural industries, has not progressed much in its methods for nearly a century. Government focus has been in creating jobs by attracting the private sector to establish businesses in the rural areas. However, rural areas are not attractive as the physical infrastructure and skills of the people are not in place. Although efforts aimed at skills training have been encouraged and funded by the government in the past five years, the infrastructure remains poor, driving the skilled workers to emigrate. Consequently, development and industrialization have not taken off in the countryside.

The project in the province several years ago by the InHand Abra Foundation indicates that its innovative approach can propel industrialization in the countryside and thus bring about real community economic development. Its approach maintains a focus on the creation of industries through community participation in partnership with organizations that have a core expertise in integrating raw material generation, production, product and technology development and marketing. This together with the application of a profit / benefits sharing formula propels industrialization. With success in this one venue, the potential for technology transfer nationally and internationally is significant for spearheading rural development in other communities where bamboo is a critically underutilized resource and where a strong skill base in bamboo utilization has flourished.

3.0 Development Objective

To study the production-to-consumption system (PCS) of the bamboo sector in Abra and to identify potential development interventions for the improvement of livelihoods in the study area via the following:

- 1) to describe the entire production-to-consumption system from raw materials extraction to end-user/consumer in the province of Abra;
- 2) to provide detailed socioeconomic information on the host communities/stakeholders for the improvement of the InHand bamboo project and other bamboo related livelihoods;

- 3) to identify the appropriate intervention and opportunities for change in the system, the technology and improvement of the livelihood of the host communities/stakeholders;
- 4) to produce fully costed activity models for several selected potential interventions.

4.0 Methodology

The study of the bamboo industry in Abra requires a look at 2 subsystems: bamboo round poles and bamboo crafts. The data for these studies was obtained primarily from field surveys and informal interviews with a selected sample of raw bamboo collectors, craftmakers, middlemen and traders, and retailers. Structured questionnaires modified for the Abra situation were utilized for the study (see Appendix A). These questionnaires were administered by a team of research assistants, led by the Executive Director of the InHand Abra Foundation. For the bamboo round poles system, the Department of Agrarian Reform (DAR), Department of Environment and Natural Resources (DENR) were tasked specifically to aid in the resource inventory process, while for the bamboo crafts, the Department of Trade and Industry (DTI) provided assistance in carrying out interviews with craftworkers. The Council of Elders was also instrumental in gathering data.

The interviews involved several visits to host villages and collection centers, as well as to processing and market centers. All sampling of interviewees was random.

Where possible and appropriate, frequency tabulation is used to present the collected information on the various aspects of the PCS. The three principles that would guide the tabulations are (i) natural exclusivity of qualities or values, (ii) internal logic and order of tabulations, and (iii) careful selection of the class intervals when the variable of interest is quantitative. Where appropriate, the distributions would be summarized, using measures such as mean, median, mode, standard deviation and coefficient of variation. Percentages will be employed to compare frequencies and to express qualitative variables in a numerical form.

The research project included two additional in depth studies: an inventory of raw materials in sample areas in the upland communities of Sallapadan, Boliney, Licuan-Baay, and Tubo, and a documentation of processing which entailed observations of time and motion to make various craft items in order to assess cost and pricing. The bamboo resource inventory was conducted by four groups -- the Municipal Agrarian Officers of the DAR, foresters from the DENR, community leaders and elder of the upland communities, and hired researchers. The DAR and DENR specifically carried out the mapping of the bamboo resources. The DENR used the stripping method for taking inventory and prepared technical maps. On the other hand, the Council of Elders and other community members applied their own skills in conducting the resource inventory, particularly in the most isolated communities (see Box 1 and Appendix K for maps).

4.1 Conceptual Framework / Analytical Framework and Technique

The Production-to-consumption System analytical framework utilized for this study is based on that in INBAR Working Paper Number 4. This framework discusses the flow of raw materials through various stages of development. Distinguishing the system flow in terms of inputs is essential for identifying the major constraints which may hinder a particular aspect of the system from optimal economic performance.

While some production-to-consumption systems may be labor intensive, others may be capital intensive. Some systems may be more actively managed at each stage of raw material flow from harvest to marketing, enabling efficient flow and maximum output, while others may operate more haphazardly thereby resulting in minimal productive outputs relative to investment in time and labor.

Table 2 provides a list of the key operating and contextual factors to identify within a production-to-consumption system and is the basis for studying the PCS in Abra, Northern Luzon, Philippines.

Table 2. INBAR Conceptual Framework of the Production-to-consumption System

Raw material sourcing:
-Collection from forest or natural stands with little management (extraction)
-Selective cutting to encourage regrowth or enrichment planting
-Low intensity cultivation
-High intensity cultivation (plantation)
Transformation: low tech transformation vs. high tech transformation; capital intensive or labor intensive
-Labor
-Capital (mechanization)
-Land (factory area)
-More specialized operations
-More transactions as material changes hands
-Transportation over greater distances
Main Constraints Faced by Target Groups
-Market
-Technology
-Government Policy
-Input Supply
-Institution
-Income Distribution
-Infrastructure
-Consumption - Quality, Price, Market access, Wide variety of final products
Proposed Interventions and Course of Action
-Technical
-Economic
-Social
-Institution
-Policy
-Other

5.0 Project Study Area

Abra is a landlocked province on the western side of the massive Cordillera Mountains in Northern Luzon, Philippines. Its deep valleys, wide plains, and sloping hills are enclosed by the rugged mountains except in the western portion where the Abra River flows towards the coastal plains of Ilocos Sur. Abra's neighbors are Ilocos Norte and Apayao to the north, Mountain Province to the south, Ilocos Sur in the southwest and Kalinga to the east.

The Cordilleras Mountain Range is said to be the last frontier on the island of Luzon and the major watershed and ecological zone of Northern Luzon. Approximately 74% of the total land area of 397,555 hectares is forested. Abra is considerably rich in several natural resources and altogether represents a solid foundation from which to develop rural industries. In addition to bamboo which represents significant portion of its natural resource base, other resources present in the area include tiger grass, gravel, nito, and rattan, copper, iron and gold to name a few.

Several varieties of bamboo grow in the area - particularly in Sallapadan, Licuan-Baay, Boliney, Bucloc, Luba, Tubo, Tayum, Lagangilang, San Juan, Penarrubia, and Bucay. *Gigantochloa levis* -- a species native to the Philippines can be found in Abra, and is used for general construction, basketry, furniture and edible shoots. *Schizostachyum lumampao* covers about 15,000 hectares of land. In total, it is estimated that 220,000 linear meters of bamboo exist for production in the province. Of approximately 734 cottage industries in the area, 59% are said to be engaged using bamboo although not all of them are registered (in 1996, there were 37 registered firms and 444 workers engaged in the production of bamboo crafts in the communities of Lagangilang, Dolores, San Juan, Pidigan, La Paz, Bangued, San Quintin, Tayum, Bucay, Luba, Boliney, Penarrubia). (See Table 3 for bamboo craft economic data.)

Table 3. Abra Bamboo Craft Economic Data

	Number of People Engaged in Bamboo craft	Investment Generated in Philippine Pesos	Domestic Sales of Bamboo craft in Philippine Pesos	Export of Bamboo craft in US \$\$
1994	254	P2,102,650	P3,002,335	\$95,953
1995	179	P2,248,000	P3,124,475	\$132,997
1996	444	P2,227,900	P6,046,000	\$191,682

Source: Abra Statistical Handbook

Monthly income for those involved in bamboo craft ranges from P10,000 to P100,000 depending on the capital investment. In comparison, a woodcraft producer earns on average an estimated P80,000.

There are two main ethnolinguistic groups in Abra. Town dwellers in the valley are mostly Ilocano who speak the language of the lowland coastal areas. The other group is the Tinggian who inhabit the upland areas which form part of the great backbone of the Cordilleras Mountains.

In the Cordilleras there is a strong desire for control and ownership of the resources, hence foreign investors have been barred from putting up factories in the area. Livelihood in Abra has thus essentially meant earning at a subsistence level by making use of the surrounding resources available to the community. With minimal economic activity and lack of educational opportunities, basic needs have not been met and the quality of life has hardly improved. Agriculture has been the primary activity for most of the population with most production in rice and corn farming.

To break this chain of hand-to-mouth existence while also realizing the enormous agro-industrial capacity for local bamboo resources, the community formally organized into the InHand Abra Foundation and teamed together with InTechDev Systems in 1988. Community members were trained through a system of "learning by doing" to develop the skills needed for self-sustaining enterprises and income generation. They then secured grants and loans and began the production of plyboards made of bamboo, or "plyboo". The basic board is 3/8" x 4' x 8' in size with strength equal to a 3/4" plywood board. It is water

resistant, and can be used for interior and exterior walls and ceiling. It is a substitute for ordinary plywood for the low cost housing needed by 60% of Filipinos, and can also be sold to local and international markets for use in upscale architectural design. Although the production of plyboo essentially came to a halt after the earthquake in 1990, the project was able to continue the production of other bamboo boards and high end pieces of furniture and handicrafts from inventory. Sales from these items grew from P 503,424 in 1991 to P 1.95 million in 1993 and has directly and indirectly employed over 200 people in Abra.

The learning by doing approach as espoused in the Industrialized Handicrafts philosophy, is a promising response to the immediate and long term needs of Abra. The program ultimately aspires to community economic development founded upon self-reliance and the local ownership and management of enterprises. This being an answer to rural development in areas such as the Cordilleras, intervention by both local organizations and outside agencies is essential. All things considered, the InHand Abra Foundation project still has enormous potential due to its innovative processes with respect to human and community development, its unique product designs which have shown to be successful in the marketplace, and its approach to rural development.

Table 4. Average Annual Income - Abra, 1994 data

Average annual income in Abra	P42,384
Poverty Level	P37,400
% of Abraeans living in poverty	68.8%
Source: Provincial Socio-economic Profile - Abra, Provincial Planning and Development Office, September 1997	
<i>Annual income for those earning primary income from bamboo in Abra:</i>	
P0-9999	49%
P10000-19999	19%
P20000-29999	11%
P30000-39999	5%
P40000-49999	5%
P50000-100000	10%

6.0 The Study: Bamboo Production-to-consumption in Abra

The Production-to-consumption System (PCS) for bamboo in the province of Abra is relatively simple in nature. There are essentially two systems in existence -- bamboo round poles and bamboo handicrafts. This paper will discuss both PC systems, as the entire study entails painting a picture of the present bamboo industry in Abra.

6.1 Bamboo as Round Poles

6.1.1. Harvesters (942 respondents)

Kawayan tinik (Bambusa blumeana) is the species of bamboo harvested in Abra for the round pole market. Most of this bamboo comes from natural stands on privately owned areas in the lowlands of Abra and is harvested for essentially one end market - fishpen owners. The harvest period takes place generally during the rainy season -- April through October. This is due to a provincial ordinance set forth by the Provincial Board (*Sangguniang Panlalawigan*) to prevent overharvesting -- both as an environmental protective measure, and to ensure availability of raw materials for craftmakers.

Generally, the basic harvest process is as follows: a large machete-like knife is used to cut bamboo poles from clumps. The poles are cut at a point about 2 meters on average above ground (See Table 5 for harvest data). Only straight, well formed poles are cut which have an average age of 2-3 years. Approximately 30 poles are harvested per person per day.

From the harvest area, an average of 12 poles can be loaded onto a carabao-hauled cart down the mountain to the river's edge - a maximum distance of about 2.5 kilometers (some areas do not need to cross the river, however). The journey lasts about 1.5 hours. At the river it is transported by boat or carabao depending on the height of the river flow to the other side -- a distance of about 250 meters. From the other side of the river, it is another 1.5 kilometers to the *barangay* (community) roadside where the poles are placed for sale to middlemen in bundles according to diameter. This classification process affects the price at which the bamboo is sold and has no bearing on round pole market utilization. No other processing takes place.

Generally, payments are given in advance through the “cowboy” or middleman. The harvester cuts the corresponding number of poles for the amount of money received.

Table 5. Bamboo Round Poles Harvest and Market Data in Abra

	PUSER	BOLO	KAWAYAN TINIK	INGRIO
Harvester	P2	P5	P20	P50/bundle of 50 poles
Avg. Sell Price				
Trader	P5	P10	P50/70	P70/bundle of 50 poles
Avg. Sell Price				
Avg. # Poles Harvested Per Day	50	50	30	75
Avg. Length	1-2 meters	5-6 meters	10-16 meters	1-2 meters
Avg. Diameter	2 inches	3 inches	4 inches	¾inch
Avg. Thickness	3 mm	5 mm	8 mm	2mm
Avg. Age	1-2 years	2-3 years	1-4 years	1 year
Avg. Distance Cut from Ground	1 foot	1 internode	2 meters	1 foot
Harvest Period	All year	All year	April - October	All year
Primary Use	Crafts	Housing, crafts	Fishpens, crafts, furniture	Vegetable props

On average, about 5% of poles in each batch are rejected essentially due to poor quality (holes, breakage during transport, small diameter or immature). These rejected poles along with other broken, crooked, or deformed poles cleared from the clump are kept for home use for things such as fencing, trellises, poultry/pig houses, gardening, etc.

Annual harvest is approximately 390,000 poles in Abra. The landowners do the harvesting themselves. However, if demand is somewhat higher than normal, they hire people to help cut. In this instance, the hired help is not paid in cash. Instead, for every 3 poles cut, the hired help cuts 1 pole for himself as payment.

Very few of the landowners with these bamboo resources have actively managed the natural stands. The extent of their management has primarily been clearing the ground around the poles/clumps to maintain fire barriers, and clearing away broken, deformed poles from the stands. They do recognize, however, that their yield could be much higher with knowledge of proper management techniques for natural stands.

Box 1. Community Participation During the Bamboo Resource Inventory

Community participation was a key element in carrying out the bamboo resource inventory conducted in conjunction with harvester interviews. Because the community leaders and elders are extremely familiar with the areas and their land classifications for parcels up to hundreds of hectares in size, their participation was highly valued.

Community leaders and elders from Sallapadan, Boliney and Tubo spent their time verifying land ownership where bamboo stands existed both at the private and government levels. They even copied all the land tax declarations as proof of ownership.

They determined the areas that had *bolo* bamboo harvestable in each of the years 2000, 2001, and 2002, and selected 2- 1 hectare plots for sampling each year. After clearing the stands, they counted each grove, and within each grove, the number of poles of diameters between 2 and 3.5 inches. They even made maps.

The harvesters are also cutting *puser, ingrio* and *bolo* bamboos according to the same process discussed above. However, they sell these bamboos both as unprocessed round poles and as scraped round poles. These poles are harvested for markets in Abra, as well as outside of Abra in neighboring provinces such as Tarlac, La Union, and Ilocos Sur. *Puser* in particular is in demand in other markets because Abra can provide higher quality in terms of pole thickness.

6.1.2 Cowboys (10 respondents)

Cowboy activity is somewhat minor in the round pole PCS, however, their role is essential since they bear the knowledge of the community and where the bamboo round pole resources are. Essentially, the cowboys are given partial advances which are used to buy the poles from the harvesters. The cowboy then oversees the harvest activity to ensure that the order of round poles is met and transported to the roadside at a predetermine delivery date. The cowboys are paid a P2 per pole commission by the traders for their role in this process.

6.1.3 Trader/Truckers (14 respondents)

In most cases, traders provide the capital and have the poles picked up from the roadside by hired trucks. These trucks are ten-wheeler in size and there are essentially 15 operating in the province of Abra. Most of the round pole traders are dealing in *kawayan tinik* (15 of 21 Traders or 71%). The remainder of the traders buy and sell *puser, bolo* and *ingrio*.

Each truck transports about 1100 poles per trip to market. The poles are picked up along the roads in several different *barangays*. This process can take up to 2 days in order to fully load one truck. The trucks travel 423 kilometers or 12 hours to Rizal where the poles are sold to fishpen owners via a trader. The trader/truckers also hire people to help load and unload the bamboo onto trucks - typically 3 to 5 persons. Each loader is paid on average P50 per loading trip plus food. During the trucking trip, expenses are incurred along the way in the form of checkpoint fees (P100 payment), DENR permits and taxes / fees for harvesting and transport of *kawayan tinik* poles. Validation of source of harvest (public or private land) in

the form of a tax declaration or land title affects the amount of fees to the DENR. Permit fee of P1000 per truckload is also paid to the provincial treasurer's office. Once arrived to market, the payment process is cash on delivery.

The bamboo is brought to Rizal/Manila once a week during the harvest season, usually at night from 8 pm until 8 am the next morning. The truckers have a dual role in Abra in that, from Abra they transport poles to the fishpen market in Manila. Upon return to Abra, they bear a full load of groceries and construction materials for sale in the province. From this, they earn more money than from the transport of bamboo poles to Manila.

The truckers have been in the trade 17 years on average as a secondary income. Only 19% of the traders earn their living primarily from bamboo trading while 52% percent earn their secondary income from bamboo trading. Their net income is approximately P2000 per load.

6.1.4 Round Pole Market (1 respondent)

The main trader for kawayan tinik round poles from Abra is Crescenzo Lazo in Rizal who has been in the business since 1980. Lazo in turn, sells to the fishpen owners.

6.2 Bamboo Crafts

The production-to-consumption system for the craftmakers begins with the market. Exporters or domestic retail outlets place their orders with traders and the order flows backward in the system in order for production to move forward. This particular PCS can be characterized as a low input system as it is labor intensive, not capital intensive. According to the traders, the market demands handmade products so there is a resistance to mechanization.

6.2.1 Exporters and Retailers (6 respondents)

The primary export markets for Philippine bamboo crafts are Europe, Japan, and the United States. Most of the products being sold to the export market are basketry items and kitchen/housewares such as trays, placemats, folding tables. The main export companies for Philippine bamboo products include the following: Ethnic Exports, Expo Craft, Duru's, JCM Baskets, Mills Exports, RANBROS, Southsea International, Community Craft Association of the Philippines.

Exporters and end market buyers together develop the final product. This interaction typically begins at the CITEM trade fair. Buyers purchase samples from the exporters and test the products at trade fairs in the home market. Feedback and suggestions for improvement may be made subsequently, usually related to size, color or general look. Once the design and price are agreed upon (there is no definitive amount applied for markups on bamboo products), purchase orders are issued to the exporter -- generally 6 months prior to desired delivery date, and the buyer pays a cash deposit of approximately 30%. Before final delivery to the buyer 1-3 months later, the exporter may do some of the finishing touches such as blowtorching, treatment, varnishing and painting. The products are delivered to Manila and if exported, shipped FOB (freight on board) Manila. Full payment is rendered at the time all documents of shipment are in the hands of the buyer..

Local retailers represent about 15% of the market for Abra bamboo products (the rest go to export) and include Shoemart, Rustan, Balikbayan Handicrafts, Silahis, The Tahanan Shop, and various public markets within the cities and provinces. At the domestic retail level, all bamboo products from baskets to furniture and barbecue sticks are sold for local use by people of various socioeconomic status and the design process is based more on tradition and culture. However, essentially the same trading process takes place at the local level, except the starting point is national trade fairs sponsored by the Department of Trade and Industry.

Today, products for export are beginning to diversify. Some of the new products being developed include candleholders, utility boxes, canisters and furniture. According to exporters, the market for bamboo products is on an upward trend as buyers from the major export markets have been asking more often for bamboo based items with a modern design. A trend towards natural materials is what is contributing to market growth for bamboo.

6.2.2 Traders (8 respondents)

The primary function of the traders is direct contact to the Manila and export markets from the communities where products are being made. In general, traders appear to be organized under an established company name of which they are owner/managers and are located in the provincial capital. Many of the traders expanded into bamboo products from wood and rattan to diversify their product base. The traders purchase multiple products from the province via middlemen, and from the provincial capital, sell to the outlying markets. Hence, trading is their main source of income and major employment, of which bamboo products are a portion of total product line. For two of the four main traders in Abra, bamboo products represent 40% of their product line, while for the other two traders it is 100%.

Exporters seek traders in communities which produce the items. Once a purchase order is placed, the trader then distributes these orders to the middlemen or via sub-supervisors and assistants to middlemen who also enforce quality control. Within the provincial markets, there are no purchase orders submitted; orders are made via verbal agreement. Of the finished products, rejected items (approximately 5% on average) are sold in "sub-markets" such as the local provincial markets, or sold in buyer/trader showrooms.

Many of the traders obtain market exposure by attending trade/craft fairs. During the year, several fairs take place at the national, regional, and provincial levels. National level fairs are sponsored by DTI and require registration and related fees for participation. If registered as a trader with DTI, the traders receive formal invitations and notification from DTI six months in advance (this is also the case for the CITEM trade fair). This leaves ample time for product development. Orders are often placed at trade fairs; and the trade fairs often open doors for establishing business relationships with some of the major domestic outlets such as Balikbayan Handicrafts, Shoemart, Silahis, as well as major exporters such as RANBROS and Natura Export.

6.2.3 Middlemen (12 respondents)

Middlemen operate on their own as individual businessmen and essentially act as deliverers of bamboo crafts from the outlying *barangays* to the provincial capital where most of the traders are located. In general, the middlemen make weekly trips to the *barangays* to collect crafts for delivery to traders.

The traders place orders with the middlemen either directly, or via telephone, local radio or telegram. Once the order is placed, a 30-50% advance is paid to the middlemen, and full cash balance is paid upon delivery between 1-4 weeks later. The middlemen are paid a commission of P2 per craft. The middlemen transport the products by boat if they have to cross the river, and then by tricycle (local transport with a capacity for 2 people and run by motorcycle) or jeepney (local van-like public transport system) within the province.

Box 2. An Experience with the Weavers

The winnowing tray weavers are from the village of Barbarangay in the municipality of San Juan -- about 45 kms. from the capital of Bangued. Barbarangay is 2 kms. away from the main road and is not accessible to public transportation because of rocky roads. I had to hire a tricycle to reach the place. I had to hold on tightly to the tricycle because of the road problem.

When I got there, the weavers were working in a group making winnowing trays. A group interview was conducted. Asked how much they sell each tray, they replied, "P40 per piece in the public markets." I proceeded to document the processes involved, taking note of the time per process and the quantity of materials used. The results of the process documentation were presented to the weavers and where there were doubts on the process and the amount of time involved, three of them would undertake the process again and an average was calculated. A production cost of P60 came out.

I left the place having learned how to weave a winnowing tray and left the people with a different glow in their eyes for having learned how to cost out their product. It was a two-way learning experience.

Bing Gallardo (Researcher)

Some middlemen operate direct to the market outlet. For instance, one middleman supplies for the Baguio market which is 4 hours away. The middleman travels there by bus with samples, and buyers place their orders for delivery during the middleman's next visit to the market. Most middlemen have more than one means of making a living, either by acting as bamboo craft middlemen, which for many is the primary source of income, or through farming, fishing or running a general store.

6.2.4 Harvesting and Craftmaking (183 respondents)

Bamboo weaving and craftmaking has existed in the Abra province for several generations. The craftmakers themselves harvest the bamboo used to weave into crafts. On average, the craftmaker harvests once per week, and spends about one day (8 hours) in roundtrip travel time to obtain the materials needed. They travel by foot into the harvest areas of which most are public lands, and cut 8-10 poles of bamboo using a machete-like knife. The poles are carried out either by the harvester or by carabao. They primarily harvest *puser* and *bolo* from public lands for no cost (if harvesting *kawayan tinik* from private lands, they pay on average P20 per pole). An overwhelming number are harvesting *puser* bamboo at the age of one year. Secondary usage is *bolo* which is harvested between 1-2 years of age. More than half of the respondents (57%) indicated that they do not cure the raw materials.

The craftmakers' families are typically involved in the entire process of craft production. Their activities include harvest and transport, cutting and splitting, weaving and finishing, as well as being middlemen to the traders. For the most part, women and children take care of curing and scraping the bamboo, and the men harvest, cut, split and produce the craft. However, there are exceptions in some villages in which the women may harvest and weave as well.

The primary set of inputs include a saw, sizer, knife, scissors, tape measure, shaver, and *bolo* knife. Other inputs varying from craftmaker to craftmaker include thread, glue, drill, blowtorch, iron wire, hammer, nails (see Table 6).

Table 6. Cost of Basic Tools Used in Craftmaking

	Philippine
Basic tools used	Pesos
Steel tape	110.00
Hand saw	220.00
Rip saw	220.00
Cross cut saw	220.00
Coping saw	300.00
Tri-square	55.00
Hammer	270.00
Small mallet	170.00
Scissors	160.00
Pliers	120.00
Long nose Pliers	120.00
Cutter	120.00
Shaver	150.00
Bradawl	1,500.00
Grinding stone	25.00
Manual hand drill	320.00
Machete	200.00
Knife	150.00
Edge sharpener	75.00

Each craftmaker produces between 1 and 5 different items and sell to between 1 and 5 traders each (via the middleman). Tables 7 and 8 demonstrate this distribution of frequency tabulation:

Table 7. Number of Craft Items Produced per Craftmaker

# of Types of Items Produced per Craftmaker	% of Respondents
1	42%
2	30%
3	15%
4	10%
5 and up	3%

Table 8. Number of Traders per Craftmaker

# of Traders per Craftmaker	% of Craftmaker Respondents
1	48%
2	23%
3	12%
4	4%
5	13%

The final products are sold to the middlemen in Abra. Most of the orders for bamboo handicrafts are placed verbally between the middlemen and the craftmaker. All craftmakers indicated that the traders set the price at which the crafts are bought and sold (See Table 10 for select sample selling prices.). The mode of payment differs from one trader to the other and affects also the price at which a product is sold. Traders who pay in cash pay lower than those who pay by installment. Oftentimes, the craftmakers ask for cash advances which they use to buy food while producing.

Historically, each village has specialized in a few specific items (see Table 12.) This evolved over time either because it was a skill passed down through several family generations (in the community of Mudeng, La Paz for example), or because it was a specific skill and craft taught to the people in the village by a trader or other entity in which case this began during the 1970s (see Table 9).

As an aside, many of the craftmakers interviewed are actually living in bamboo houses. This is a general testament to their lower economic status.

6.3 Role of the Government in the PCS

Government involvement in the bamboo PCS is manifested through the DENR as it relates to harvest policies, while DTI is more directly involved in facilitating marketing and marketing linkages. Relationships with DTI are instrumental for many reasons. For the bamboo industry in particular, some business relationships have been established through the DTI office. DTI also assists in providing skills training to the craftmakers, and for gaining access to capital via local banks.

Table 9. Origin of Craftmaking Skills

Inter-generational transfer of skills	44%
Traders	18%
Self taught	16%
Sister Mary Grace and related church group*	14%
Other	8%

*Note: Sister Mary Grace belonged to the Sisters of the Holy Spirit Congregation whose mission is to provide Christian education. They worked closely with the priests of the Society of the Divine Missionaries. One of their programs in the early 70s was Foster Parents. Students from their Holy Cross school would be adopted by a foster parent from the United States who provided money for tuition and school supplies. To augment the funds, their parents were then taught how to weave products for sale. At that time, a Japanese involved with CITC noted the ability of the Abraeneans and decided to embark into the Bamboo craft business. This explains the weave taught to the groups in the community of Lagangilang.

Table 10. A Sample of Craft Cost vs. Sell Price (Philippine pesos)

InHand Product	Item	Specs	Raw materials	Labor	Total Unit Cost	Craftmaker Sell Price	Trader Sell Price (minimum)	Local Retail Sell Price
	Fruit Bowl		6.05	35.47	41.52	20.00	25.00	39.75
	Oval Mirror Frame	xl	7.81	26.93	34.74	25.00	120.00	170.00
		large	7.25	25.01	32.26	22.00	110.00	n/a
		semi	5.86	23.09	28.95	15.00	90.00	120.00
		set of 3	13.23	57.72	70.95	29.00	n/a	219.75
	Bilao		9.26	31.82	41.08	35.00	35.00	40.00
	Bakol		20.59	35.29	55.88	45.00	n/a	n/a
	Slat Tray		6.79	17.89	24.68	40.00		45.00
	Sticks (per 1000)	3/16x10	0.04	0.18	0.22	20.00	35.00	n/a
	Placemat	12 x18 slat, natural finish	3.75	21.80	25.55	18.00	40.00	n/a
	Bobo jar		4.13	22.17	26.30	30.00	130.00	n/a
	Pineapple jar		6.82	41.36	48.18	50.00	60.00	n/a
	Back Pack		32.50	202.50	235.00	-	n/a	n/a
	Placemat	101	2.06	6.38	8.44	20.00	n/a	n/a
	Fruit Tray	runo, set of 3			-	150.00	n/a	n/a
	Sombrero hat		4.38	12.95	17.33	17.00	23.00	50.00
	Placemat	103	1.30	12.40	13.70	12.00	n/a	n/a
	Attache case	large	10.33	107.13	117.46	40.00	100.00	139.75
	Coryemte	large	56.68	145.25	201.93	30.00	na	130.00
	Fan		0.29	12.53	12.82	6.50	na	10.00
x	Tissue box				-	35.00	n/a	n/a
	Shoe box		3.14	124.76	127.90	150.00	n/a	n/a
	Beach chair	natural finish	42.54	65.92	108.46	250.00	450.00	1,395.00
x	Folding table	16x21x26 slat	11.80	49.72	61.52	150.00	250.00	n/a
	Placemat		1.82	12.31	14.13	18.00	n/a	n/a
x	Towel ladder		13.73	32.16	45.89	150.00	200.00	400.00
	Beach stool	natural finish	14.10	35.78	49.88	75.00	95.00	225.00
x	Hamper		2.82	33.44	36.26	103.45	148.00	595.00
x	Towel rack				-	60.00	101.70	265.00

Table 11. Profit Margins on Bamboo Crafts

InHand Product	Item	Specs	Raw materials	Labor	Craftmaker Margin	Trader Margin	Local Retail Margin
	Fruit Bowl		0.15	0.85	(51.83%)	25.00%	59.00%
	Oval Mirror Frame	xl	0.22	0.78	(28.04%)	380.00%	41.67%
		large	0.22	0.78	(31.80%)	400.00%	
		semi	0.20	0.80	(48.19%)	500.00%	33.33%
		set of 3	0.19	0.81	(59.13%)		
	Bilao		0.23	0.77	(14.80%)	0.00%	14.29%
	Bakol		0.37	0.63	(19.47%)		
	Slat Tray		0.28	0.72	62.07%	(100.00%)	
	Sticks (per 1000)	3/16 x10	0.18	0.82	8990.91%	75.00%	
	Placemat	12 x18 slat, natural finish	0.15	0.85	(29.55%)	122.22%	
	Bobo jar		0.16	0.84	14.07%	333.33%	
	Pineapple jar		0.14	0.86	3.78%	20.00%	
	Back Pack		0.14	0.86	(100.00%)		
	Placemat	101	0.24	0.76	136.97%		
	Fruit Tray	runo, set of 3					
	Sombrero hat		0.25	0.75	(1.90%)	35.29%	117.39%
	Placemat	103	0.09	0.91	(12.41%)		
	Attache case	large	0.09	0.91	(65.95%)	150.00%	39.75%
	Coryemte	large	0.28	0.72	(85.14%)		
	Fan		0.02	0.98	(49.30%)		
x	Tissue box						
	Shoe box		0.02	0.98	17.28%		
	Beach chair	natural finish	0.39	0.61	130.50%	80.00%	210.00%
x	Folding table	16x21x26 slat	0.19	0.81	143.82%	66.67%	
	Placemat		0.13	0.87	27.39%		
x	Towel ladder		0.30	0.70	226.87%	33.33%	100.00%
	Beach stool	natural finish	0.28	0.72	50.36%	26.67%	136.84%
x	Hamper		0.08	0.92	185.30%	43.06%	302.03%
x	Towel rack					69.50%	160.57%

Table 12. Village Bamboo Craft Product Lines

<i>Village</i>	<i>Bamboo crafts produced</i>
Mudeng-Udangan, Beuben, La Paz	Attache cases, placemats, bags and hats, fans, boxes, In-Hand Products
Nagtupacan, Lagangilang	Mirror frames, assorted Japanese trays
Dalaguisen, Lagangilang	Plates, Japanese trays, mirror frames
Talogtog, Dolores	Hats, plates
Lublubba, Dolores	Hats, placemat
Libtec, Dolores	Hats, placemats, plates
Gaddani, Tayum	Japanese baskets, rice baskets, winnower, slatted trays
Bumagcat / Pagpagatpat, Tayum	Trays, placemats, folded tables, and chairs, InHand products (umbrella rack, towel rack, towel ladder, etc)-
Tiker / Basbasa, Tayum	Trays, placemats, folded tables, mirror frames, In-Hand products
Bugbog / Abang/Tabiog/Al-aludig, Bucay	Bamboo furnishings, placemats, coasters, hot pad, fruit tray, tissue rack, Japanese trays, In-Hand Products
Riverside, Bucay	Trays, hats, mirror frames
Bangcagan, Bucay	Bamboo furnishings
Layugan, Bucay	Backpack, bamboo furnishings
Sta Rosa, Penarrubia	Trays, baskets
Bagong Barrio, San Juan	Bobo jars, hats and baskets
Poblacion East, Pidigan	Baskets, round pole sala sets, sofa
Banay / Cautit, Pidigan	Baskets
Palang, San Quintin	Baskets
Calaba, Bangued	Bobo jars, pina weave jars
Upland municipalities	Ethnic baskets, bags

6.4 InHand Project

The first attempt at augmenting the bamboo industry in the province occurred in the late 80s and was led by the InHand Abra Foundation. The participant beneficiaries individually and collectively own the enterprise as incorporators, with percent ownership stipulated in what is called the Equity Share Certificate.

The project was a plyboo factory which employed 40-50 people full-time to start. The factory workers received 30 days of hands-on training prior to the start of factory operations which continued onsite at the factory.

The basic PCS for this bamboo project was as follows: approximately 30 harvesters provided raw material (*bolo* bamboo) to the factory. As with the round pole PCS, the poles were left at the roadside and the InHand truck picked them up. A receipt was issued from the factory and given to the harvest group leader. The bamboo was delivered to the factory where it was cured and processed into plyboards. About 2400 poles came into the factory each day with the daily output of about 32, 1/2 " thickness plyboo panels. As the factory and its workers increased their production capabilities, the product base diversified into items such as riftgrain and floorboards.

Factory workers were paid on a per piece basis predetermined by standard production processes. Each factory worker was responsible for enforcing quality control at the worker's applicable stage of the process while a "traffic" officer also oversaw the general process. The cost of any rejects from operations were deducted from the responsible person's salary. (See Appendix H for InHand product pricing).

The major market for the boards was a leading Filipino architect particularly known for his use of bamboo in his work - Francisco Manosa. Manosa purchased 95% of the output of the plyboo factory. Other buyers included resort owners in Mindanao and Borocay, and local craftmakers in Abra. The local craftmakers were trained to build modern furniture with the boards. These furniture pieces were then sold to export companies and to a local retail outlet called the Tahanan Shop via marketing assistance from the project implementers.

The prices paid for the boards and furniture were determined based on what is called a productivity formula (see Appendix E). This formula ensures adequate compensation for the workers, commensurate with inputs.

Table 13. Problems, Constraints and Interventions Matrix

Table 13. Problems, Constraints, and Interventions Matrix

<u>Problems</u>	<u>Constraints</u>								<u>Intervention</u>	<u>Outputs</u>
<u>ROUND POLES</u>	market access	market power	production volume	income generation	resource supply and demand	product quality and durability	industry reputation	motivation		
Lack of transport and infrastructure	x		x	x					Refer to Government DRIVE program	Establishment of farm to market roads.
Low prices		x		x					Resource management training and Resource Centers.	Capacity building and primary processing and centralization of raw material sourcing.
Harvest season restrictions	x		x	x					Resource management training and Resource Centers.	Raw material stock and inventory centers.
Limited buyers	x	x	x	x					Refer to Government DRIVE program; linkage with government low cost housing program.	Expanded market.
<u>CRAFTS</u>										
Low and non standard prices		x		x				x	Bamboo board manufacturing centers and hands-on production training.	Proper costing methods, product diversification with higher market value and better quality.
Limited buyers	x	x		x					Refer to Government DRIVE program; linkage with government low cost housing program; Resource Centers sub-intervention; Marketing Center sub-intervention.	Marketing assistance/linkages, establish marketing program, institution building.

Lack of transport and infrastructure	x		x	x					Refer to Government DRIVE program	Establishment of farm to market roads.
Lack of capital	x	x	x						Refer to Government DRIVE program	Establishment of lending programs.
Lack of business and craft skills	x	x	x	x					Production/business training, resource centers; bamboo industrial villages.	Skills for product diversification; production of high end bamboo products; proper production management, institution building.
Lack of opportunity and government support	x			x					Refer to Government DRIVE program; Development nucleus.	Support in development of local bamboo industry; institution building.
Low input and productivity			x	x					Resource Centers sub-intervention; bamboo industrial villages.	Mechanization of repetitive manual tasks, constant access to raw materials; economies of scale; production efficiency.
Lack of resource management					x	x	x		Resource management training.	Sustained yields, higher quality raw material.
Lack of land ownership			x	x						

7.0 Problems and Constraints Analysis

The Abra bamboo production-to-consumption study has revealed a number of problems which constrain greater production efficiency and ultimately, income generation (see Table 13). The following discusses the problems and constraints and how they affect the production-to-consumption system.

7.1 Bamboo Round Pole Constraints

Within the round pole PCS, the major constraint identified by the harvesters was lack of infrastructure (roads). No effective means of transporting poles from harvest areas to the *barangay* road for collection, and having to rely on carabao or manpower to transport them, clearly limits the ability to meet greater demand for round poles or to expand the market base.

Low price was the second most frequently noted problem faced by the harvesters. It is certain that because the harvesters primarily supply only one trader who ultimately supplies the fishpen market, the price that can be commanded remains very low. Lack of buyers constrains the ability for increased income generation both in terms of selling price and volume. It would be logical for round pole harvesters and middlemen to supply the craftmakers with raw materials, and in fact, they are meeting this need but to a small degree. However, it may be possible to infer that a larger market amongst Abra craftmakers does not exist for the round pole harvesters since the craftmakers not only probably believe they are saving money by harvesting poles themselves versus buying poles from those harvesting for the round pole market, they also have little cash with which to do so.

Seasonality was also noted as a problem for the harvesters. Harvesting periods are limited both by government decree and the decreased risk of powder post beetle attack. This constraint impacts socioeconomic stability for the harvesters and their families.

7.2 Bamboo Craft Problems and Constraints

7.2.1 Low and Non-Standard Pricing

The PCS study confirms the fact that annual income is meager for participants in the system other than for the traders, manufacturers and retailers/exporters as mentioned previously (See Appendix D for Socioeconomic data). In particular, while the harvesters and middlemen within both PC systems make very little money, in economic terms, the craftmakers appear to be losing more than they put in to the process.

From the research, the major revealing data with respect to craftmaker income are the buying and selling prices for bamboo crafts. A comparison of these prices together with an in-depth analysis of craft production costs shows that no value is added to the cost of the craftmakers' work. The detailed analysis of time and inputs clearly shows that in most cases, the selling price of the crafts they produce is not sufficient to recover their labor time -- assuming official minimum wage rates, plus raw material inputs. For example, the cost to produce a fruit bowl equals P41.52 while the craftmaker sells this item at only P20. This is a negative profit margin of 51.83%. (See Tables 10 and 11 for further examples).

Pricing is in fact the most frequently noted problem representing 30% of all answers given by craftmaker respondents (see Table 14). All craftmakers indicated that they have no role in setting prices as they are pre-set by the middlemen and traders. The problem with pricing is a significant constraint to the craftmakers' production and socioeconomic status. The researchers learned that several years ago, a large percent of skilled craftmakers in Abra were actively producing. However, of that number, only about 10% are still producing today. Essentially, the craftmakers have not been happy with the minimal income made from their work in relation to their efforts, and have expressed discontent with the buying system maintained by the traders. Those who are still producing continue to do so in order to maintain their needs and pass the time away. Even so, the craftmakers motivation to meet production demand orders is a problem, as indicated by many of the traders.

Not only are prices too low, the payment system is not standard. In various cases, the traders may conduct business differently with each craftmaker even though more than one craftmaker may be producing the same item. For instance, the price paid for the craft may differ for the same product from one craftmaker to the next, and the amount and timeliness of advance and final payments to craftmakers varies as well. Further, in the past, when craftmakers have attempted to raise the prices of their products, the buyers have successfully resisted by offering full cash payment only at the lower stated prices, while offering only a percentage down payment for any price higher.

Table 14. Problems Faced by Craftmakers

Type of Problem	% of Respondents
Low pricing/no standard pricing	30.7%
No steady market/buyers	16.5%
Lack of Infrastructure/transportation	11.8%
Lack of capital	8.7%
Not enough skills	4.7%
Lack of other job opportunities	3.5%
Lack of government support	3.2%
Delayed payment from buyer	3.2%
Lack of technology	3.2%

7.2.2 Limited Market

The limited number of buyers is also a major problem, being the second most frequently cited. Referring back to Tables 7 and 8, it is evident that close to half of all craftmakers (42%) are producing one product which is sold to one trader via middlemen. And although a craftmaker may make more than one product, the trader for each item may differ. As discussed each village specializes in specific crafts. However, in most cases, these are the only products that the craftmakers have ever learned and continue to produce repetitively.

In total, the study shows that there are approximately 33 traders buying 82 kinds of products from Abra craftmakers. However, of the 33 traders, only four of them are buying more than five kinds of crafts (see Table 15). The ratio of craftmakers to traders (considering only the four major traders in Abra) together with the limited diversity in crafts produced by each craftmaker, essentially allows for the traders to have more control over the craftmakers' potential to have greater access to market, increased prices, and therefore higher incomes.

Table 15. Trader Product Lines

Trader	# of Product Types
InHand Abra Foundation	45
Calixterio	24
Balbin	20
Villastiquis	12
Other Traders (29)	5 or less

7.2.3 Lack of Transportation and Infrastructure

The third most frequently noted problem for the craftmakers is transportation / infrastructure. The provincial government reports that farm to market roads are still inadequate especially in the upland areas where products are transported by animal or by human labor along trails. There are 45 provincial roads totaling 494, 239 kms: 37,928 km are asphalt; 185,312 km are gravel; and 235,887 km are earth.

Such a situation provides big losses of agricultural products especially perishables. Furthermore, the situation becomes even more difficult during the rainy season. Presently, the craftmakers spend one entire working day harvesting the materials needed for production. While the actual distance to raw material access is not that far (3 kilometers), roads that previously existed in the uplands for access to raw material resources were devastated by the 1990 earthquake and have not since been rebuilt. This hampers craftmaker ability to reach the raw materials, significantly slows down their ability to transport the raw materials away, since carabao is their only method possible under these conditions, and also hinders their ability to spend more time producing at higher volumes since one whole day is spent just to obtain raw materials. Finally, the poor infrastructure also has a bearing on direct access to market for their products.

7.2.4 Lack of Capital

Since lack of cash and capital is a problem for the craftmakers, they are seemingly compelled to settle for lower prices in order to obtain direly needed cash. The problem of cash flow amongst the craftmakers is illustrated by the following: In one community, one of the middlemen also owns a general store. Local craftmakers come to buy from the general store but are unable to pay in cash. As a solution, the middleman agreed to receive bamboo crafts as payment for purchases made from the store.

7.2.5 Lack of Business Management Expertise and Other Skills

Lack of business skills is also a constraint to income generation. In addition to the fact that the traders and middlemen dictate low prices, the craftmakers are not fully costing out the inputs to handicraft production because they do not have an understanding for process costing (See Box 2). And from the detailed cost analysis (see Tables 10 and 11), it is apparent that craftmaking is actually not a real profitmaking activity for the producers, when in fact, their greatest concern is the conversion of product into cash for basic needs.

Furthermore, the skill level of the craftmakers is quite low as shown by the limited variety of items being produced by each craftmaker. This is a major constraint to their market power, effectively keeping them at a disadvantage to the traders in terms of selling price and overall market access.

7.2.6 Lack of Government Support in Economic Development

Finally, active support from the local and national government is always essential. However, in the case of Abra, as discussed earlier, support has not been forthcoming in terms of infrastructure and local industry development, capacity building, or access to capital. While the government has stated goals in achieving the development of SMEs and has the technical expertise for doing so, it is yet to actually implement the agenda. Recommendations stemming from the craftmakers include government support in terms of capital financing, marketing and local trading policies as a part solution to the problems.

7.2.7 Other Constraints Revealed

7.2.7.a Low Input System as a Barrier to Higher Productivity

The Abra PCS research reveals that no technology is applied in the production of handicrafts -- every aspect is completed by hand. This clearly has a direct constraint on the volume of production and ultimately, on income generation potential.

7.2.7.b Lack of Proper Harvest and Management of Natural Resources

Most craftmakers are harvesting one year old *puser*. *Puser*, like most other species of bamboo, is best harvested after 2-3 years at least. Early harvest of bamboo leads to problems later in terms of product quality and durability. This is confirmed by the traders who mentioned fungal mould and pests as problems affecting product quality.

Early harvest is also a problem in terms of regrowth of natural stands. This lack of natural resource management will have a long term impact on raw material supplies. It is already noted by many that certain species are dwindling in numbers and that with the long term expected growth in the bamboo product market, raw material supplies will not be sufficient to meet that demand.

From the harvesters of bamboo round poles, it is known that rodent attack on bamboo shoots is also a problem. All in all, insufficient harvest and management techniques ultimately constrain the system in terms of producing quality crafts. More and more rejected crafts will be the result of poor management and harvest techniques and will constrain the bamboo industry as a whole in Abra in terms of product reputation.

7.2.7.c Lack of Land Ownership

The survey revealed that harvesting of bamboo for handicrafts occurs primarily on publicly-owned lands. Like the constraints related to lack of transportation and infrastructure, this system of accessing the natural resources, contributes to the craftmakers' inability to produce more output. However, lack of land ownership is the reason for the current system of finding raw materials to harvest. If people had a piece of land to cultivate, especially land adjacent to their homes, less time and effort could be spent harvesting and transporting the materials, and more time managing the production of their crafts.

Table 16. Summary of Primary Problems Identified by PCS Participants

	ROUND POLES		CRAFTS
HARVESTER	Not enough buyers	CRAFTMAKER	Low Prices, non std pricing
	Infrastructure (lack of roads affects year round access)		Not enough buyers
	Prices		Lack of transportation and infrastructure
	Seasonality		Lack of capital
COWBOYS	Not enough buyers	MIDDLEMAN	Not enough buyers
	Prices		Prices
	Capital		Not enough capital
	Checkpoints fees		
TRADER TRUCKERS	Infrastructure (roads and bridges)	TRADER	Product Quality
	Permitting process		Production Deadlines
	Lagay		
	Trading restrictions		

7.3 Conclusion

All of these constraints point to overall system problems. A great deal of support will be needed to improve what appears to be a very fragmented bamboo production-to-consumption system in Abra, to effectively meet the needs of the participants and overcome the constraints. Enabling the participants at the lower end of the chain to be more proactive participants would enhance their ability to transcend their economic status and standard of living. Moreover, a shift in the functioning of the chain of PCS activities could bring greater productive efficiency. In light of the identified constraints, the following is a discussion of the recommended interventions for improvements to the overall Abra bamboo industry.

8.0 Recommendations and Interventions

With the overall goal of increasing the livelihoods of the people of Abra, the entry points for overcoming the constraints facing the fragmented Abra bamboo industry today are: skills training, marketing, diversification and value added processes, and partial centralization. These entry points are the basis for the interventions recommended below.

Project Goal: increased livelihood and the creation of sustainable enterprises via the planning and systematization of the bamboo industry

InTechDev, Medilen Singh (Project lead)

InHand Abra Foundation, Carmelita Bersalona, (Project implementation)

Intervention 1: Establish a development nucleus -- an interdisciplinary team of designers, Philippine bamboo experts, international bamboo organizations, and representatives of government agencies and business organizations.

Purpose: to plan, implement, and oversee the development of the Abra bamboo industry via organization (institution building), discipline (building industry infrastructure and systems), and know-how (training programs). The nucleus is also responsible for the identification of product trends and spearheading product development, creating marketing strategies.

Related problems/constraints: limited market, lack of skills, lack of support.

Collaborators:

Medilen Singh, InTechDev, project lead, capacity building, manufacturing design

Ino Manalo, Cultural Scholar

Bobby Manosa, Architect for Philippine Government low cost housing program

Carmelita Bersalona, Executive Director - InHand Abra Foundation, Community organizer and Bamboo Industry Representative

INBAR, international organization for bamboo, technology transfer

Governor of Abra, and related local government agencies of DTI, DENR for national and local support

Fil Alfonso, Asian Institute of Management, for industry planning with local government

The upward trend in bamboo export indicates that Philippine bamboo products are increasingly becoming acceptable in the international market. Recent statistics point to growing market diversification as indicated by the increasing number of country destinations for Philippine bamboo products (reference 1). Abra, with its strong skill base and traditions in bamboo craft, can take a lead role in meeting this growing market. The development nucleus can provide the support and guidance needed to bring Abra to the forefront of the market.

Other responsibilities of the nucleus include:

Work with customers, international marketing and business leaders to define products which meet customer needs and market competition cost effectively.

Anticipate manufacturing issues and designing the product accordingly.

Prepare business plans for the Abra bamboo industry.

Minimize product to market time.

Training support for producers of bamboo product lines.

Intervention 2. Resource management training

Purpose: to assure a sustained natural resource base into the future from which to supply a growing demand in bamboo-based products.

Related problem/constraint(s): lack of resource management, pests, product quality and durability.

A large number of harvesters surveyed indicated that plantations and management of existing stands are needed to ensure survival of the bamboo industry in Abra. The reasons for this arise from poor harvest techniques -- particularly, early harvest which leads to difficulties in regeneration and also in raw material quality and durability. Pests are also a problem within the natural stands. In consideration of natural disasters which have caused flowering and damage amongst natural stands, planting a variety of useful species would cut risks against loss of the natural resource base in the case of natural disasters and would also augment the supply for a growing bamboo market. The major industrial uses of bamboo are furniture and handicraft, housing, utilities for fishpens and agriculture, food and pulp and paper. Intraregional analysis of the demand for and supply of bamboo in two of seven regions of the Philippines (reference 1) showed that there exists an immense deficit of raw materials to fully assure continuous operation of industries that are currently in place.

Resource management would also ensure higher quality material which could command better prices and expand the market for poles and crafts coming from Abra.

Specifically, resource management training would include the following elements:

- Proper maintenance of natural stands
- Proper harvest techniques
- Establishment and management of bamboo plantations

Sub-intervention. Establish bamboo resource centers (buying stations)

Purpose: to centralize harvest output in order to provide a year round supply of high quality, cured raw materials for local, regional and national demand at equitable prices.

Related problem/constraint(s): harvest seasonality, limited buyers, low prices, low productivity due to labor intensive preparation of raw material.

Bamboo resource centers are a place where raw materials coming from managed stands and plantations can be stockpiled and processed. These are value-added processes which will allow for better selling prices. In these centers, the following will be available:

- Equipment for raw material curing
- Machinery for cutting, scraping, and stripping raw materials
- Storage space for ensuring a year round supply of raw materials to the market

The resource centers are a way of also making the raw materials available to an expanded market beyond fishpen owners such as the local craftmakers and traders. Processed materials are an incentive for the local craftmakers and traders to buy from these resource centers because of the greater guarantee against pest attack and rotting, as well as more time allocated to production of crafts as a result of mechanization of what is time consuming manual labor (cutting, scraping and splitting).

The bamboo resource centers are meant to function as the hub for major inputs and outputs for raw material processing and product finishing. In this sense, the center acts much like a supply cooperative offering the craftmakers economies of scale in some of the production processes via technology -- in other words, applying technology for mass production of processed raw materials.

Intervention 3. Establish 3 bamboo board manufacturing learning centers

Purpose: to provide local economic opportunities and diversify bamboo production.

Related problem/constraint(s): low prices, lack of economic opportunity, low productivity, lack of skills and related product diversification.

The manufacturing centers will augment the bamboo industry in many ways. They will provide another market where harvesters can sell their raw material and will offer direct employment opportunities for a couple of hundred individuals. They will also create an indirect economic opportunity for craftmakers who can use the output in the production of high value furniture and crafts for export, allowing them to diversify their skills and product base and increase their market power and ultimately income generation.

- Bamboo laminates
- Bamboo plyboards
- Bamboo floorboards

Sub-intervention a. Institute hands-on production training

Purpose: to build management capacity, decisionmaking skills, and awareness.

Related problem/constraint(s): lack of business and other skills, lack of marketing power.

Hands-on training is the focus of these manufacturing centers. Skills training in production and production processes, management, and costing is greatly needed to empower the participants to be more proactive in the Abra bamboo industry to the extent that they become owners of the process and not just passive producers. The training modules are based on the Industrialized Handicrafts methodology applied previously in the late 1980s when InHand Abra Foundation first implemented the plyboo project (see Appendix E) and involves the following 4 training modules:

- Integrated tactics (innovation and creativity skills)
- Product design module (product development and enabling technologies)
- Process design module (manufacturing processes)
- People module (planning, strategy, allocating resources)

The hands-on training will allow the participant-students to learn the innovative techniques for managing the process, producing bamboo boards while earning fair and equitable wages for their inputs and outputs.

Sub-Intervention b. Set up a marketing center / trading post at each factory

Purpose: to provide a center for designers to establish business with local bamboo producers, for traders and exporters to acquire bamboo products, and a locale in which the development nucleus is based.

The establishment of these marketing centers is an additional investment into the manufacturing learning centers. Showrooms, conference space and office space are the essential additional elements.

Intervention 4. Establish bamboo industrial villages

Purpose: to network craftmaker resources and production processes.

Related problem/constraint(s): low productivity, low prices, lack of skills, lack of economic opportunity.

Table 12 shows that each municipality in Abra specializes in certain bamboo products. An industrial village attempts to strengthen and solidify the existing system of handicraft production in Abra. It allows participants within the entire PCS chain to continue to act as individual entrepreneurs, but for the common good of equitable economic and social development via both mass production and mass customization of bamboo crafts.

Historically, the making of handicrafts has taken place in the home. Industrializing this tradition will allow for this to remain the same, while adding the benefits of economies of scale as such: the home is enhanced into a two-story house of 60-100 square meters in which the living space makes up the top story, and the ground floor becomes the workshop with basic tools and equipment needed to support the mass customization of bamboo products which can combine bamboo boards from the factory learning centers with bamboo craft skills.

This intervention requires investment into housing re-construction, as well as the machinery, equipment and tools to be placed within these home workshops. The industrialized villages can include the bamboo resource centers (Intervention #2 above) which function as the hub for the major inputs and outputs for raw material and product finishing. In this sense, the industrialized villages act much like cooperatives, offering craftmakers economies of scale in some of the production processes -- mass production while still leaving room for customization of high end products.

Supporting Policies and Programs

The primary agenda of the Estrada presidential administration of the Philippines is the alleviation of poverty. The implementation of this agenda consists of two major components: low cost housing and the development of cottage industries.

A leading Philippine architect -- Francisco Manosa, is charged with heading the low cost housing program. Architect Manosa is renowned for his use of bamboo in architecture in the Philippines and he is a staunch supporter of modern applications of bamboo. He had previously been the primary consumer of the InHand Plyboo project during its short lifespan. Previous low cost housing models have been designed by Architect Manosa utilizing the plyboo panels as the primary construction material. The resulting cost of the house was approximately US\$5000 for a 36 sq. m home. Creating a solid program linkage between the Abra bamboo industry and the government low cost housing program would revitalize previous visions for success in addressing the housing shortage in the Philippines.

The development of cottage industries will be implemented via a framework plan called "Developing Rural Industries and Village Enterprises" (DRIVE). DTI is charged with the planning and promotion of the DRIVE program and in Abra specifically, the local implementing office has determined bamboo as 1 of 3 areas on which to focus. (See Appendices H & I for program details). Its specific objective is to promote and develop the bamboo industry as a sustainable source of income in Abra and the general plan includes the establishment of bamboo research and development station, productivity improvement, entrepreneurship development, policy advocacy, and market promotion and development.

DTI has included InHand Abra Foundation to be a primary collaborator in realizing the DRIVE bamboo program because of its leadership in the community in bamboo endeavors. Importantly, this government-based program for poverty alleviation is crucial particularly for providing the infrastructure and services needed to pave the way for the growth of the bamboo industry in Abra - namely, farm to market roads and financing programs. Local government endorsement of bamboo development in Abra is a significant factor for realizing the goal for increased livelihood in an area previously left behind.

9.0 Benefits Stemming from the Recommended Interventions

The benefits extending from the interventions are manifold. The development of the entire bamboo industry into a more cohesive whole -- bringing together the participants to function in a more efficient system of production, the possible results are multiple -- socially, economically and environmental:

Social benefits. A more efficient and effective system of operation which increases income generation for the people of Abra will result in a greater work ethic. The industry plan enables an environment for the people to realize their potential as individuals working towards a collective gain. Motivation and pride are natural results extending from innovation, knowledge sharing and teamwork. Furthermore, it enhances and strengthens the family traditions in handicraft production that have existed over the years.

Economic benefits. The interventions envisioned also result in economic benefits via increased livelihoods. The resource centers and factory learning centers allow for sustained year round production,

production output is higher, profit margins are higher, more equitable and consistent. Higher quality and diverse product lines will increase market share and therefore, increase revenues.

Environmental. Resource management is essential for preserving the environment. Proper harvesting techniques are important for ensuring regeneration of the resource, prevent loss of species from overexploitation, and allows the watershed to remain intact.

Instead of being victims of the cash economy in which the benefits extend only to some, the people of Abra can become active participants within the system in a manner which benefits all from harvest to retail. In short, a knowledge worker is created who not only possesses unique craft knowledge but is also proficient in manufacturing processes, enabling them to innovate and create required systems, processes, products in short time periods to conform with the market demands of the 21st century.

All in all, the entire model espouses a sustainable approach to development.

"Abra -- a self actualized community of individuals -- fully aware of their self-worth, dedicated to the sincere service for the preservation of all life, actively participating in the process of self-governance, productively sharing in the fruits and responsibility of self-sufficiency through the effective control and management of resources for its economic benefit through understanding, knowledge and use of appropriate and indigenous technology while maintaining ecological balance."

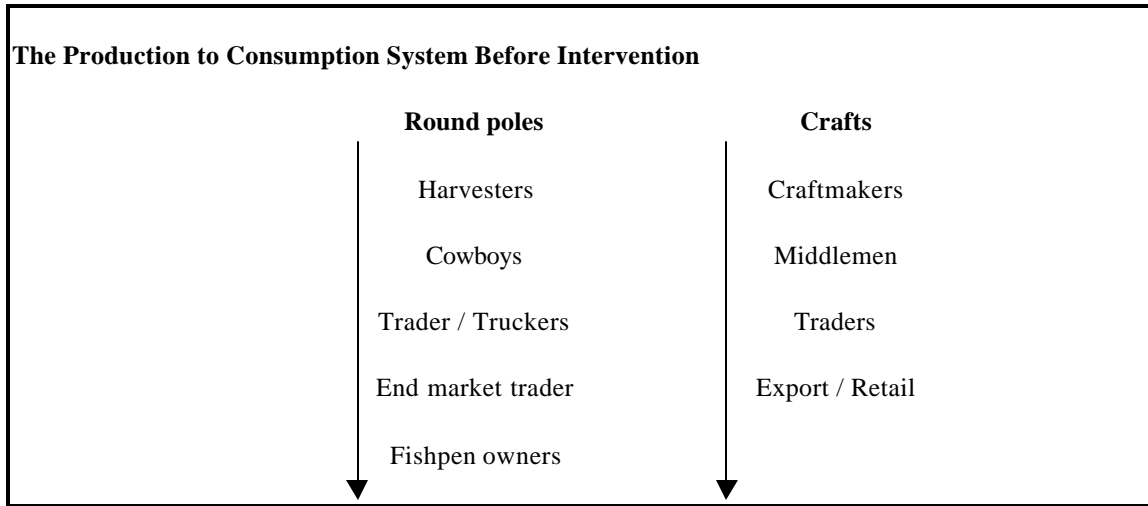
Table 17. Projected Demand for Bamboo, Philippines, 1995-2015 ('000 culms)

	1995	2000	2005	2010	2015
Banana Props					
High	37,800	37,800	37,800	37,800	37,800
Low	33,464	28,737	24,677	21,191	18,197
FishPens	856	856	856	856	856
Outrigger	340	340	340	340	340
Furniture	1,000	1,650	2,475	3,494	4,933
Handicraft	219	353	450	575	733
Construction	15,208	18,503	22,512	27,389	33,322
Panel Boards	17,500	28,184	35,971	45,909	54,525
Total - High	72,923	87,686	100,404	116,363	132,509
Total - Low	68,587	78,623	87,281	99,754	112,906

Source [original]: Department of Natural Resources, 1990, Master Plan for Forestry Development (Bamboo)

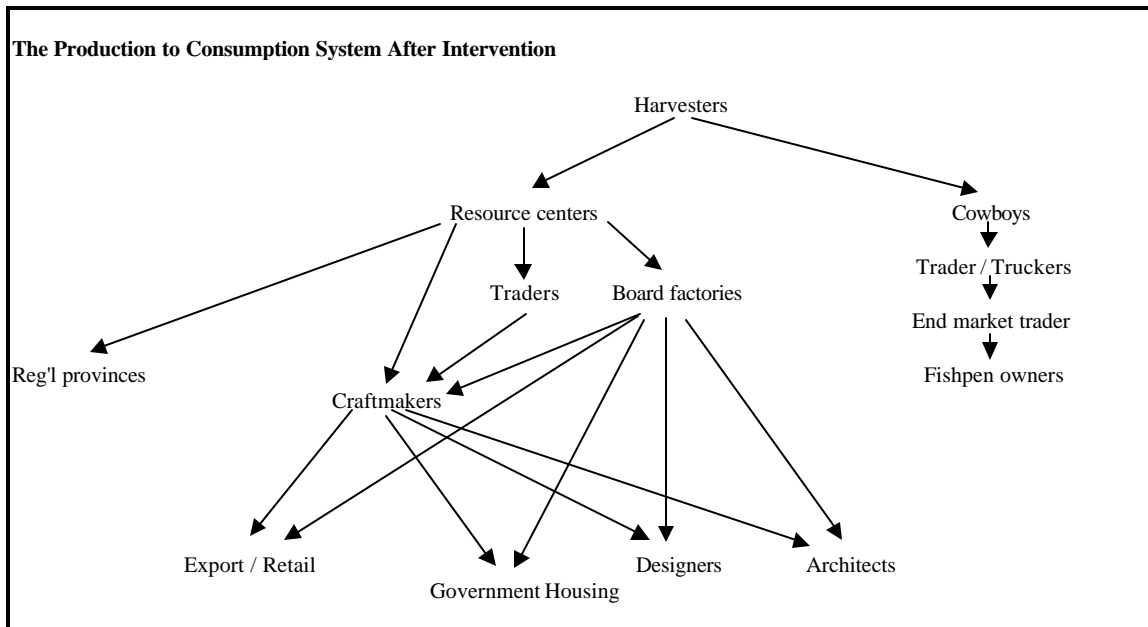
Figure

1.



Figure

2.



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