RATTAN AND BAMBOO IN UGANDA
A Study of the Production to Consumption Systems

By

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INBARs Bamboo and Rattan Development Programmes.

The application of bamboo and rattan in enhancing the economic and ecological well being of resource-dependent communities in Asia has been extensive. Systematic studies of the potential of bamboo and rattan, previous and current uses, and the social, cultural and political perspectives of these resources have been invaluable in promoting development through innovative and sustainable use of bamboo and rattan. The International Network for Bamboo and Rattan (INBAR) has played a pivotal role in advancing the bamboo and rattan sector in this region. INBAR has facilitated and coordinated research (including action-research) on biodiversity and genetic conservation, production systems, processing and utilisation and socio-economics and policy, while promoting capacity building at the national level. A number of rural development programs are being implemented in the region. INBAR has also been instrumental in promoting technology transfer and information exchange between network partners.

The replicability in Latin America and Africa of the success stories from South and South-east Asia is yet to be assessed, despite the immense interest from the private sector, non-governmental organizations and government institutions in using bamboo and rattan to fuel rural development in the region. The dearth of information on the bamboo and rattan sector has been the main constraint to the development of systematic and sustainable development programs in this sector.

In order to do this INBAR has commissioned national studies from selected countries in, Africa and Central and South America. These national studies will provide a thorough review of the current state and future potential of the bamboo and rattan sectors in each country. Certain standard indicators will be documented in these studies to allow regional comparisons while other information will be country-specific. The national studies will help the experts decide the priority areas of study at the local, national and regional levels. This in turn will help INBAR clearly define its role within these countries as a facilitator and coordinator.

INBAR has developed an outline for these national studies. The outline serves two purposes. Firstly, it is meant to facilitate the data collection process and secondly, it should assist in the formulation of case study reports. The framework also guarantees that comparable information is provided in each national study. Information covered includes; general information on the country (geographical, topographical, climate, demography, political, environmental); the bamboo and rattan sector (biodiversity, production, utilisation, socio-economics, marketing, legislation); the institutional capacity at the national and local level; previous, ongoing and upcoming research and development interventions in the bamboo and rattan sector; and finally conclusions and recommendations.

After defining priority areas, case studies are undertaken in a number of carefully chosen, highly representative, locations within the country to collect raw data on all aspects of the present state of the bamboo and/or rattan sectors in those locations. The case studies investigate the Production-to-Consumption system of the resource. This involves the entire chain

of activities to which the bamboo or rattan is subjected, from the production of raw materials (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.

Once the raw data has been collected it can then be analysed. It is classified into two focus areas; constraints and opportunities. Possible options that could address the constraints or take advantage of the opportunities and thereby promote development are identified, and a plan for development formulated. This plan is then developed into an action-research project, which is actually a micro- or mini-level rural development project. It is effectively a trial project, and is intended both to test whether the interventions suggested by the study are appropriate and to obtain feedback from the local population on all aspects of the program. The methodology and development options (interventions) of these projects would be finalized at a stakeholders meeting in the country prior to the start of the project.

If an impact analysis study towards the end of the action research project indicates that the project is successful, and the community agrees, this would then form the basis for developing similar programs that could be multiplied in scope and applied in similar situations throughout the region or nation. In this way we go from fully tested small-scale trial project to multiple projects with large impact in a short time. At this national or regional level these programs would attract investment from donors interested in poverty alleviation and rural development.

Table of contents

List of Tables

List of Annexes

Executive summary

In Uganda, rattan has long been collected from natural forests for domestic use and for trading in local markets, with a small amount exported through unregulated channels. Furniture is the most commonly traded finished product from rattan. These finished products are haphazardly manufactured and fetch very low sale prices on the domestic market.

The production-to-consumption system (PCS) of rattan in Uganda involves various stakeholders such as the Forest Department (FD), rattan collectors, traders of raw rattan and finished products, and those who combine various processing activities.

This study revealed that rattan from the centrally located natural forests in Mukono and Mpigi districts is no longer available in the required quantities. This has forced traders to travel long distances to source raw materials. Traders regularly go to the Budongo Natural Forest in Hoima and Masindi districts and sometimes as far as the Democratic Republic of Congo. The increased cost of transport over these long distances greatly increases the cost of the raw rattan. This is the prime reason why various stakeholders are willing to participate in programmes aiming at restocking the forests efficiently using available stocks, and even establishing rattan plantations.

On the other hand the importance of bamboo has long been recognised by several cultures in the country. In particular, bamboo shoots are a major source of income to communities adjacent to bamboo forests, such as the Gishu in Mbale in Eastern Uganda (one of the study areas), where they are regarded a traditional delicacy.

However, the market for other products such as furniture is not yet well developed. Much of the bamboo is used for poles by people in villages on the fringes of the forest. Interest in the establishment of bamboo collectors' committees has been expressed in many of the areas studied in order to promote development of the bamboo industry,

Since bamboo is one of the protected species in the natural forests, there is need to establish dialogue with other protected areas in the country. This will be an eye-opener to the remote communities far away from market centres with the objective of promoting resource utilisation and market development.

PART ONE

CONTEXTS

Uganda in East Africa is located between 4^{o} 0' North and 1^{o} 30' South and 30 to 35^{0} East. It has 2, 698 km of land boundaries and is bordered by Kenya (933 km) in the east, by Sudan (435 km) in the north, by Tanzania (396 km) and Rwanda (169 km) in the south and by the Democratic Republic of the Congo (765 km) in the west. It is completely landlocked and covers a total area of 236, 040 sq. km, of which 199, 710 sq. km is land and 36, 330 sq. km is water.

TOPOGRAPHY

Much of Uganda is plateau at an altitude of 1000 metres or more and is bordered by a rim mountains in the east and north east and by the Rwenzori ranges, which rise to over 5000 m, in the southwest. The lowest point is Lake Albert at 621 m and the highest is Margherita Peak on Mount Stanley at 5, 110 m. The principal river is the Nile which flows north from Lake Victoria and then into Sudan. Lake Victoria in the southeast is the largest lake but Lake Kyoga in the centre of the country and Lake Albert in the west are each over 50 miles long. Uganda has resources of copper, cobalt, gold, limestone, nickel, salt and tin.

BAMBOO AND RATTAN RESOURCES.

Most of the country's bamboo resources are located in a few major sites, namely:- the North Western district of Arua, the Western and South Western districts on Hoima and Kabale respectively in addition to significant portions of the resource in the Eastern district of Mbale. However, little has been done to explore the nature and extent of bamboo resource use in these areas. Most of the bamboo resources are located in protected areas under government control. Due to restrictions on these areas, not all the bamboo forest is accessible to the harvesters.

Arundinaria alpina is one of the species that generally offers high utilisation potential and is abundant in most of the sites. *A. alpina* is a monopodial species with culms arising individually from running rhizomes. Culms grow to 20 m tall and up to 13 cm in diameter. New shoots are produced during the rainy season and live for between seven and 14 years (Were, 1991). Due to restrictions on harvesting and the lack of a well-developed market, little of it is used for commercial purposes.

The rattan sector in Uganda is characterised by restricted availability of raw materials. Because of the high demand for rattan products, almost all the rattan used in major production centres like Kampala comes from Hoima and Masindi districts of western Uganda. The last two decades or so have witnessed the rapid dwindling in rattan resources especially in town-fringe forests in Mpigi and Mukono districts. Today, most harvesting and processing activity relies on rattan from Hoima district.

In Uganda, rattan and bamboo resources are recognised as providing increasingly substantial contribution to the income generation, employment and to some extent to the foreign exchange earnings of the country. These resources directly benefit mainly, but not exclusively, the people residing in the communities adjacent to the resource base. In general activity in these sectors cuts across gatherers, suppliers, processors (both primary and secondary) and traders in mainly furniture and crafts products.

Rattan and bamboo resources in Uganda have traditionally been used by people as a source of building materials, for crafts, furniture, food (young bamboo shoots) and as well as areas for hunting wild game. The high productivity and economic potential of the rattan and bamboo sector in Uganda has barely been tapped, and experience so far shows and this will be relatively easy once the socio-economic aspects of the sector are appropriately examined. Important issues for consideration include the rattan and bamboo production and the flow of the products through various processors to the final consumers.

PART TWO

ISSUES

RATIONALE AND OBJECTIVES OF THE STUDY

The aim of this study was to explore the activities that characterise the bamboo and rattan industries in Uganda with the aim of specifying interventions for the development of the rattan and bamboo sectors in Uganda. This was achieved by studying the production to consumption system of the rattan and bamboo sectors in Uganda, and then identify development interventions that would sustain the industry.

The production to consumption system (PCS)

Bamboo and rattan are some of the most important Non-Tree 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 or rattan 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 or rattan. 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 or rattan resource. However because of the huge variety of raw material-management systems and processing techniques to which bamboos and rattans 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 or rattan 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.

Subsequent analysis of the PCS enables identification of all the constraints limiting bamboo or rattan 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 or rattan 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.

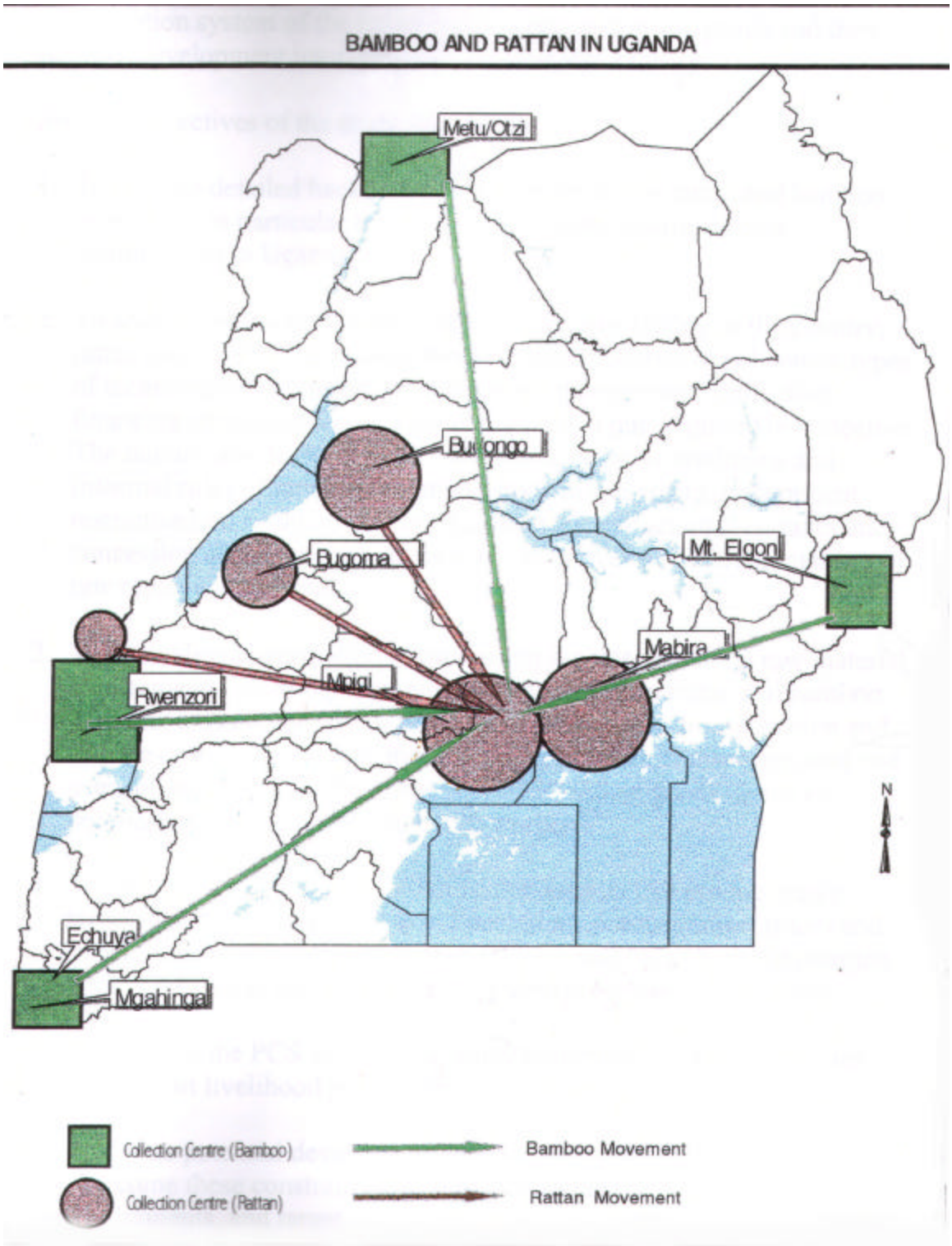
The Production to Consumption System analytical framework utilized for this study is based on that explained in INBAR working paper Number 4 (Belcher, B. 1995. Production to consumption systems: A framework for assessing development options.). It discusses the flow for rattan and bamboo materials through various stages of development. Distinguishing the system flow of in terms of inputs is essential to the identification of major constraints which may hinder a particular aspect from attaining optimal economic performance.

The rattan and bamboo sectors in Uganda are characterised by the restricted availability of raw materials, but the actual degree of resource-use depends *inter-alia* on the modes of resource conversion skills at the production stage. The wide distribution and spread of activities of this sector means that the large portion of people engaged in these activities, and the end users of the products they produce, have led to the degradation of the natural rattan and bamboo resources. The achievement of efficient management and sustainable utilisation, therefore requires particular urgency in addressing issues of resource availability and use, as well as the constraints that affect the production process for each resource at the various stages of the PCS.

Specific objectives of the study were:-

1 To analyse and describe the nature of the rattan and bamboo sector in the country.
2 To assess resource availability of rattan and bamboo in the country.
3 To examine the socio-economic significance of the rattan and bamboo sector in Uganda.
4 To examine the technologies involved in the transformation process at the various stages of the production-to-consumption system.
5 To identify threats and/or opportunities to the industry and propose appropriate interventions.

Map 1. Location of rattan and bamboo resources in Uganda



Methodology:

Study Area:

The Central and Southern regions of Uganda constituted the study area for rattan while that of bamboo covered Kisoro / Kabale and Mbale districts. These areas have relatively higher concentrations of rattan and bamboo collectors and processors compared to other parts of the country.

Sampling Technique:

The study carried out a comprehensive case study of the rattan and bamboo sector in the country by adopting a PCS framework. In the absence of a sampling frame of collectors and processors, a quota sampling technique was employed. Raw rattan and bamboo collecting and processing communities in rural and urban towns were chosen basing on relative distribution patterns of target stakeholders (collectors, primary and secondary processors, traders) in the named parts of the country. Since the precise distribution of all rattan and bamboo collectors and processors was not known beforehand, the actual survey sites were chosen after reconnaissance survey in commercial / urban centres. The survey locations were as below:-

Rattan:

Collectors	(Hoima, Mukono, Mpigi, Kampala)
Processors	(Kampala, Mpigi, Mukono, Hoima)
Traders	(Kampala, Mpigi, Mukono)

Bamboo:

Collectors	(Mbale, Kabale)
Processors	(Mbale, Kabale)
Traders	(Mbale, Kabale)

A structured questionnaire was designed for data collection in the field. Interviews were conducted by trained interviewers during several visits to host villages and collection centers.

Data analysis

Two methods of analysis were employed in the study; descriptive and statistical analyses. Frequency tabulation was used to present the information collected and the distributions were summarised using statistical parameters such as mean, mode, range and standard deviation. Percentages were used to compare frequencies and to express qualitative variables in numeric form. These are presented in detail in the annexes of the report.

THE PRODUCTION TO CONSUMPTION SYSTEM OF RATTAN IN UGANDA

Supply of raw materials

The rattan sector in Uganda is characterised by restricted availability of raw materials. Most of the rattan harvested and used in Uganda comes from Budongo and Bugoma natural forests in Hoima district, in the North Western region of the country. Although there is also some production from other natural forests like Mpanga and Kasanje (Mpigi district) and Mabira (Mukono district), this is mainly used in local villages with only a small proportion transported to nearby small towns and trading centres for processing. Almost all the rattan used in the major centres like Kampala, Mukono and Mpigi comes from Hoima. The low level of conversion skills and the rapid spread of activities in the sector have led to the degradation of the resource in many parts of the country. The natural stock of rattan in many forests has been extensively harvested and during times of scarcity rattan is collected from as far afield as Congo.

Table 1. Estimated percentage area of forest covered by rattan resource

District	Forest	Rattan coverage %
Hoima	Budongo	30
	Bugoma	30
Mukono	Mabira	25
Mpigi	Kasanje	20
	Mpanga	*

Source: Survey data, July 1999 * Data not available.

Although it was not possible to determine the proportions of rattan that comes from each forest or district, it was readily established that most of it comes from Budongo.

Harvesting and transportation

In Mpigi only local people residing in forest fringe communities harvest the rattan, but in Mukono collectors from other areas are also involved in harvesting. A large section of the harvesters interviewed in the study in Mpigi and Mukono districts harvest rattan from Hoima district. In most areas, harvesting of rattan is done as an individual undertaking. There are no stipulated community rules and regulations to be met before harvesting and collectors have access to the entire forest. However the harvester is required to have a license from the Forest Department, obtainable for a fee of 8000/= per month. The Local Councils in some areas require notification of harvesting activities.

Harvesting involves slashing around the area, removing the sheath and thorns from the lower part of the rattan stem and then cutting and pulling down the cane. Rattan collection is normally done by men because of the laborious nature of the work involved. Women were not involved in harvesting in any of the sites investigated. Most of the rattan harvesters had primary

or secondary level education.

The only tools used for harvesting are pangas. Most collectors harvest only mature rattan between 8 and 15 metres long, and about 2 cms thick. However, there are situations where some of the rattan harvested is not yet mature, due to scarcity of this quality of cane.

Table 2. Size of rattan harvested:

District	Length (m)	Diameter (cm)	% rejected [1]
Mpigi	15	1.8	14
Mukono	15	1.4	12
Hoima	8	2.0	10

[1] Rejection may be because the canes have dried out, are tapered, have short internodes, are broken, or were harvested prematurely.

After harvesting, the rattan is rolled into bundles and transported to the villages. In Hoima this is done on the head (human poterage), but in Mukono and Mpigi bicycles are commonly used. Thereafter, especially in Hoima, the rattan is loaded onto pick-up trucks and transported long distance for processing,

There is no specific rattan-harvesting season in any of the sites studied and harvesting is said to go on throughout the year. However harvesting activities during the rainy season are reduced due to transportation difficulties.

Rattan is collected solely for commercial uses. During the study there were no situations where rattan was harvested for subsistence use. The rattan used for household needs, such as making simple furniture, racks and home crafts, is usually sourced from that which has been rejected. In Mukono and Mpigi the amount used for household averages about 4% and 10 % respectively.

The volume of rattan harvested is mainly determined by demand and the availability of transport. Usually one harvester undertakes to finance the harvesting expedition and he recruits, facilitates and pays the workers in the harvesting team. The harvesting teams on average comprise 8 persons in Hoima, 5 in Mpigi and 4 in Mukono but teams may be as small as 2 people and as large as 6 in Mukono, and 10 in Mpigi. These are mainly local residents of the area and very rarely members of the same household. The team assembles some 5 km from the forest on average. In Hoima there are cases of collection teams assembling long distances from the forest, for example where groups of collectors from Kampala travel to Hoima and recruit only a few workers for collection. In such situations, the team may assemble 150kms from the source of rattan and travel aboard a hired truck. The rattan is usually located about 4 kms into the forest and this distance is covered on foot. The rattan is usually scattered in the forest and locating it often requires the assistance of local guides.

Collection is also influenced by the financial needs of the harvester, by the accessibility of the resource and by the availability of manpower and / or finances needed to hire it. On average 125 bundles are collected per trip, in Mpigi, 150 in Hoima and only 64 in Mukono

where the rattan resources are almost completely depleted. On average a single collection trip is undertaken per month in Mpigi, two in Mukono and ten in Hoima.

Costs incurred in rattan harvesting cover transport, feeding, tools purchase, labour and fees. In Hoima because of the characteristic nature of transactions, some costs are not established/recorded (see annex 3).

The raw rattan is sold to processors, craftsmen and traders (retailers and wholesalers) (annex 4). The transaction often takes place both in the collectors' households and at the processing places. A bundle of raw rattan costs 4,000= in Hoima, 8,000= in Mukono and 12,000 in Mpigi. The buyers transport their rattan on their own using means that befit the quantity bought and the distances they are to travel. Transport costs vary with distance traveled, and average 255,000= in Mpigi and 62,000= in Mukono. Distant buyers usually use pick-up trucks (Dyna) or lorries, while local traders and processors use bicycles.

In Mpigi and Hoima, the collectors do not carry out processing of the cane but in Mukono most collectors are also involved in primary processing of the cane. This involves sorting, removing the nodes, sun drying and sizing. Some collectors also manufacture items like stools and tables.

During the study, it was found that scarcity of raw materials is the main problem facing harvesters. This forces them to travel long distances to access the resource. During transportation up to 10% of the harvest may become damaged or rejected. This translates into higher prices for the rattan that reaches the market, averaging about 12000 Ug Shs[1] per bundle in Kampala.

Processing

The rattan sector in Uganda is still in the infant stages of its development, and the level of processing carried out is still low. There are basically two stages or levels through which rattan is processed.

1 Primary processing involves cleaning the rattan so that it can be used in manufacturing. This involves sorting the raw cane, removing the nodes and remaining sheath, sizing, sundrying for 2 – 7 days, removing the skin using knives and smoothing the surface with sandpaper. Sometimes, the rattan is cleaned by rubbing it with paraffin or washing it with soap and water, although this is only done occasionally.

2 Secondary processing takes place after the rattan has been cleaned. This stage of processing involves designing and manufacturing various end products which include crafts and a wide assortment of furniture. At the secondary stage of processing, the rattan canes are bent into rings and twisted and flexed so as to achieve the curves necessary for the fabrication of the required products. In the actual process of

[1] 1000 Ug Sh. = 0.5 US$

manufacturing, the pieces of rattan are wound around wooden frames and attached together using small nails to produce stools, arm chairs, basket chairs, dining chairs, tables, bookstands, cornerstands, cabinets, flower pot stands, and bottlestands amongst other products. Depending on the type of clients being targeted the products may then be either vanished or artistically painted. Buyers in rural areas prefer painted furniture, while vanished furniture dominates the urban market.

The two stages or processing are inextricable linked. There is no distinction between primary processors and secondary ones, because the latter clean the rattan themselves before using it in manufacturing.

Statistics concerning the populations of processors per district was not available given that this sector is not developed and most aspects of rattan processing activity are not documented. The largest number of processors were found in Kampala. The processors are usually located on the outskirts of major towns and are concentrated in centres, along main roads where they are easily accessible to customers. In the Kampala area, processing is intensive at Nsambya, and to a lesser extent at Bwaise and Kabila in Mpigi district. The latter is administrated by a different district, but its proximity to Kampala centre and similarity in their characteristics allow for them to be lumped together in one location. In Mukono, processing is concentrated at Butebe and Wagala.

Processors tend to work in loosely knit groups of about 2 – 10 members, headed by a chairman. The chairman is not the owner of the group, but is charged with overseeing the work of the group members, in addition to being a worker in the group. The members work together, although each conducts business independently. When handling large orders processors often subcontract part of the work to other members of the group. These working groups are not formally registered and their existence is dependent upon the mutual convenience of their members. The main reason for their existence is to reduce costs incurred in rent and storage. (see annexes 5a, b, c, d)

Rattan processing is predominantly done by men (see annex 6) given the strenuous nature of the work. In some processors' households, women and children are casually involved in simple tasks during primary processing. (See annex 7). Women are also active in painting and vanishing of finished products, and are considered smarter than their male counterparts, though not as fast.

The nature of employment for the majority of rattan workers is either contractual or self employment. Casual employment occurs in very few instances, and workers in this category are mainly associated with the primary stage of processing. Four out of five processors in Kampala work on a full time basis and the rest work part-time. In Mukono more than half of the processors work full time, and about 2/5 part-time. There are also a few incidents of processors working under subcontractual arrangements (see annex 8). For nearly all processors in Kampala (96%), rattan processing is the main source of income, as compared to other sources like trading (2%) and local artisan (2%). The situation differs little in Mukono, where some 86% of processors depend mainly on rattan for income as compared to local artisan (7%) and farming (7%) (annex 9).

On average the processors in Kampala had spent four years in the trade by the time of this study, while those in Mukono had been there for about seven years. The most experienced processor was located in Kampala and had been in the trade for 24 years. Most processors had attained secondary school education (annex 6) but hardly any of those interviewed had formal technical training. They learnt the skills of processing on the job, of course with a lot of personal creativity put in, as well as tutoring from friends and / or relatives already in the trade. The learning process takes between 6 months to one year, but many processors continue working as apprentices for their tutors for another year or so, before they become independently established.

The need for technical training is not urgently felt by most processors. Whenever it arises, assistance is sought from workmates and other processors in the locality. The major problems that bother processors are low demand or lack of market for their products, scarcity of rattan and the monotony of work. Others include inadequate shelter, over taxation and lack of capital and technology. (see annexes 17, 18)

There is no specific peak or slack season for processing but activity fluctuates with demand. There is however a tendency for demand to increase in December, and slacken in June.

Uses

The rattan resources in Uganda have traditionally been used by people as a source of materials for making crafts and furniture. Rattan is mostly used in making furniture e g chairs, cabinets and tables. It is brought to the production centres in the form of raw canes, rolled in bundles of 40 canes each, and then it is processed and used for making crafts and furniture. The rejected rattan is also used in many households as cooking fuel.

Trading

There is no clear division of labour between manufacturers and traders at most rattan processing centres. The sale of rattan and rattan products is done by the processors themselves. Finished products are exhibited outside the workshop, normally along a busy road. There are also some craft and furniture centre in the towns but these account for only a small portion of the market. Each individual processor transacts business independently and sets the price himself. However this price is greatly influenced by the prices asked by other processors in the locality and is also determined by factors such as input costs, time and labour invested, financial needs of the processor, volume purchased and general demand situation in the market. When sales are very low processors send out mobile sales persons (Batembeeyi) to sell portable pieces of furniture.

The high price of raw cane inputs requires that they be used effectively so as to maintain a fair profit margin; but this is frustrated by low levels of skills and equipment, and lack of

adequate capital. In addition, it is very hard to transport the finished products to other markets, and consequently producers are concentrated in market centres, where competition is high and processing is less lucrative. The rattan workers interviewed expressed the need to diversify the marketing strategy of their products as the way out of the marketing problem facing this sector. There is also need to address the supply side, where establishment of rattan plantations was floated as the solution for the increasing scarcity of the resource.

THE PRODUCTION-TO-CONSUMPTION SYSTEM OF BAMBOO IN UGANDA

Supply of raw materials

Bamboo harvesting and processing in Uganda is concentrated in the mountain forests of Elgon in Mbale district in the eastern part of Uganda, Rwenzori in the west and Echuya, Bwindi and Mgahinga in Kabale district in the south western corner of the country. There are also other small pockets of bamboo vegetation scattered in various parts of Uganda. In areas like Bbajo (Mukono district), Metu and Otzi in Moyo district (See Map 1) the bamboo thickets are exploited by local residents to provide bamboo reeds used mainly in construction. But bamboo activities in these areas are not as pronounced as they are in Kabale and Mbale districts.

In Mbale, the area of forest covered by bamboo is about 1276 hectares and this is mostly in natural forest reserves. These forest reserves are not legally accessible to users but bamboo harvesters who are mostly local residents of the communities neighbouring the forests find their way there. The volume of bamboo harvested cannot easily be established but is estimated to be approximately 700 bundles per month per village. In the areas visited it was estimated that there were about 500 bamboo based enterprises per parish on average, carrying out various stages of processing. These enterprises are very small and largely comprise individual households. The techniques employed are also quite simple and vary according to the type of bamboo harvested. There are two types of bamboo collected in Mbale; edible bamboo shoots and poles which are used for construction and in the manufacture of handicrafts and furniture.

In Echuya Forest Reserve, the bamboo is estimated to cover about 90% of the forest area. Local harvesters are allowed access to about half of this area, which is under the control of the Forest Department. Harvesters are required to register with the department office and pay an official fee, (see annex 10) and in addition carry out practices in line with FD regulations. Even here, the volume harvested varies widely, but a harvester normally makes about 2 - 4 trips each month and harvests several bundles of 10 bamboo stems each. (see annex 11). There are close to 80 small enterprises around Bwindi involved in the manufacture of mainly baskets from bamboo.

Harvesting practices

i) Kabale

Bamboo harvesting in Kabale is solely a men's activity. No female harvesters were found in any of the parishes visited. The majority (74%) of collectors had no formal education and none had reached secondary school (See annex 12). Harvesting is an individual undertaking, and the harvesters do not own the land from which the bamboo is harvested. They are required to have a permit from the Forest Department obtainable at a fee of 25000 per year, and make an additional payment to the market masters about 5000/= per year. (See annex 10). Harvesting is permitted on Thursday only. On average four collection trips are made per month by teams comprising about six individual harvesters. The team assembles 2-3 kms

from the forest and moves on foot to the bamboos. The bamboo is slashed down using pangas, branches are removed and the poles transported from the forest. Transportation to the villages is by human poterage using individual labour. Bamboo is harvested either green or dry. It measures about 6-7 metres long and is of varying diameters.

Harvesting is largely harvested for commercial purposes. Each harvester collects about 5 bundles of 10 stems per trip; and sells each stem to processors and traders at about 200/= (See annex 13b). The amount of bamboo collected depends on the season, with peak harvesting season for green bamboo from February to May and August to November. Dry bamboo is harvested all-year-round.

ii) Mbale

In Mbale, women are involved in bamboo collection, though not to the same extent as their male counterparts. In fact about a quarter of the collectors visited and interviewed in this study were women. Fifty seven percent (57%) of the collectors had attained at least primary education and only about 43% had not gone to school at all (See annex 12). Most bamboo collectors in this district are also farmers.

The harvesters work as individuals and do not own the harvested land, but still they do not have to pay access fees. On average collectors pay about 3500/= per annum to the market masters. (See annex 10). Most of the harvesters interviewed see no need for instituting this fee, though they go ahead and pay. About four collection trips are made per month by teams comprising about 7 people (See annex 11). The team travels for about 5 - 7 kms from the point of assembly to the source of the bamboo. The harvesters collect bamboo shoots which are cut using pangas at about 1 metre from the ground. They then chop off the hairy tip which is not edible.

The harvest is transported on the head. On average, 30 shoots are collected per person per trip, with each shoot measuring about 1 metre long and 3 – 4 cm thick (See table 4). About 5% of poles are rejected due to pest damage. Bamboo is collected both for commercial and subsistence purposes. It is eaten as vegetable. The quantity of bamboo collected is influenced by factors such as the availability of capital, transport and seasonality of the bamboo shoots. Peak harvest takes place from April to July for edible bamboo. The peak harvest season for edible bamboo shoots takes place from April to July.

Table 3: Size of bamboo harvested

District	Length (cm)	Diameter (cm)
Kabale	6 – 7	*
Mbale	1	3 - 4

*(Thickness) Diameter

No transport or labour costs are incurred in bamboo collection in Mbale because the collection is mostly personal. Apart from the payment made to the market masters (3500/= per annum), collectors buy a box of matches at 50/= each, and own a panga (see annex 10). The edible bamboo is dried over a fire and this requires firewood, which is gathered from the

forests. Shoots are sold direct to the consumers at local markets and beer communities at 40/= per shoot.

Processing

Most of the bamboo processors sampled in Mbale district are located in Busiu, Bundesi, Bukayemba, Sipi, Lukusi and Gamanyi. Processing activity however spreads to many other villages. In Kabale, the sites of Kalengyere, Bufundi, Ikamiro, Kasenkye and Muhindura were studied.

Bamboo processing involves two stages. In the primary processing stage, all the side branches are removed and the bamboo is cut to size. It is then split, slivered and bundled. The tools used for this stage are pangas, knives, sickles and hammers. The secondary stage of processing involves the manufacture of handicrafts and furniture. In Mbale, processors mainly make bamboo beds and chairs, (See annex 20) while in the case of Kabale, there are lots of handicrafts as well, including various types of baskets, bee-hives, local granaries, etc. (See annex 19).

There are very few cases of processors specialising in only primary or secondary processing. In both districts processors undertook both types of processing. Processors who manufacture end products also carry out primary processing but the actual processes carried out vary according to the type of bamboo and the products.

Most processors work individually and on a part-time basis. In Kabale they invest eight hours per day for five days a week, working two weeks per month for six months a year. In Mbale processors work for six hours for four days a week and devote 2 - 4 weeks of the month to processing. They work for 5 - 12 months of the year (See annex 14).

Most processors are also farmers and earn most of their income from activities other than processing bamboo (e.g. trading, local artisan; see annex 15). The average incomes of processors in Kabale are generally low but they are about three times those in Mbale. (See annex 13). Family labour is used in many cases but wives and children only assist in wetting the bamboo from time to time. In Kabale, assistance from non-family members is given (e.g. for splitting and sizing) and is normally rewarded with local beer. When a weaver is handling a large order however, communal labour can be called upon. Processors learn the skills from family members and friends, and it is from these people that they seek technical assistance. The Skills are transferred via informal arrangements with families and friends. Lack of formal training opportunities limits progress.

In Kabale the input costs incurred by processors include labour, equipment, raw materials, taxes and fees (See annex 13a). Labour costs average about 16,000/= per month, but vary quite widely depending on the product and processes involved in its manufacture. Raw materials mainly include bamboo stems and nails (see annex 16b) and the equipment used includes pangas, hammers, knives, saws and sand paper. In Mbale processors inputs include raw materials such as bamboo, nails, labour and equipment like panga, knife, plane hammer, saw, tape-measure etc. (see annex 16a).

Uses

Dry bamboo is used for the construction of houses, support for granaries, fencing, firewood, ceilings and making stretchers for carrying sick people. Ceilings and fencing are usually made under contract to the client. The contractor may employ a second person depending on the quantity and nature of work to be done. Granaries and beehives are made by weaving both green and dry bamboo.

Green bamboo is used for making baskets. It is harvested during the rainy season when it is still young. The bamboo is split and sized and the internodes are removed using pangas and sickles. The bamboo can thereafter be kept for several months.

Trading

There are no established trading arrangements for bamboo. Transactions are home based, with both retail and wholesale buyers finding the processors at his / her residence. The size and design of products often depends on market preferences, or on special orders. It is common for buyer to order products, and deposit part of the payment in advance.

Traders in Kabale pay taxes of about 20,000/= p a and market dues of 500/= per market day. (See annex 13a). Their product range includes baskets costing between 1,500/= and 4,000/= each. Construction of a bamboo ceiling charged at 10,000/= per room, while an average fence costs 15,000/= to make. Granaries and beehives sell at 5,000/= to 6,000/= each. (See annex 19).

In Mbale traders pay market fee of 300/= per month. Products are sold in single units and include beds (6,000/=), chairs (1,500/=) and trays (3,000/=) (see annex 20).

PART THREE

ANALYSIS

CONCLUSIONS FOR RATTAN

The rattan sector in Uganda is in the first stage of development with a low level of organization and processing capacity. The Hoima (Northwest) district is the actual centre for rattan harvesting. A small number of collection teams make trips to the forest for harvesting after they have made arrangements with local communities and have obtained a license from the Forestry department. They experience an increasing scarcity of the raw material and need to go deeper into the forest to find mature rattan. The continuous extraction of rattan from the forest is slowly resulting in a depletion of the natural stands. The forest is officially public land, but neighbouring communities have a usufruct right and give their approval for extraction. The harvesting of rattan is presently administered by the forestry department and a permit is required. Apparently, the actual management structure is not able to tackle the problem of depletion.

Collection teams use rudimentary harvesting techniques and increasingly harvest immature stems. The scarcity of the raw materials is a serious threat for the whole rattan sector in the short-term. Primary processing of the harvested rattan is insufficient and results in low quality and high rates of wastage. The cleaning of the raw rattan is limited to surface smoothing and sun-drying after which the stems are bent for the manufacturing of the products without further treatment. The processing industry is small-scale and lacks craftsmen with enough skills for proper treatment and processing of rattan. As a result, the crafts and furniture produced are low quality. Almost all the rattan used in major processing centres like Kampala, Mukono and Mpigi comes from Hoima. Craftsmen, loosely organized in local groups, are engaged in processing and manufacturing all sorts of crafts and simple furniture. The craftsmen sell their products directly to the public without intermediaries, mostly along the roadsides. Processing activities fluctuate with demand and manufacturers do not keep large stocks due to a lack of storage capacity and a need for direct cash payment.

RECOMMENDATIONS AND INTERVENTIONS FOR RATTAN (ANNEX 5)

Stopping the depletion:

The first concern should be the sustainable management of rattan in natural stands by raising stakeholder awareness about the need for collaboration in handling the resource.

Dialogue with the forestry department should be initiated with the objective of replanting rattan in the protected forest areas where it existed before, as a way of generating sustainable resources. The forestry department should organize a proper monitoring and control of rattan extraction and should be involved in setting up nurseries and plantations. This would also positively impact forest conservation and biodiversity.

Local communities should be encouraged and trained to sustainably manage the rattan resources in the forests they use, and become aware of the value of the material and the danger of depletion. They need to be integrated in proper rattan planning and management programmes

Upgrading the processing industry:

Rattan collectors and processors should be mobilised with the objective of instituting effective training programmes. Improvement of the collaboration between processing groups should facilitate the organization of workshops.

The purpose of the training of harvesters and craftsmen is to obtain a better primary and secondary processing of rattan in order to have better quality of rattan with a longer durability. The introduction of improved and new technologies in the various stages of rattan processing will also increase efficiency in use of resource inputs. Both interventions will enable to add value to the rattan during the harvesting and manufacturing, which should improve the incomes of the people involved.

The establishment of central rattan seasoning facilities utilising modern technology would promote the greater use of canes and greatly increase the quality, and hence the marketability, of the products.

Improving marketing and trading:

Creating and developing improved market conditions in the urban centres is the first prerequisite for the establishment of an integrated rattan industry. Training in business and entrepreneurship skills would enable producers to reap greater financial benefits from their products and to further develop their businesses. Higher-quality products would find potential buyers in the export market, a market that is currently being emphasised by the government.

CONCLUSIONS FOR BAMBOO

Bamboo stands are present in the eastern and south western part of Uganda in natural forests. Local communities harvest bamboo and they are required to obtain a permit from the Forestry Department. There is no management of bamboo resources. There is no proper treatment of the bamboo, which is directly processed after harvesting. There exists a small local market for bamboo products. Green bamboo is used for weaving baskets and dry bamboo is used for housing, fencing, and the manufacturing of handicraft and furniture (beds and chairs). Bamboo shoots are also harvested in Mbale, Eastern Uganda and they are regarded as a traditional delicacy by the Gishu.

RECOMMENDATIONS AND INTERVENTIONS FOR BAMBOO (ANNEX 6)

Showing the opportunities of bamboo at a community level

Villagers should be encouraged to take an active role in the management of the bamboo resources in their vacinity to increase yield, guarantee quality and for forest protection.

On-farm bamboo cultivation can be encouraged with interested community members and by establishing bamboo collectors' (resource users) committees. Such committees can be instrumental in education programmes aimed at improving and developing the bamboo industry.

Dialogue should be established with other protected areas of the bamboo forest aimed at initiating resource utilisation programmes particularly those to do with bamboo harvesting.

Bamboo processing such as basketry and furniture making should be promoted and improved by applying new technology and processing methods.

Starting with small-scale bamboo processing methods

Improved technologies should be introduced at the various stages of bamboo processing so as to increase efficiency in use of resource inputs.

Adopt technologies to add value to bamboo crafts and other products combined with training and capacity building in bamboo utilisation. Ensure information on markets is available to the manufacturers.

Bamboo shoots

The harvesting of bamboo shoots in Mbale is done on a small-scale for proper consumption and for commercialization on the market. A promotion of this vegetable in other parts of Uganda could develop a larger market for this NTFP in which women could be involved, generating income and a variation on the household diets.

ANNEX 1

TABLE 5: LOGICAL FRAMEWORK FOR RATTAN

ACTIVITY	FINDINGS	CAUSES	CONSTRAINTS	INTERVENTIONS	OPPORTUNITIES	OUTPUTS
Rattan harvesting	1 Rudimentary harvesting methods 2 High rates of rejected rattan (see table 3)	Lack of harvesting technology and modern tools/knowledge/skills	Lack of training in rattan harvesting methods	Training in harvesting methods. Provision of modern tools.	- FORI manpower facilities - Current harvesters' teams can be developed into groups - Harvesters' high aptitude to learn - Good working relations between communities and the FD	- Increase in the volume of rattan harvested - Higher quality rattan harvest, thus higher prices/incomes (see table 3)
	3 Long distances of rattan sources (see map 1 and Annex 1)	- Over exploitation of rattan in natural stands - Poor methods of extraction	- Rattan in natural stands near Kampala is almost depleted - Decline in the stock of rattan in natural stands	- Establishment of rattan nurseries and plantation as a pilot unit near Kampala	• Idea of nurseries is widely popular (see page 13) • LC environment committees as a basis for village nursery establishment • Land availability at Kifu • Proximity to major rattan working centres of Mukono and Kampala • FORI/FD collaborative approach to forest management (CFM) • Group formation can be based on current teams • Good working relations between communities and FD	- Improved rattan stocks in natural stand - Reliable supply of rattan from plantations near the market (Kampala) - Reduction in transport costs and damages in transit - Regeneration technology uptake will be wide spread - Shared responsibility over the sustainable use of the rattan resource
	4 High rates of rejected rattan	Lack of harvesting technology and	Lack of harvesting management skills	- Training of harvesters' - Alternative uses for rejected	(See training above)	

	(table 3)	modern tools/knowledge		rattan	(See manufacturing)	

ACTIVITY	FINDINGS	CAUSES	CONSTRAINTS	INTERVENTIONS	OPPORTUNITES	OUTPUTS
Processing	1 Processing is rudimentary	- Lack of training in this rattan sector	- Poor quality (processed) rattan material - Low skill	- Training processors in modern methods of processing at various stages	- Groups already existing can be strengthened - Authority structure is clear in these groups (see page 15) - Processors are young with high aptitude to learn (See Annex 4) - Education is fairly high (secondary)	- Empowered processors and improved incomes
		- Lack of seasoning facilities of rattan for various uses - Lack of adequate tools	“ “	- Establishment of central seasoning facility - Provide tools to processors on hire purchase system	- Processing is localised - Pilot facility at FORI’s Kifu station - (See groups above)	- Regular supply of processed rattan material - More efficient processing
	2 Restricted availability of raw materials	- High demand not coping up with supply - All rattan is found in natural stands managed by government	High cost of rattan raw material	Training processors in modern methods of processing at various stages Establishment of rattan seasoning facilities	(See training above)	- Empowered processors and improved incomes - More efficient use of rattan resources
	1 Lack of quality products	Lack of production technology	- No adequate workshops - Lack of capital	- Training in modern rattan manufacturing/entrepreneurship - Craftsmanship development	- As for training - Education level fairly high (secondary)	- Rattan will become a more income generating resource - High quality products will be produced and fetch higher prices

ACTIVITY	FINDINGS	CAUSES	CONSTRAINTS	INTERVENTIONS	OPPORTUNIES	OUTPUT
	2 Reliable flow of raw materials	Decline rattan stocks in natural stands	- Higher raw material costs			
	3 Rising costs of raw materials	Decline rattan stocks in natural stands				
	4 Lack of adequate production facilities	Lack of capital to rent stores	Lack of training in production of rattan products	- Training workshops - Craftsmanship development	- As for training - Localised activity makes knowledge transfer faster	
Trading/Marketing	1 Lack of storage facilities for finished products	- Lack of capital to rent stores	Poor products fetch very little from consumers leading to low returns from rattan enterprises	Regularise the entire rattan market system through training	- National policy to promote non traditional exports	- Rattan will become a more income generating resource - Export market will earn more foreign exchange for the country - Wider range of rattan items capturing a larger market - Multiple outlets for rattan products - Higher incomes from rattan production and sale
	2 No clear division of labour between processor, manufacturers and traders	- Lack of government support of this sector				
	3 Low quality products that cannot compete well both in domestic and export crafts market	- Lack of business and entrepreneurship skill “	Small market is captured “	- Training in entrepreneurship skills - Craftsmanship development among manufacturers	- (see training)	
	4 Low quality of furniture produced from rattan					

Acronyms:

FD Forest Department
FORI Forestry Research Institute
CFM Collaborative Forest Management
LC Local Council

ANNEX 2

TABLE 6: LOGICAL FRAMEWORK FOR BAMBOO

ACTIVITY	FINDINGS	CAUSES	CONSTRAINTS	INTERVENTIONS	OPPORTUNITIES	OUTPUT
1 Harvesting	- Bamboo harvested form natural stands (see map 1 and page 17)	- No bamboo private plantations	- Permit to harvest must be obtained from FD and paid for by harvester	- Involvement of bamboo stakeholders in sustainable management - Establish bamboo plantations	- Collaborative approach by FORI and FD to forest management (CFM) - FORI facilities	- Improve sustainable management of bamboo - Supply raw materials of bamboo will be reliable
	- Tools used are quite rudimentary (See page 28)	- Lack of awareness about better techniques - Lack of capital to buy better tools	Harvesting process is slow and laborious Bamboo sector is not developed	- Provision of modern harvesting technology to harvester	Awareness among the communities	- More efficient use of bamboo resources - Better quality bamboo raw material - Transporting to market centres simplified
	- Bamboo stocks are far away from the potential market (See page 28)	- There are no bamboo plantations - No markets near bamboo sources	Raw materials transportation to potential market is hard and expensive	- Establish primary/secondary processing units near bamboo natural stands	- Good working relations between the FD and the communities	- Availability of Raw materials to potential market
2 Processing	- Splitting is done manually (see page 19)	- Lack of modern processing technology and techniques	- Inefficient processing - Slow process - Small amount of bamboo	- Training processors in modern techniques - Equipping of processors with tools	- FORI facilities - Existing groups	- Availability of bamboo raw materials to manufacturers - Efficient process - Foot Process - More output

ACTIVITY	FINDINGS	CAUSES	CONSTRAINTS	INTERVENTIONS	OPPORTUNITIES	OUTPUT
3 Manufacturing	- Few items produced from bamboo	- Lack of bamboo sector information by manufacturers - Lack of training opportunities	- Low levels of craftsman skills	- Train manufacturers i e craftsmanship development - Equipping manufacturers with current information on bamboo products/market development	- Existing working groups can be strengthened - Demand for bamboo products	- Wider market will be captured - Increased incomes of manufacturers - Diversity of products
4 Trading/marketing	- Lack of marketing outlets	- Poor quality products - Undeveloped sector	- Low demand - Small market	Craftsmanship development through training at manufacturing level	(See manufacturing)	
	- Items trades are few especially in Mbale (See page 20)	- Lack of bamboo sub-sector development	- Poor quality bamboo products - Bamboo shoots poorly handled - No preservation methods applied - Lack of market development	- Increase items produced from bamboo through craftsmanship development/market development	- FORI facilities - Involvement of women is vital in developing upon their craft weaving skills	- Employment opportunities will be revised - Incomes of all stakeholders will be revised

ANNEX 3

Costs of rattan collection per trip (Ug.shs).

	Mpigi	Mukono	Hoima
Transport	255000	62000	*
Food	105000	21000	6000
Tools	3000	3000	4000
Labour	453000	10000	*
Fees	334000	26000	2000
Others	95000	6000	*
Total	**1245000**	**128000**	**12000**

*Missing data in Hoima was attributed to the informal nature in which payment for these items is usually carried out.

ANNEX 4

Revenue from rattan collection per trip (Ug.shs).

Average	Mpigi	Mukono	Hoima	
Price / bundle	12000	8000	4000	
No. of bundles	125	64	150	
Total revenue	**1500000**	**512000**		**600000**

ANNEX 5a

Input – cost structure of enterprises in Kampala.

	Activity			
	Procurement	Storage	Manufacture	Marketing
Raw materials*	62800	-	-	-
Labour	-	-	100000	-
Rent	-	70000	-	-
Transport	3500	-	-	-
Equipment^	-	-	78000	-
Loan interest	-	-	-	-
Taxes	-	-	-	1300
Other fees	-	-	4000	

NB All costs are in Ug.shs and are monthly apart from transport costs that are per trip, and costs of tools.

* See annex 5c for types, unit price and volume of purchase.

^ Equipment and their unit costs (in Ug.shs) are as below:

Panga **3500** Plane **60000** Knife **1800** Hammer **3000** Saw **3500** Cutter **6000** Brush **1000**

ANNEX 5b

Nature, volume and cost of raw materials – Kampala

Material	Units	Unit cost	Volume*
Rattan	Bundle (40)	12000	4
Timber (o/c1)	Piece	700	6
Poles	Frame^	100	10
Nails	Kg	1500	2
Vanish	½ ltr tin	2500	2
Paint	,,	2500	1

^ Frame = 3 pieces of pole of about arm-length
o/c1 = off cuts of about 5 – 7 m length
* Average volume purchased per month

ANNEX 5c

Input – cost structure of enterprises in Mukono.

	Activity			
	Procurement	Storage	Manufacture	Marketing
Raw materials*	60000	-	-	-
Labour	-	-	107000	-
Rent	-	15000	-	-
Transport	1000	-	-	-
Equipment^	-	-	11500	-
Loan interest	-	-	-	-
Taxes	-	-	-	1000
Other fees			4000	

NB All costs are in Ug.shs and are monthly apart from transport costs that are per trip, and costs of tools.
* See annex 5d for types, unit price and volume of purchase.
^ Equipment and their unit costs (in Ug.shs) are as below:
Panga **3500** Knife **500** Hammer **3000** Saw **3000** Brush **1500**

ANNEX 5d

Nature, volume and cost of raw materials – Mukono

Material	Units	Unit cost	Volume*
Rattan	Bundle (40)	10000	4
Timber (o/c2)	Piece	50	30
Poles	Frame^	100	100
Nails	Kg	1800	2
Vanish	½ ltr tin	2500	2

^ Frame = 3 pieces of pole of about arm-length
o/c2 = small off cuts of about 5cm width and 5 – 7 m length
* Average volume purchased per month

ANNEX 6

Age, Sex and Education of processors

Variable	Characteristic	District	
		Kampala	Mukono
Age	Mean	29	38
Sex (%)	Male	93	100
	Female	7	0
Education (%)	Primary	27	31
	Secondary	69	54
	Tertiary	2	15

ANNEX 7

Household characteristics

Variable	Characteristic	District	
		Kampala	Mukono
Household Size	Mean	4	5
Males in processing	,,	1	2
Females in Processing	,,	0	1
Total in Processing	,,	1	2

ANNEX 8

Employment profile

Variable	Characteristic		District	
			Kampala	Mukono
Status (%)	Full-time (F)		79	54
	Part-time (P)		21	38
	Sub-contract(S)		0	8
Hours/day	Mean		10	9
Days/week	,,		6	6
Weeks/month Mean	F		4	4
	,,	P	3	3
	,,	S	-	3
Months/year	Mean	F	12	12
	,,	P	11	10
	,,	S	-	3

F = full-time P = part-time S = sub-contract

ANNEX 9

Income status of processors

Variable	Characteristic	District	
		Kampala	Mukono
Income Source (%)	Rattan	96	86
	Trading	2	0
	Artisan	2	7
	Farming	0	7
Monthly^	Mean	100000	107000
Annual*	,,	1150000	1225400
Annual^	,,	1127000	2652000

* Income from all sources

^ Income from rattan processing

ANNEX 10

Monthly costs of bamboo collection.

	Kabale	Mbale
Fees	2500	300
Materials	-	50
Total costs	**2500**	**350**

ANNEX 11

Monthly income from bamboo collection

	Kabale	Mbale
Trips / month	4	4
Bundles / trip	5	-
Pieces / bundle	10	30
Price / stem	200	40
Income / trip	20000	1200
Income / month	**40000**	**4800**

ANNEX 12

Gender and education of bamboo collectors

District	Gender		Education level		
	Male	Female	None	Primary	Secondary
Kabale	100	0	74	26	0
Mbale	76	24	43	52	5

Note: Percentages are out of total number of collectors in the sample per district.

ANNEX 13a

Input – cost structure of enterprises in Kabale.

	Activity			
	Procurement	Storage	Manufacture	Marketing
Raw materials* *	-	-		-
Labour	-	-	(16000)	-
Rent	-	-	-	-
Transport	-	-	-	-
Equipment^	-	-	12000	-
Loan interest	-	-	-	-
Taxes	-	-	1800	-
Other fees	-	-	-	500

NB All costs are in Ug.shs and are monthly apart from (market dues) other market fees paid per day, and costs of tools paid in many years. ( ) Costs on labour vary widely depending on products and processes involved in the manufacture.

* See annex 14b for types, unit price and volume of purchase.

^ Equipment and their unit costs (in Ug.shs**)** are as below:

Panga **3000** Hammer **3000** Knife **1000** Saw **3500** Sand paper **1500**

ANNEX 13b

Nature, volume and cost of raw materials – Kabale

Material	Units	Unit cost	Volume*
Bamboo	stem	200	(500)
Nails	kg	1800	(3)

*Average volume purchased per month depends on product.
Bee-hives, Granaries = **180** Baskets = **100**
Ceiling, Fencing = **700** – **1500** depending on size / length of room / fence.
( ) These are average estimates of widely varying volumes.

ANNEX 14

Employment profile

Variable	Characteristic	District	
		Kabale	Mbale
Status (%)	Full-time (F)	0	18
	Part-time (P)	100	82
	Sub-contract(S)	0	0
Hours/day	Mean	8	6
Days/week	,,	5	4
Weeks/month Mean	F	-	4
	,, P	2	2
	,, S	-	-
Months/year	Mean F	-	12
	,, P	6	5
	,, S	-	-

F = full-time P = part-time S = sub-contract

ANNEXE 15

Income status of processors

Variable	Characteristic	District	
		Kabale	Mbale
Main Source (%)	Bamboo	-	-
	Trading	7	32
	Artisan	-	25
	Farming	93	43
Monthly^	Mean	16000	6000
Annual*	,,	300000	150000
Annual^	,,	96000	68000

* Income from all sources
^ Income from bamboo processing

ANNEX 16a

Input – cost structure of enterprises in Mbale.

	Activity			
	Procurement	Storage	Manufacture	Marketing
Raw materials*	10000	-	-	-
Labour	-	-	6000	-
Rent	-	-	-	-
Transport	-	-	-	-
Equipment^	-	-	65800	-
Loan interest	-	-	-	-
Taxes	-	-	-	-
Other fees				300

NB All costs are in Ug.shs and are monthly apart from costs of tools.
* See annex 14b for types, unit price and volume of purchase.

^ Equipment and their unit costs (in Ug.shs) are as below:

Panga	2500		Plane 50000
Hammer	4000	Saw 4000	Tape measure 1000
Knife	500	Sand paper 2000	

ANNEX 16b

Nature, volume and cost of raw materials – Mbale

Material	Units	Unit cost	Volume*
Bamboo	Stem	40	200
Nails	kg	1500	4

*Average volume purchased, varies between products

ANNEX 17

Production structure of rattan processors in Kampala

Product	Unit of sale	Unit price	Production in units per month for five sampled processors				
			1	2	3	4	5
Basket chair	Set (3)	120000	2	3	4	2	1
Arm chair	Set (3)	90000	2	3	4	4	1
Dining chair	Set (6)	130000	2	-	1	2	1
Table	1 Piece	20000	4	-	2	-	5
Stool	,,	3000	-	-	-	-	15
Cabinet (s)	,,	4000	-	-	12	3	5
Cabinet (b)	,,	20000	4	2	2	3	2
Corner stand	,,	20000	-	2	-	-	-
Flower pot stand	,,	10000	6	-	-	4	-
Bottle stand	,,	12000	-	-	-	4	-
Book shelf	,,	6000	5	2	4	3	2

Notes:
Sample of processors not statistically significant but only portrays the production structure in the district.
All prices are in Ug.Shs and could vary slightly between processors.
For cabinets: s = small b = big
Products in sets are also sometimes sold piece by piece at about 1/3 or 1/6 the price of a set.

ANNEXE 18

Production structure of rattan processors in Mukono

Product	Unit of sale	Unit price	Production in units per month for five sampled processors				
			1	2	3	4	5
Stool	1 Piece	1500	300	140	50	300	240
Cabinets	,,	30000	10	8	12	7	7
Tables	,,	10000		-	8	5	10
Chairs	,,	25000	7	15	10	12	12
Chairs	Set (3)	80000	3	1	2	1	1
Flower pot stand	1 Piece	5000	6	-	4	-	-

Notes:
Sample of processors not statistically significant but only portrays the production structure in the district.
All prices are in Ug.Shs and could vary slightly between processors.
For chairs: sale is both in sets of 3, and piece by piece.

ANNEX 19

Production structure of bamboo processors in Kabale

Product	Unit of sale	Unit price	Production in units per month for five sampled processors				
			1	2	3	4	5
Basket (s)	1 Piece	1500	-	50	15	60	
Basket (b)	1 Piece	4000	-	30	12	12	25(b)
Ceiling	1 Room	10000	1	-	-	-	-
Fence	Fence	15000	1	-	-	-	-
Granary	1 Piece	6000	-	-	-	1	-
Bee hive	1 Piece	5000	-	-	-	1	-

Notes: For Ceiling and Fence price does not include materials used.

ANNEXE 20

Production structure of bamboo processors in Mbale

Product	Unit of sale	Unit price	Production in units per month for five sampled processors				
			1	2	3	4	5
Beds	1 Piece	6000	4	5	4	10	14
Chairs	,,	1500	10	-	6	-	10
Trays	,,	3000	-	-	10	-	-