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# **The Hidden Harvest: The Role of Wild Foods in Agricultural Systems**

*Beer and Baskets: The Economics  
of Women's Livelihoods in  
Ngamiland, Botswana*

**Report Compiled by Josh Bishop and Ian Scoones**

**IIED**

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**BEER AND BASKETS:  
THE ECONOMICS OF WOMEN'S LIVELIHOODS IN  
NGAMILAND,  
BOTSWANA**

**Report compiled by Josh Bishop and Ian Scoones**

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**1994**

**Hidden Harvest Project**

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The *Research Series* of the Sustainable Agriculture Programme of the International Institute for Environment and Development reports the findings of collaborative research carried out as part of the programme's activities. Each volume of the *Research Series* is devoted to a different research project.

This report is a case study of the *Hidden Harvest* project at IIED. This project is a collaborative research project coordinated by the Sustainable Agriculture Programme and the London Environmental Economic Centre at IIED and supported by the World Wide Fund for Nature (International). The project aims to develop approaches to local level economic assessment, using a combination of Participatory Rural Appraisal (PRA) and environmental economics approaches. Case studies make use of various elements of these techniques to examine the importance of wild resources for local people's *livelihoods*.

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## **GLOSSARY**

<b>BCC</b>	Botswana Christian Council
<b>IIED</b>	International Institute for Environment and Development
<b>NGO</b>	Non-governmental Organisation
<b>P</b>	Pula (P1.00 = US\$0.46)
<b>PRA</b>	Participatory Rural Appraisal
<b>RRA</b>	Rapid Rural Appraisal

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# **BEER AND BASKETS: THE ECONOMICS OF WOMEN'S LIVELIHOODS IN NGAMILAND, BOTSWANA**

## **SUMMARY**

This report examines the economics of basket making and beer production in two sites on the western edge of the Okavango delta in Ngamiland, Botswana. Using Participatory Rural Appraisal methods, the study focused on the priority concerns expressed by villagers and explored women villagers' use of wild species. Income generating activities based on the use of wild resources were situated and evaluated in a total livelihood context.

After offering a very brief introduction to methodology, the report provides an overview of the social and environmental setting of the study area. This is then followed by an examination of the natural resource profiles of each village site. Resource management and control issues are addressed by examining harvesting practice and resource tenure issues. The next section examines the costs and benefits of basket making and contrasts the economics of using wild and cultivated palm. The comparative returns to labour of different livelihood activities are discussed, setting the role of basketry within a wider context. Resource conservation and management options are then identified.

## **1. INTRODUCTION**

Small-scale craft industries are often seen as a way of increasing the incomes of marginalised people, particularly women. Making use of available natural resources and extensive local skills in craft production potentially offers significant increases in local cash income levels. In southern Africa basketry, pottery, weaving or carving have developed for new markets, often related to the tourist industry. The success of the Botswana basketry industry since the early 1970s is unparalleled in southern Africa. Markets have expanded, designs have been developed and quality improved such that the industry is now a significant exporter raising large revenues. But this rapid development has costs. The environmental costs of resource depletion are perhaps the most severe. Rapid expansion of palm and dye collection for basketry has meant that such resources are increasingly scarce in those areas where commercial marketing is well developed (Cunningham, 1992). The result is longer distances to collection sites and greater incentives to substitute to alternative materials. Another potential constraint to the successful expansion of the basketry industry is marketing. In Botswana, the highly organised marketing operation through Botswanacraft has allowed for significant market expansion along with price increases.

This report examines the economics of basket production in two sites on the western edge of the Okavango delta in Ngamiland, Botswana. The villages were chosen as they had been the site of occasional study over the past decade (eg. Cunningham and Milton, 1982, 1987; Terry, 1984, 1986; Cunningham, 1987, 1988, 1992). The villages of Etsha and Gumare have been the centres for basketry development through support by outside agencies. Basket making is thus a significant economic activity in these areas and has been for some time. These sites therefore provided a model situation for the impacts of basketry development. The lessons learned at these sites may therefore be useful in other areas around the Okavango, in Namibia and in Zimbabwe where commercial basketry is expanding, prompted by the expansion of the tourist industry and export opportunities.

The study concentrated on two hamlets within the Etsha and Gumare area (Figure 1.1). Within Etsha,

Etsha 5 was chosen as it is in a central position in the long linear development of Etsha village on the edge of the Okavango flood plain. It is also close to the main market centre of Etsha 6 and the buying point of the Botswana Christian Council. Etsha 5 represents a site where commercial basket making has been on-going for at least two decades. Danega is in a contrasting position being situated on a raised island within the floodplain. As a result, Danega is closer to the palm and dye resources than Etsha 5, but further from a market.

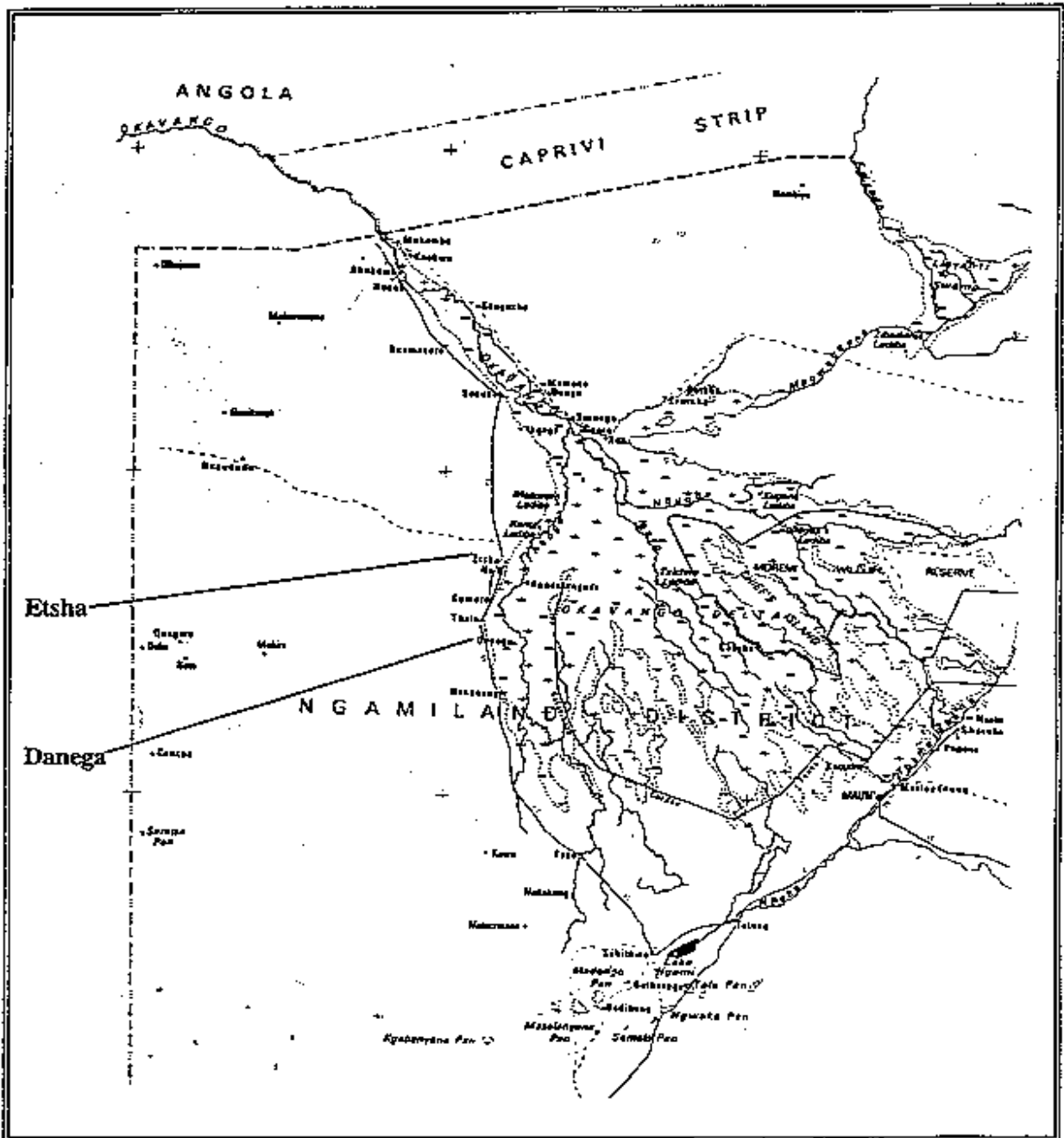
The objectives of this study were therefore to use two case study sites to explore the economics of basket making. This would examine the returns to labour from basket making and a range of other activities (including beer making) carried out by women. This would lead to an assessment of the incentives for engagement in basket making and the role basket making has in women's livelihoods. Options for increasing the added value of basket making for women would also be explored through the economic analysis. Finally, resource conservation and management options would be examined through an economic assessment of palm cultivation as an alternative to collection from wild sources.

The study attempted to focus on the priority concerns expressed by villagers and echoed by local development agencies. Women regularly complain about the increasing scarcity of quality palm, the distance to the palm and dye collection sites and the dangers encountered on the way (cf. Terry, 1984, 1986; see below). Local development groups (notably the Botswana Christian Council in Etsha and Ngwao Boswa in Gumare) have responded by encouraging the cultivation of palm at village sites. This study attempted to explore (among other things) the economics of this alternative.

After offering a very brief introduction to methodology (section 2), the report provides an overview of the social and environmental setting of the study area (section 3). This is then followed by an examination of the natural resource profiles of each village site (section 4). Section 5 looks at resource management and control, examining harvesting practice and resource tenure issues. The next section examines the costs and benefits of basket making and contrasts the economics of using wild and cultivated palm. The comparative returns to labour of different livelihood activities are discussed, setting the role of basketry within a wider context.



Figure 1.1. Map of Okavango delta area in Botswana, showing study sites



## 2. METHODOLOGY AND SEQUENCES

### A brief overview of Participatory Rural Appraisal (PRA)<sup>1</sup>

Rapid Rural Appraisal (RRA) emerged in the late 1970s as an alternative approach to inquiring about rural life and conditions which tried to offset the anti-poverty biases of 'rural development tourism' and to avoid the defects of questionnaire survey 'slavery'. In its emphasis on 'approximate ignorance' and 'appropriate imprecision', RRA stressed cost-effective trade-offs between the quantity, accuracy, relevance and timeliness of information collected and analysed.

A growing awareness of the failures of conventional approaches in meeting the needs of poor people has led to the exploration of alternative methods for investigating poverty and resource management issues and planning research and development initiatives. These draw on a wide range of sources ranging from agroecology, ethnobotany and social anthropology.

Participatory approaches and practical techniques for the diagnostic analysis, planning, implementation, monitoring and evaluation of development activities are currently being utilised and refined by a wide array of governmental and non-governmental organisations in the context of their research and development activities.

Participatory Rural Appraisal (PRA) is based on interactive learning, shared knowledge and flexible yet structured analysis. The methods are applied in the field by an interdisciplinary team working closely with local people, and are designed to quickly generate new information on, and new hypotheses about, local conditions and livelihoods. But, the approach is more than simply a collection of innovative techniques. It involves self-critical awareness of the attitudes and behaviour on the part of the investigators towards the people with whom they work.

It is this relaxed rapport, open dialogue and mutual sharing that makes the methods effective. Furthermore, beyond their value for learning and analysis, some of the methods are also a means of establishing rapport; they help sustain and strengthen the participatory process of which they are a part. The shift from RRA to PRA has been discussed by Chambers (1992). Table 2.1 highlights some of the contrasts. In practice there are many overlaps; participatory methods may be used as part of a data collection process, which may only later lead to local action. The distinction between method and overall approach is important in this regard.

With a formal survey, information is appropriated by the interviewer. It is transferred from the words of the person interviewed to the paper of the questionnaire schedule where it becomes the property of the outsider. In contrast with questionnaires, local people do not have a sense that information is being handed over and taken away when they are involved in the PRA. Instead, by visually sharing a map, model or diagram, all who are present - both insider and outsider - can see, point to, debate, discuss, modify and refine conceptual diagrams or representations. Control over the creation and analysis of the maps, models or diagrams is shared by all who are present. Those who cannot read and write are not excluded; every human being possesses a 'visual literacy' which allows them to actively participate in the PRA process.

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<sup>1</sup>This summary is based on a short piece written by John Thompson, Sustainable Agriculture Programme, IED, London.

**Table 2.1. RRA and PRA compared (from Chambers, 1992: 11)**

Characteristic	RRA	PRA
Period of major development	Late 1970s, 1980s	Late 1980s, 1990s
Major innovators	Universities	NGOs
Main users	Aid agencies, universities	NGOs, government field organisations
Key resource earlier overlooked	Local people's knowledge	Local people's capabilities
Main innovation	Methods	Behaviour
Predominant mode	Elicitive, extractive	Facilitating, participatory
Ideal objectives	Learning by outsiders	Empowerment of local people
Longer-term outcomes	Plans, projects, publications	Sustainable local action and institutions

One of the central features of PRA methods is their emphasis on diagramming and visual sharing (Table 2.2):

**Table 2.2. Methods used in Participatory Rural Appraisal**

Visualised Analyses	Interviewing	Group and Team Dynamics
<ul style="list-style-type: none"> <li>● Participatory mapping and modelling</li> <li>● Aerial photograph analyses</li> <li>● Seasonal calendars</li> <li>● Daily and activity profiles</li> <li>● Historical profiles and trend analyses</li> <li>● Timelines and chronologies</li> <li>● Matrix scoring</li> <li>● Preference ranking</li> <li>● Venn and network diagramming</li> <li>● Systems and flow diagrams</li> <li>● Pie diagrams</li> </ul>	<ul style="list-style-type: none"> <li>● Semi-structured interviewing</li> <li>● Transect and group walks</li> <li>● Wealth ranking</li> <li>● Focus group interviews</li> <li>● Key informant interviews</li> <li>● Ethnohistories</li> <li>● Futures possible</li> </ul>	<ul style="list-style-type: none"> <li>● Team contracts</li> <li>● Buzz sessions and reviews</li> <li>● Rapid report writing</li> <li>● Do-it-yourself (taking part in local activities)</li> <li>● Villager and shared presentations</li> <li>● Self-corrected notes and diaries</li> </ul>

A key finding of PRA is that it can be more cost-effective in both time and money than most conventional long-term surveys. PRA can be used in conjunction with other more conventional approaches, making them more effective and focused. The search for cost-effectiveness has led to a recognition of the need to make trade-offs between the depth, breadth, accuracy and timeliness of data collection, and an acknowledgement that "it is better to be approximately right than precisely wrong."

## PRA and economics

A major challenge for this field exercise was to attempt to use PRA methods to answer economic questions about resource valuation and production returns to different activities<sup>2</sup>. A range of methods were used to investigate economic questions within a broader understanding of livelihood strategies at a local level. Key activities within women's livelihoods were identified through a variety of PRA exercises, including mapping (social and resource), matrix ranking, seasonal calendar diagramming, joining harvesting and collection activities in the field and semi-structured interviewing. These activities were then investigated in more depth with the qualitative information collected earlier being complemented by more quantitative information on production returns.

While formal statistical sampling of the total population was not carried out, cross-checking of information continued throughout the fieldwork with a triangulation of both methods and informants. For instance, a variety of methods were used to investigate production activities in the two village sites. These included village sampling and livelihood analysis using social maps, investigation of a range of livelihood settings with a series of individual case studies and group discussions where the group debated a series of issues, confirming or rejecting information gathered from other sources. The choice of economic production models that emerged during the fieldwork were thus the result of a dialogue with a variety of villagers

## Economic models

The economic models developed in section 7 of this report focus on the returns to labour of a series of activities that are important components of women's livelihoods within the two study area villages. To illustrate the place that basket weaving occupies in household livelihood strategies, relative to other productive activities, a simple economic model was constructed, using a cost-benefit approach. The model developed here is necessarily crude due to data limitations, but it nevertheless provides a useful framework for analysing alternative strategies to promote the basket industry in Ngamiland. More generally, the model offers insights into the constraints and opportunities confronting resource-based craft industries in developing countries.

The general approach used is similar to that used in constructing farm budgets for labour-intensive, subsistence agriculture. As local labour markets are poorly developed and opportunities for paid employment are extremely limited, reliable data on wages are not available. For the same reason, it is not appropriate to estimate a shadow wage to value labour inputs for basket weaving. Instead, information on labour inputs to basket production was combined with price data for intermediate and final outputs to estimate a range of values for the *returns to labour*, expressed in local currency (Pula per hour; at the time of study P1.00 = US\$0.46).

Three stages of production are distinguished in the model (see section 7):

- Collection of raw materials;
- Processing of raw materials;
- Weaving baskets.

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<sup>2</sup>A series of methodology papers exploring the challenges of combining PRA techniques with economic assessments are being prepared by the *Hidden Harvest* project at IIED. These papers examine both the broader dilemmas faced when attempting local level economic analyses and details of specific methods.

Each production stage is further broken down into tools, labour inputs and outputs. Standard units are one trip or headload (the amount of material that a woman can collect and carry home in a single return trip), and one N5 basket (a typical, open basket of 37 cm diameter by 8 cm high). Inputs are expressed in terms of the quantity per headload (collection and processing) or the quantity per N5 basket (processing and weaving). A conversion ratio relates the two standard units.

Sensitivity analysis was used to identify crucial variables and especially to examine the sensitivity of economic returns to changes in the amount of time spent collecting raw materials. Potential time savings in collection are assumed to be the main advantage of cultivating the *mokola* palm (*Hyphaene petersiana*) as a substitute for wild material. These benefits are finally compared to the costs of cultivation and other avenues for improving returns to labour in basket making.

A combination of primary and secondary data inputs were used to construct the economic model. Primary data were collected in various ways and from a number of different sources, including PRA sessions with groups of basket weavers, as well as interviews with selected weavers and other villagers, and with individuals and organizations involved in promoting the basket industry (Beth Terry, Botswana Craft, BCC and Ngwao Boswa). The latter also provided access to financial accounts and price lists (Ngwao Boswa) and to recent records of basket purchases (BCC). Secondary data used in the analysis included agricultural statistics published by the Botswana government as well as written reports and other documentary materials provided by Beth Terry and Tony Cunningham.

### Sequence of methods used

A variety of different methods were used during the fieldwork. They were combined in a flexible sequence that moved from general background (secondary data) to group work to derive village level profiles and further questions about women's livelihood strategies to investigations together with individual women. At each stage cross-checking with different methods and informants was carried out to improve data reliability. The sequence of methods employed differed slightly between the two village sites, but the broad pattern is illustrated in Box 2.1.

### **Box 2.1. Methodological sequence**

1. Secondary data analysis (past reports, key informants etc.)
2. Village mapping exercise - resource map, including collection sites for palm and dye
3. Field visit with palm leaf collectors - collection time trials plus informal group discussions about resource management issues
4. Seasonal calendar exercise - identification of range of production and income earning activities and their seasonal distribution
5. Income ranking - ranking of income earning opportunities in relation to basket making; attempts at local definition of shadow wage rate
6. Matrix ranking - focused on critical issues for further investigation (eg. problems of resource collection and contrasts between sites; wild fruit resources)
7. Social mapping exercises - household list, identification of livelihood combinations
8. Well-being ranking using village household list
9. Individual case studies (selected from village social map) on economics of different livelihood options
10. Income source ranking by individual households
11. Group discussions on various themes (eg. following feedback of diagrams)

### 3. NGAMILAND: SOCIAL AND ENVIRONMENTAL CONTEXT

Ngamiland is dominated by the Okavango Delta which spreads out into the dry Kalahari sands area. The flood waters of the delta are derived from the catchments of the Cuito and Cubango rivers systems of South-eastern Angola. These provide a March to July flood, sometimes with two peaks depending on the rainfall pattern in the highlands of Angola. The varying pattern of islands, channels and lagoons results in a range of water availability and a mosaic of different vegetation types within the delta. Livelihoods in the delta are thus based on a mixed reliance on dryland and wetland areas, rainfall and floods (see section 4).

Table 3.1 shows the annual rainfall levels at Gumare since 1984-85. The pattern is immensely variable. Income sources reliant on rainfall, such as dryland agriculture, are thus highly risky in this environment. More stable sources of income, based on more perennial sources (such as tree products - palms, dye, fruits) are potentially more reliable (see below).

Table 3.1. Rainfall in Gumare (mm/year)

Yr	84-85	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93
Mm	236	282	271	431	705	340	483	189	636

Source: Agriculture Office, Gumare

Evidence of human involvement on the edge of the Okavango delta goes back at least 100 000 years, when hunter-gathering communities inhabited the area. Since the eighteenth century a number of different agricultural and pastoral groups have come to settle in the area, transforming the landscape in various ways. Bayei and Hambukushu agriculturalists moved into the delta in the eighteenth century from what is today south-west Zambia, the Caprivi Strip and the Kwando and Linyati river areas. The Bayei introduced a range of fishing and hunting methods as well as flood-retreat (*molapo*) agriculture. The Hambukushu introduced iron smelting technologies for the production of a variety of implements.

Cattle owners also began to move into Ngamiland from the nineteenth century. Batswana cattle owners first came with their herds and later, following their defeat by Germans in Namibia, the MaHerero settled in Ngamiland during the first decade of this century. Following widespread malaria and tsetse control through spraying campaigns in the 1950s and 1960s, further in-migration became possible. From 1967 to 1969 a large influx of Hambukushu refugees arrived from Angola and joined their relatives in northern Botswana. Later, these people were settled in a string of thirteen hamlets that became Etsha.

This long history of in-migration from a variety of places means that the delta edge today exhibits a great cultural and ethnic diversity. This is reflected in the differing livelihood strategies of the two major groups found in the study villages of Danega and Etsha. The Bayei who dominate the Gumare/Danega area are dryland and wetland agriculturalists and fisherpeople, while the Hambukushu who remain concentrated in the Etsha villages are primarily dryland cultivators. Both groups are cattle owners, but to a lesser extent than the MaHerero pastoralists who have settled in nearby Nokaneng.

Basket making limited to utilitarian use has long been part of the material culture of both the Bayei and Hambukushu. However by the 1960s weaving had practically died out in the area because of the widespread substitution of plastic or metal containers. It was only in the early 1970s that basket

making was revived for commercial sale in the Etsha and Gumare area. This was promoted by the resettlement officer for Etsha, Malcom Thomas, who was keen to find income earning opportunities for the newly arrived Hambukushu refugees who, because of their refugee status, were prevented from taking up formal employment. With buying arrangements established by Botswanacraft from 1973, the craft industry in the area took off, based on the dense stands of the *mokola* palm and indigenous dye trees (*Berchemia discolor* and *Euclea divinorum*) which occur naturally in the delta.

By the mid-1980s around 50% of women in the Etsha and Gumare areas were occupied with basket weaving on a regular basis (Terry, 1984; 1986). Training, marketing and resource management assistance was provided by Botswanacraft throughout the 1970s and 1980s. Today, basket weavers are supported by development aid through the Botswana Christian Council buying point in Etsha and the Ngwao Boswa group in Gumare.



#### 4. VILLAGE NATURAL RESOURCE PROFILES

Villagers in Etsha 5 and Danega are reliant on a variety of different ecosystems. These range from the semi-arid woodlands to the mosaic of habitat types found in and around the delta area. Figures 4.1 and 4.2 illustrate the range of resources found in transects between the villages of Etsha 5 and Gumare/Danega and the main collection sites for *mokola* palm. These sites were visited together with a group of women basket weavers and the soil types, dominant plant associations and harvested products noted.

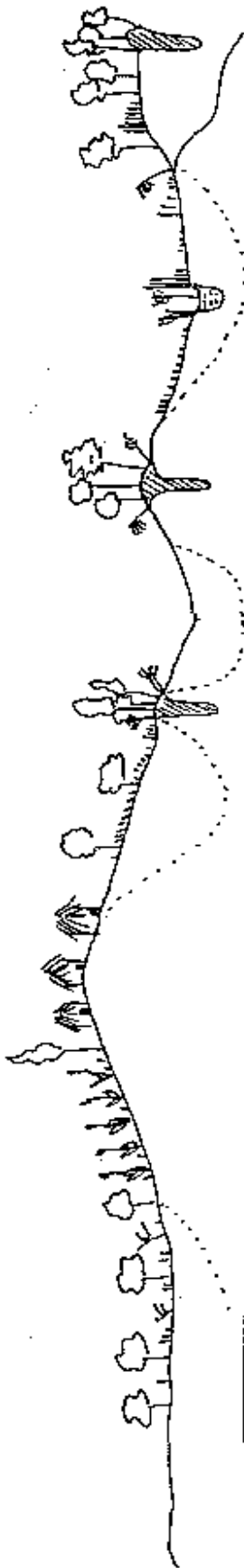
The Etsha 5 transect (Figure 4.1) shows schematically the relationship between the dry woodlands to the west and the delta wetlands to the east. The village and its dry fields are found on the edge of the two main ecosystem types in an area with shallower sands and heavier soils. Villagers are thus able to exploit both wetland and dryland resources. The dry woodlands are used for grazing, firewood collection and fruit harvesting. *Grewia bicolor* fruits in particular are found some 10km from the village and are collected in large numbers for making *kgadi* beer. The wetlands offer a diverse mosaic of habitats ranging from permanent water channels and islands to seasonally flooded grasslands and ponds. Of particular importance are the species-rich delta islands (eg. Xomoxau, Wabe, Qoroga) which contain a wide diversity of fruit trees, together with *mokola* palms and dye resource trees. Bird-dispersed plant formations on the delta islands are usually associated with termitaria. Clay-rich patches within a wider sandy savanna landscape thus form sites of species diversity and places of special importance for villagers wanting to make use of the range of wild products available.

The schematic transect for Danega village (Figure 4.2) shows a similar diversity of available habitat types. However because of its different location, there are important differences in the resource profile of Danega village. Danega is found within the delta area on a permanent island now denuded of most trees. Unlike Etsha it is a considerable distance (20-30km) from the dry woodlands where the *Grewia* fruit are found. However villagers are still able to make use of this habitat type as fruit traders travel out into the delta selling the *Grewia* to beer brewers. Gumare is the local commercial centre and is found on the edge of the floodplain area. Danega has easier access to delta islands (eg. Ogxe) and other delta resources. Delta grassland resources (especially *Andropogon huillensis* for thatch) are harvested from sites around 20km distant near the Okavango 'buffalo fence'.

Each of the main types of wild plant resources exploited by local women is characterised by different ecosystem dynamics, with different products exhibiting different degrees of seasonal availability, different options for storage and different levels of inter-annual variation in productivity. Each resource type also exhibits different patterns of long term change due to different levels of resilience to exploitation (Table 4.1). Making use of this diversity of resources is critical to villagers' livelihood strategies. The wild resources of the woodlands and the delta islands and floodplains combine with agricultural products derived from managed fields in a complementary fashion.

Villagers make good use of the spatial and temporal complexity of their environment, exploiting different areas at different seasons and in different years. When one product fails to be produced, for instance due to lack of rainfall in a particular year, there is often another option to turn to. Because the villagers of Etsha 5 and Danega can exploit both the wetlands and the drylands, they are in a good position to offset the risks of production failures in any one site. Making use of the diversity of the resource base, and combining flexible harvesting of a range of products with storage for bad times, thus acts to reduce vulnerability and ensures that livelihoods are sustained.

Figure 4.1. Village resource profile - Etsha



Land-use	Bush grazing	Dry fields	Etsha 5 village	Floodplain grazing	Seasonally flooded area	Floodplain islands/termitite mounds	Permanent channel	Delta island
Soils	Deep sands	Sandy clays	Deep sands	Deep sands	plus termitite mounds	plus termitite mounds	Silt/alluvium	Deep sands and termitaria
Vegetation	Acacia erioloba; Terminalia; Grewia spp.; Baphia	Colophospermum mopane; Ximena americana		Terminalia senecia; Cynodon dactylon	Miscanthidium sp.	Ficus sycamorus; Diospyros mespiliformis; D. lyciodes; X. americana; Berchemia discolor; Euclea divinorum; Hyphaene petersiana; Phoenix reclinata; Garcinia livingstonei; Acacia nigrescens; Croton megalobotrys	Phragmites australis; Cyperus papyrus	as floodplain island
Uses	Beer; firewood; carving	Food crops, mainly millet	Settlement	Firewood; grazing	Fish; thatching	Baskets; fruits; medicine; dye	Fish; reeds	Baskets; fruits; medicine; dye

Sources: Field observations and discussions

Figure 4.2. Village resource profile - Danega



Land-use	Bush grazing and Gumare village	Floodplain grazing	Permanent channel	Floodplain fields (motapo)	Floodplain island and termite mound (Oxe)	Danega village/cattle post	Seasonally flooded channel	Buffalo fence
Soils	Shallow sands	Sands	Water	Sands and silt; <i>termitaria</i>	Sand	Sand	Water	Sand
Vegetation	<i>Colophospermum mopane</i> ; <i>Acacia erioloba</i>	<i>Cynodon dactylon</i> ; <i>Acacia hebeclada</i>		<i>Ficus sycamorus</i> ; <i>Garcinia americana</i>	<i>Hyphaene petersiana</i> ; Phoenix <i>reclinata</i> ; <i>Berchemia discolor</i> ; <i>Euclea divinorum</i> ; <i>C. megalobotrys</i> ; <i>A. erioloba</i>		<i>Phragmites</i>	<i>Andropogon</i> sp. and other (thatch grasses)
Uses	Firewood; wet season grazing	Dry season grazing	Fish	Food crops, mainly maize	Medicines, fruits, dye, palms	Settlement	Fish, reeds	Thatch grass

Sources: Field observations and discussions

Table 4.1. Village resource dynamics (Key: \*\*\*\*\* = good storage or high interannual variation in resource productivity)

VILLAGE RESOURCES	KEY PRODUCTS	SEASONAL AVAILABILITY (months)	STORAGE OPTIONS	INTER-ANNUAL VARIATION	LONG TERM CHANGES
Dry woodland	<i>Grewia bicolor</i> fruit	3-4m	*****	**	Resilient to fruit harvesting
Delta islands/termitaria	<i>Mokola</i> palm leaves and hearts ( <i>gau</i> )	12m	***	*	Productivity reductions due to unselective and intensive harvesting
	Dye resources: <i>Berchemia</i> and <i>Euclea</i>	12m	*****	*	Highly susceptible to overuse. Conventional harvesting destructive. Disappearing from the area
	Wild fruits (eg. <i>Garcinia</i> , <i>Ximenia</i> , <i>Ficus</i> )	2-3m	*	***	Resilient, unless competing use for tree (eg. fuelwood, fence posts)
Delta channels	Reeds ( <i>Phragmites</i> )	2m	****	*****	Dependent on flood & previous years' rainfall
	Fish	12m	*	**	Resilient at low levels of harvesting
Seasonal ponds	Fish	3m	*	****	
Delta grasslands	Thatch grass (eg. <i>Andropogon huillensis</i> )	2m	**	*****	Dependent on rainfall & competition with cattle/game
Dryland fields	Small grains (millets & sorghum)	1m	****	*****	Dependent on rainfall
Floodplain fields	Maize, melons, pumpkins etc.	2m	**	****	Dependent on rainfall and flood regimes

Not all resources are resilient to heavy use. The reduction in diversity through over-exploitation of particular resources is always a threat to the livelihoods of people living in the area. With the boom in the local basket making industry heavy demand for bark and root dyes has had a major impact on *Berchemia discolor* and *Euclea divinorum*. Over the past decade the dye resource has practically disappeared locally through over-harvesting in the more accessible sites, such as Wabe or Qoroga islands (Table 4.2).

**Table 4.2.** Impact of basketry on the dye resource, Wabe island near Etsha

DATES	% of <i>Berchemia</i> ringbarked	% of <i>Euclea</i> alive	% of baskets with <i>Indigofera</i> or sorghum dyes
1970	0%	100%	Very low (<2%)
1982	27% (60% with more than 75% of lateral roots removed)	Few large trees left, most with root damage	10%
1992	81% (and most trees dead due to root removal)	Large and medium sized trees gone; few small seedlings remain	50%

Source: Cunningham, 1992; Terry, 1986 and field notes.

The long term availability of other resources is also in question. For instance women are having to travel further afield to obtain sufficient *mokola* palm leaves for basket making. The productivity of the palm resource in closer sites such as Wabe island appears to have been reduced through intensive and non-selective harvesting and the reduction of the palm resource to a short coppice (Table 4.3).

**Table 4.3.** The transformation of the palm resource, Wabe island, near Etsha

DATE	PALM HEIGHT	% USE	COMMENTS
1970	12-15m; savanna with short coppice	Probably < 1%	Leaf use for local basketry only; palm fruits harvested locally
1982	Most palms < 0.5m	46%	Tall palms felled for fruits, short coppice maintained through palm heart ( <i>gau</i> ) removal by Mbukushu refugees
1992	Most palms < 0.5m	Unknown, but high level of cattle browse and leaf harvest	High level of palm heart removal during drought periods

Source: Cunningham, 1992; Cunningham and Milton, 1987; field notes

Sustainable harvesting rates are estimated at 50% of new leaf growth (Milton and Cunningham, 1982). In accessible sites such as Wabe this has been long exceeded. The intensity of current use of the *mokola* palm resource is almost certainly unsustainable. The balancing of competing uses within each village resource niche is determined by the demand for the products and the effectiveness of the local controls over resource exploitation (see below). In the case of *Berchemia*, the demand for dye far exceeds any incentives to retain the trees for fruit. However as the technique for obtaining dye involves stripping bark, and the tree is a relatively slow-growing species, intensive use has resulted in the effective elimination of the tree from a number of sites.

Similar trade-offs exist with other resources found in the area. Palms, for instance, are used both as a source of leaves for basketry and as a source of food (*gau*). At a low level of harvest, palm heart removal can stimulate palm coppice production, increasing the density of short palm leaves favoured for basketry. However high intensity digging plus cattle browsing of leaves competes with basketry leaf production. Other competing resource uses noted include: grass for thatch or graze; trees for fruiting or heavy browsing; trees (eg. *Colophospermum mopane*) as sites for mopane worm harvesting or as good sources of firewood, craftwork and building material.

### Palm and dye resource sites

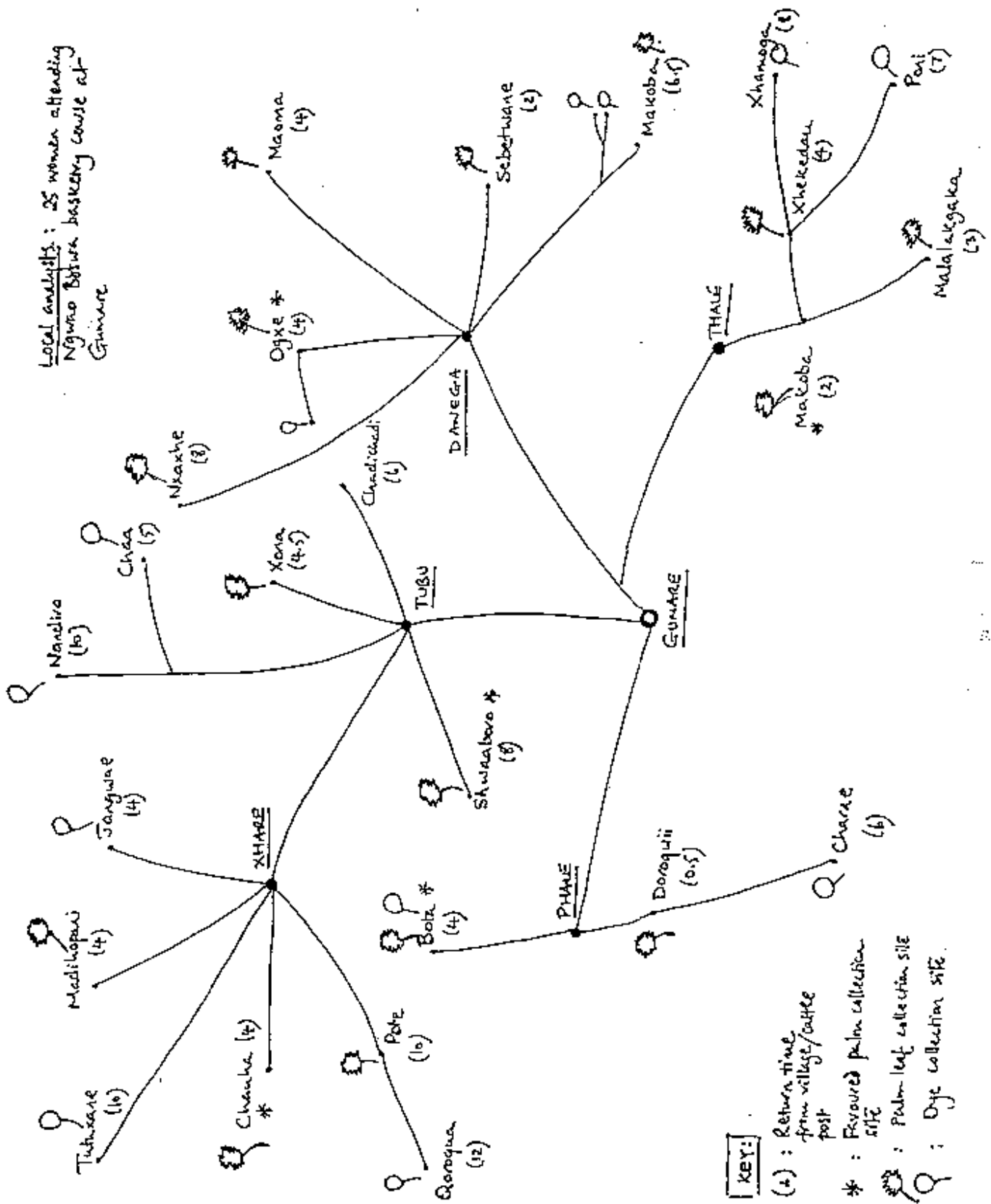
Women from both Etsha and Danega identified a number of different collection sites for palm leaves and dye during a ground mapping exercise (Table 4.3 and Figure 4.3). Sites were selected according to a variety of criteria. These were largely the same as those noted by earlier surveys in the area (Terry, 1984; 1986). The most commonly mentioned criteria for site choice were:

1. Short walking distance;
2. Availability of resources; density of trees;
3. Quality of product (soft leaves, strong, dark dye);
4. Dangers of travel (lions, crocodiles, snakes);
5. Inconvenience of travel (water, holes).

Table 4.3. Collection sites for palm/dye resources

ETSHA 5	DANEGA
Wabe	Ogxe
Kachika	Maoma
Kayevi	Nxaxhe
Mboma	Sebetwane
Shanambi	Makoba
Kaunduchi	
Xhara	
Xomoxau	
Qoroga	

Figure 4.3. Map of palm and dye collection sites around Gumare



The way these were traded off by a group of three women from Danega is illustrated in the matrix ranking shown in Table 4.4. The first row shows the estimated number of hours for a return trip to each site. The other three rows show the criteria chosen and the ranked order of the sites.

**Table 4.4.** Matrix ranking of collection sites from Danega

	Oxge	Nxaxhe	Sebet-wane	Makoba	Maomo
Return trip time (hrs)	4	8	2	6.5	4
Short time to get there	2	4	1	3	2
Soft leaves	1	3	5	4	2
Plentiful, grow fast, near water	1	3	4	4	2

*Source: women's basket making group, Ngwao Boswa*



## 5. RESOURCE MANAGEMENT AND CONTROL

The favoured palm leaf collection sites (Wabe from Etsha 5 and Ogxe from Danega) were visited together with women basket weavers in order to observe the resource situation and carry out palm leaf collection time trials for cross-checking with village interviews. The field visits also provided a good occasion for informal discussion on a wide variety of topics.

The Ogxe area near Danega (see Figure 4.3) was visited with five basketmakers, all women, and J. Mibidhi (Forestry, Gumare). After discussion on the limited resource (for four harvesters with knives and one with a hoe) it was agreed that two women would do a time trial harvesting with knives (selectively) and one with a hoe (non-selective cutting). Hoe cutting was slower than knife cutting (15 leaves in 48 minutes as against 22 and 29 with the knife). All women objected to hoe cutting due to the destructive effect on emerging leaves and greater chance of being cut by the palm when swinging the hoe. The women argued that cutting could be more controlled with a knife so that leaf quality was assured and the chances of being cut reduced. This is reinforced by local rules set by the village headmen and enforced by the women themselves. This involves a ban on hoe/axe cutting with women refusing to purchase any palm leaves collected in such a way. No sign of previous non-selective hoe cutting was seen at Ogxe and it appears that the area continues to be harvested in a selective manner using knives.

The Wabe and Qoroga areas were also visited together with two women basket weavers. Here a quite different story emerged. Palm leaf collection time trials were carried out in both areas. In the resource-poor site at Wabe a headload was collected in 90 minutes using an axe, while at the relatively resource rich site of Qoroga half a headload was collected by two people in 30 minutes using knives (equivalent to a single person taking 2 hours to complete one headload). The women accompanying the team argued that the axe was preferred because it takes too long to collect the leaves using a knife. In addition, using an axe avoids the problems of cut hands and knuckles when cutting with a knife. For this reason it appears that hoe or axe cutting is prevalent in the Wabe area, resulting in short, stunted palm plants.

Currently the Wabe and Qoroga palm resources are effectively open access. They are many hours' walk from Etsha and there are only a handful of island residents (temporary guardians of a cattle post). Local resource control is therefore effectively absent. But the Wabe and Qoroga islands used to be more populated than they are today. During the 1950s and 1960s farming populations were permanently resident on the islands. Informants recall that local headmen used to set rules about resource use on the islands and were able to exclude others if they so wanted. Whether this involved any active management of the palm resource it is difficult to judge, but whatever management did exist in the past has disappeared today.

The collection and resource management strategies appear to be quite different in the two sites. In Ogxe, a selective harvesting regime is followed, with local rules and sanctions apparently being effective. By contrast, in Wabe a non-selective harvesting is being carried out and an open access situation prevails. So why the differences? Some tentative suggestions can be proposed:

- At Wabe, the smaller size and low structure (40-70cm height) of the palms means that swinging an axe or hoe is unlikely to result in the cutting of the arms by palm thorns as clearly happens in the taller structured palm association found in Ogxe (70-100cm height).
- Less resource competition for various palm products (leaves/*gau*) in Ogxe which is used by the smaller population of Bayei people living in Danega with demand focused only on leaves. By contrast the Wabe resource is used by a large number of people from Etsha 5 and 6 (both

Hambukushu and Bayei) with demand for both leaves and *gau*.

- Greater resource control and management (regulations and sanctions) among the Danega people where a relatively small and discrete population is able to manage a relatively nearby resource. By contrast the Wabe resource is effectively open access with a large, heterogenous population making use of it. With few and temporary island residents, local resource control has ceased and more destructive extraction practices can be used without fear of any sanction.
- The Bayei of Danega are generally better basket makers than Etsha weavers. They are *therefore more particular about the quality of the leaf they harvest.*
- The Hambukushu of the Etsha area are particularly reliant on basket making as they have few other sources of income. They are also reliant on a smaller selection of sites. Thus the pressure for non-selective harvesting is high.

## 6. VILLAGE LIVELIHOOD PROFILES

### Life on the edge of the floodplain: Etsha 5

#### *Seasonality of activities*

The seasonal pattern of different activities was investigated with two groups of seven women in Etsha 5. Two seasonal calendars were produced and one woman from each group reported back the findings to the other group. The range of activities covered differed slightly between the two groups, reflecting the activities carried out by the group members. Most comments during the feedback were centred on the structure of the calendars. One group divided the year among the four seasons recognised by the Hambukushu, while the other group used a twelve month calendar. One composite calendar is shown in Figure 6.1 which combines information from both groups.

The year is divided into four seasons. *Ditenya* refers to the hot season prior to the rains (approx August to October/November). This is a time for basket making, grass and reed collection, hut building and beer brewing. The rainy season is known as *ndombo*. This is the time of ploughing, planting and weeding in the fields. Other non-farm activities subside during this time, although beer brewing and basket making still continue. The harvest period that follows is known as *kwintha*. During the early harvest period green crops are enjoyed. This is also the time when *Quelea* birds may attack the maturing grain crops and women may have to spend considerable time scaring birds in the fields. The cold season follows (*kufo*; May-July) and this is a busy time when women must bring the crops in from the fields and start the laborious process of threshing sorghum and pearl millet (*tumbi* and *mahango*). If there is sufficient surplus this is the time for grain crop sales.

The seasonal calendars constructed by the Etsha 5 women show how a diverse range of activities interact to provide local livelihoods. Clearly all activities are not carried out by everyone, but most women noted that they were engaged in several activities. The women noted the major importance of basket making as a year round activity, beer making (especially that brewed from *Grewia* fruit) and agricultural production in good years. Many noted that in recent years they had been relying on publicly funded drought relief employment which carried on throughout 1992-93. This decreased the amount of time invested in other activities. The flow of cash in the local economy has become very bound up with the drought relief payments. Cash for 'fat cakes', beer or other products comes from a limited range of sources; the most important of which is drought relief. Other sources of cash for women include basket sales, reed/grass sales and remittance income, but this money tends to be spent immediately on food/grocery items or clothes for the family.

#### *Social map: village livelihood composition*

A social map of Etsha 5 was constructed with two women key informants (Figure 6.2). This was later cross-checked by a further group of women, with corrections made and missing information filled in. The map shows the clustered settlement pattern within Etsha. Each cluster, named usually by the eldest male household head, may contain between two and fourteen separate household units. A total of 88 households were marked on the map. A basket weaver is resident in 41% of these households, although there are only 20% of households with regular basket weavers. 28% of households do some beer brewing, nearly all of these (84%) on a regular basis. Currently only three households (3.4%) cultivate palms.

Figure 6.1. Seasonal income earning activities in Etsha 5

ACTIVITY	DITENYA (Hot season)	NDOMBO (RAINS)	KVINTHA (Harvest)	KUFO (Cold season)
BASKET MAKING /20	•••••	•••••	•••••	••
PAUM COLLECTION	••••	••••	••••	••••
HUT & REED FENCE BUILDING	••••	••••	••••	•
REED /THATCH COLLECTION	••••	••••	••••	••
MOISONSILLA COLLECTION	••••	••••	••••	•
KGADI BEER	••••	••	•	••••
SUGHUK BEER	••••	••••	•	••
'POWER' BEER	••••	••••	••••	••
WORK IN FIELDS	••	••••	•	••••
GRAIN SALES	••••	••	••••	••••
MELONS, GREEN MAIZE SALES	•	••••	••••	••
FAT- CAGE SALES		•	•	•
DROUGHT RELIEF	•	(*)	•	•



The social map illustrated the importance of basket making as an income earning activity in Etsha. But it also showed that this is not the sole activity, nor do people make baskets all the time. The mapping exercise and the discussions it prompted with the women involved, suggested the next steps, which was more focused interviews with different groups of people. These included:

- Regular basket makers
- Irregular basket makers
- Beer makers
- Those who do neither

A series of case studies were carried out through detailed interviewing. These are reported below.

### *Basket making*

There are various phases of basket making, from collection or purchase of inputs to weaving. Box 6.1 provides two case studies where women collect and purchase inputs. The overall collection times to Wabe, based on 8 interviews, are shown in Table 7.2.

#### **Box 6.1. Collection or purchase of inputs**

*Collection.* Moreputa and Tumoneni collect palm leaves from Wabe. Most collection takes place during the hot season and the rains. This is the period when they need more money from baskets as it is the "time of hunger". Dye must be collected on separate trips from east of Etsha 2 and Etsha 9. All trips are long and arduous, but when they go together with other women friends, the trip is not so bad.

*Purchase.* Tunayande Kukura purchases all her basket making inputs. She is unable to collect the products because her feet hurt. She buys the following products.

Undyed white palm (small bundles) @ P1

Motsentsila (*Berchemia discolor*) dyed palm: small bundles @ 50t and large bundles @ P2.5

Motsentsila dye (pounded) @ P2 per 150ml cup

Mukokothi from Tsodilo and Shakawe @ 50t/dyed bundle

Mohetsola (*Indigofer tinctorum*) collected by her sister

Lethajwa (*Diospyros lyciodes*) @ 50t/dyed bundle.

Muhonyi (*Eragrostis* sp.) grass bundles @ P1/bundle

Vine (*Cocculus hirsutus*) collected around Etsha

### *Palm cultivation*

Many people have tried cultivating palms, because of the difficulties faced by the long treks to collect *mokola* (see Table 6.2). However few have been successful (see Box 6.2).

### Box 6.2. Palm cultivation

Eva has tried to grow palms, but they all failed to emerge after planting. The best place to grow palms is near the home. This means that they can be collected and processed easily; the lands areas are too far for this. Also at home you can water the palm when it is young and protect it from goats or cattle with a small circle of *Acacia* thorn.

Kayuo provided a similar story, pointing to the problem of children who play around the home and destroy any growing palm tree. Naledi however thinks she should try growing the palms in the lands area. Every time she has tried growing them near the home they have failed. She thinks that the soil is too sandy and it does not hold enough water.

### Beer brewing

Beer brewing, usually of *kgadi* beer made from *Grewia bicolor* fruit, is an important contribution to women's livelihoods in Etsha. The relatively low labour inputs (especially if the fruit is purchased) means that brewing and sale can be mixed with other activities around the home.

### Box 6.3. Beer brewing

Thehembe Dierenge began selling beer when the drought relief programme started. Money from drought relief allowed her to purchase sugar for brewing. She now brews every day. She uses a 50 litre container to which she adds 14 cups of *Grewia bicolor* fruit (worth P7), 2.5kg of sugar (P4.85) and some millet residue. Small cups of the beer (150ml) sell at 10t each. Each new batch of beer requires a top-up of 9 cups of fruit (P4.50) and 2.5kg of sugar.

Tumonene also brews *kgadi*. She collects the fruits from near Etsha 1, around 15km from her home. It takes a whole day to collect and return home. She makes beer in a 25litre container five times per week. To each batch of beer she adds 2.5kg of sugar and some fruit. The fruit lasts for several batches. She sells the beer for 10t/cup and usually sells the whole container in a day. She reckons beer making is good money, but basket making can potentially yield more.

### Grass and reeds

Grass is collected from islands in the delta areas while reeds are found along the permanent channels of the delta. Both are collected by women for sale in Etsha. The preferred grass in Etsha is *moxu* and it is widely used for thatching. The *Phragmites* reed is used for wall-building.

### Wild fruits

A wide range of wild fruits are collected by people living in Etsha, particularly by children and women. They form important complements to the basic diet. Most are collected opportunistically and are eaten as snacks; a few are collected in larger quantities and are sold locally. Discussions with a dozen teenage boys resident at the Etsha junior secondary school revealed a list of 13 fruits collected regularly in the Etsha area. Eight of these were highlighted as "important" fruits. A matrix ranking (where 1 represents the favoured item) of these fruits followed, according to a range of criteria suggested by the boys (Table 6.2).

Table 6.2. Matrix ranking of indigenous fruits

LOCAL NAME	Nunda	Ngone	Mukudik- udi	Muxing- wa	Wushika	Mundu	Mungovo	Tukukuru
LATIN NAME	<i>Diospyros mespil- iformis</i>	<i>Hyphae nepeter- siana</i>	<i>Syzygium cordatum</i>	<i>Phoenix reclinata</i>	<i>Garcinia living- stonei</i>	<i>Grewia flava</i>	<i>Grewia sp.</i>	<i>Ximenia americana</i>
OVERALL RANK	1	2	3	4	5	6	7	8
Available locally	1	8	5	5	4	3	7	4
Short distance	3	7	3	3	3	1	8	2
Storage good	3	2		4			1	
Important in drought	2	1						
Sales high	1	3					1	
Soft flesh	2		3	1		4		
Sweet taste	3			1		2		
Keeps teeth white	2	6	8	2	6	2	1	2
Good for small kids	3					1		2
Beer brew					(2)		1	
SEASON	July to October	All year	Feb	Feb	Nov to Dec	March to April	February to July	All year

Source: Analysts included Matangara, Kayunde, Charles, Moyo.

All the fruits noted, with the exception of *Mungova* (*Grewia* sp.) are found in the wetlands area of the delta, particularly on the islands and sites associated with termite mounds. Most fruits are collected by small boys when herding cattle. Women collect *Nunda* and *Mungova* in particular and sometimes in large quantities. *Mungova* is particularly sought after for *kgadi* beer. A few of the fruits are sold. These include *Nunda* (25t-75t per cup), *Ngone* (10t each) and *Mungovo* (25t-50t per cup).

#### Income ranking

A total of ten detailed case study interviews were carried out in Etsha 5. At the end of each interview participants (in all cases women) were asked to rank the different income earning activities that they had mentioned. The results are shown in Table 6.3.



**Table 6.3. Income ranking, Etsha interviews**

Participant:	A	B	C	D	E	F	G	H	I	J
Baskets	1	1		1	1		1	1	1	2
Drought relief		2	1	4	3	1	3			
Kgadi	2		2	2	2	2		3	3	3
Reeds						3		4	2	
Farming	3			3			2	2		1

Almost all women who were making baskets ranked basket weaving as a very important source of income for them. For those who do not weave or who are unable to due to disability (particularly poor eyesight) rely on drought relief as their primary income source. Kgadi brewing is the next most important supplementary source of income. Reed collection was not highly rated, and grass collection for sale was not mentioned by anyone. Farming received a low rank by most people. Although most people received some yield this year due to the better rains, most regarded farming as a risky activity with uncertain returns. The experiences of recent droughts ensured that farming (particularly crop sales) was ranked low.

### **Life on the floodplain - Danega**

#### *Seasonality of livelihood activities*

One seasonal calendar was developed with a group of 16 women in Danega (Figure 6. 3). Four seasons dividing the year were identified along with a range of livelihood activities. Beans were used as counters to mark the relative importance of different activities in different seasons. When the calendar was completed the women were asked to rank the range of activities they had identified in order of importance.

Basket making is a year round activity with peaks in the hot season (*selimo*) and the harvest/cold season (*marega*). Palms are collected throughout the year in order to support continuous basket production. The agricultural system in Danega is centred on flood-retreat (*molapo*) agriculture. In contrast to the dryland agriculture of Etsha, wetland agriculture has a longer season, a greater diversity of crops and greater labour input requirements for cultivation. Agricultural activities (from land and field preparation to actual farming) are therefore continuous. After some debate, the women decided that the amount of work was "lots" and all year. Other activities are more seasonal and complement basket making and agriculture. These include thatch and reed collection, as well as building. These activities are concentrated in the cold (*marega*) and early hot season (*dekakologo*). As in Etsha, drought relief jobs have become an important part of the village economy. All women involved in the calendar exercise had been involved in drought relief work for pay, although not on a continuous basis. Beer was not regarded as an important income earning activity among the women involved with the calendar. Indeed, only one individual among the 16 was regularly involved in beer making. However, within the wider population of the village, beer making was found to be significant (see below).

### *Social map: village livelihood composition*

A social map of Danega was compiled by a group of village analysts, including both men and women (Figure 6.4). Analysis of the map shows that, as in Etsha, basket making and beer brewing are both important activities. 37% of the households are involved in basket making, 19% are involved in brewing beer, 18% in thatch grass sales and 10% in reed sales. Many are involved in a combination of activities.

#### *Basket making*

There are many expert basket makers in Danega. They primarily rely on sales to Ngwao Boswa in Gumare who come once in every couple of months. Basket making provides a steady stream of income through the year, with peaks during the dry season when agricultural labour demands are not so high. Nearly all basket makers in Danega collect their own palm leaves and most collect dyes also. A few rely on commercial dye selling by Mr Kalelelo who sells *Berchemia* dye as unprocessed bark or as a powder by the cup full.

#### *Kgadi beer making*

Beer making is an important income supplement for many women in the village (see Box 6.4). Due to the distance of the dryland fruit sources, the availability of *Grewia* fruit is lower than in Etsha, resulting in a lower level of brewing activity in Danega.

#### **Box 6.4. Beer making**

Kirumpe has brewed beer for a number of years. It is her main income earning activity and complements her agricultural production activities. She makes beer nearly every day. She buys *Grewia* fruit from Hambukushu or Bushmen who come to Danega. A 1 litre cup of fruit costs 1 Pula. To this she adds 1 kg of sugar (P2.65) and a 20 litre bucket of water.

She sells the beer for 40t - 70t depending on the cup size. With each additional bucket of water she must add more sugar, but only after 7 buckets does she have to add 40t worth of more fruit. Most of her customers are those who have been paid for drought relief work (both men and women).

#### *Grass collection*

Grass is collected at various sites some distance from Danega. Most good sites are close to the buffalo fence some 25 km away. A variety of grasses are collected. These most preferred is *mokamakama* (*Andropogon huillensis*). The next preferred species are *moxu* and *selalapaya*. Grass is collected during the dry season, with July being the peak month.

The availability of grass and so the rate of harvesting varies considerably between years. Women estimated that they were able to collect 5 bundles per day this year. This might rise to 10 bundles per day in a good rainfall year, but would drop to only 2 bundles per day when the rainfall is lower. In droughts no grass at all can be reaped.

Figure 6.3. Seasonality of activities in Danega

ACTIVITY	SELIMO (Hot season)	LETAJOLA (Raining season)	MALEGA (harvest, cold season)	DEKAKOLOLO (Begins to be hot)	IMPORTANCE RANKING
BASKET MAKING	••••	••	••••	••••	2
PALM COLLECTION	••	••	••	••	1
AGRICULTURE	Prepare fields, ploughing	weeding, green harvest	harvest, thresh, pound, storage, sales	prepare tools, fencing	1
CROP SALES	Maize, it surplus	Green melons, water melon, sweet reed, morokko	Maize, beans, pumpkins	Surplus maize	1
DROUGHT JOBS	•		•	•	3
BUILDING	Temporary shelters in fields		••• village building & thatching	•	4
BEER	•		•	•	5
PALM FRUIT COLLECTION					6



### Box 6.5. Grass collection

Lesang goes twice a year to Xiriga to collect grass. If she travels on a donkey it takes around 3 hours to get there. If she goes on foot it takes double the time. She usually goes with others, either friends or other relatives. She harvests around 20 bundles of grass during a day and waits for a relative to come with a cattle-drawn sledge to pull the grass back to Danega. This costs her nothing as it is done as a favour. She sells the grass to people in Danega or Nokaneng for P2 per bundle.

Rumbe also collects and sells grass, both *Muxo* and *Mukamakama*, at Matabaimeo and Nxame. It is a long distance so she goes and sleeps there. She usually travels with a group of women friends once a year. She cuts grass over a period of about two weeks. This year she filled four sledges with 16 bundles of grass each. She hired four sledges to transport the grass back to Danega and paid a total of P100. She intends to sell some of the grass locally after she has completed her own building works. The last time she collected grass in any quantity was in 1990 following the good floods. During that year she sold 41 bundles, with the remainder being kept for her own use. She managed to get the money all at one time and it was more than she managed to get from baskets that year.

Other women can hire a pick-up to collect their grass. This costs between P40 and P50 per trip. An alternative payment mechanism is that the vehicle owner gets one full load (equivalent to approximately 40 bundles) free for transporting a full load for the hirer.

### Reed collection

Good reed harvests are intermittent, being dependent on good floods within the wetlands. Two years were remembered by the women of Danega. These were following the high floods of 1979 and 1989. In 1990 one informant collected 40 bundles and sold 10 at 2P/bundle. Another informant collected 70 bundles and sold 50. However since that time there has not been enough water for reeds due to persistent drought. Those that have been collected have been for home use only. Instead, they have had to rely on other income sources, in particular baskets.

### Income ranking

During most individual interviews a ranking of income/livelihood sources were carried out. The results are shown in Table 6.5.

Table 6.5. Income ranking in Danega village for 1993

ACTIVITY	Kirumpe	Kalelo	Lesang	Kazembe	xxx	Rumbe
Basket making			3	1	1	2
Reed selling				4	4	
Thatch selling			4		3	3
Agriculture	1	2	1	2	2	1
Kgadi brewing	2			3		
Drought relief			2			4
Remittance		1				

The income rankings showed how various off-farm activities complement agricultural production. Basket making in particular was regarded as especially important (see Box 6.6).

**Box 6.6. Baskets and livelihoods: some quotes:**

Life depends on baskets. Grass only comes once a year with rainfall and reeds only following a flood. But baskets can be sold monthly.

Ones who know how to weave can always make baskets. Those who don't weave only have skill for collecting reeds.

When the ranking pattern of this year following a good rainy season was contrasted with last year when drought struck the region badly, the importance of baskets as an income source was further highlighted. In many cases baskets and beer brewing provided the only source of livelihood when agriculture failed. This was complemented by drought relief work which continued for many people until recently.

*Palm cultivation*

Local people's experiments with palm cultivation have generally not been successful (see Box 6.7; Figure 6.4). Lack of protection combined with poor soils (dry sands with high infiltration rates) and lack of effective rainfall over long periods during the past decade has made most cultivation attempts unsuccessful. Despite this, people are prepared to persist with their attempts and in Etsha are signing up for the proposed cultivation plots with great enthusiasm.

**Box 6.7. The problems of palm cultivation**

Kalelo from Danega village first planted mokola palm in the wet year of 1978. These seeds germinated well and continued to grow. Encouraged by this success, she has continued to plant seeds since then. She is particularly keen to have palms near to her home because she is old and crippled and so unable to walk to the collection sites. However her cultivation attempts have not met with much success. The primary problem has been drought which reduces germination and survival. In addition, white ants attack the growing seedlings along with "worms" which feed on the roots and inside the plant. Goats also feed on the palms at all stages, making the palms grow very slowly. The palms planted in 1978 are still not of a harvestable size. This year she decided to plant the mokola seeds inside the grass and reed fence of her compound. Two of the three seeds planted germinated due to the good rains, but she is unsure how long they will last because during the next rainy season the protective fence will be moved to the lands area where she stays during the agricultural season. She fears that they will suffer the same fate as previous attempts. Kalelo recognises that protection from goats (and children) would solve much of the problem, but says that she is not fit enough to cut *Acacia* thorn to protect growing plants. She says that her sons are working in town and she is hoping that they might send her money for fencing or at least employing someone to help. But until that happens she must continue planting seedlings as before.

## 7. THE ECONOMICS OF BASKET MAKING

### History and background

The livelihood profiles of Etsha and Danega reported in the previous section support earlier evidence of the importance of basket weaving to rural households and especially to women.

Today's economic activity builds on traditional craft skills brought to the area when the current inhabitants settled in the area (see section 3). Baskets were traditionally used for storage and transport of grain and other food stuffs. Little traditional ornamentation is observed, other than variation in the weave to create textured patterns. In the past there was limited use of coloured material based on vegetable dyes.

With the expansion of the basketry market since the early 1970s, this has all changed. Producers have been encouraged to develop a wide range of designs, making use of an increasing amount of local dye materials. Nationally, Botswanacraft basket sales (export and local) have increased from under P 75 000 per annum to a peak of P 250 000 in 1983. This decreased in the late 1980s, but was still maintained at around P100 000 per annum (Cunningham, 1992). This is reflected in the participation of women in basket making activities. Prior to 1970, people only made baskets for home use. This practice was increasingly dying out with the greater availability of containers made from synthetic materials. But with the increase in the commercial basket market and the promotion of the industry by Botswanacraft and more recently by local development agencies, this has changed. By 1984 around 50% of the female population in the study area were involved in basket making (Terry, 1986). Today, it is similarly high.

Local market outlets are dominated by two channels. In Gumare, and surrounding areas, the Ngwao Boswa group purchases baskets regularly, both at their shop in Gumare and on buying trips to outlying areas. Prices offered to producers are high, with special incentives built in for high quality baskets. A large portion of the transportation and marketing costs incurred by Ngwao Boswa are being subsidised through development aid grants to the group. In Etsha the major market outlet is the Botswana Christian Council shop. They also provide a graded sales price according to size and quality. The prices are lower than in Gumare, reflecting a different subsidy and operating margin strategy. Additional sales can also be made to passing tourists and some tour operators and business people operating from Maun who make occasional purchases. The opportunities for these more opportunistic sales may increase with the construction of the new tarred road.

Nearly all the baskets purchased by Botswana Christian Council and Ngwao Boswa are sold on to Botswanacraft in Gaborone. Botswanacraft are the major marketer of craft products in the country. In the past they operated a decentralised buying network, but now increasingly rely on other operators selling on baskets to them. The prices they offer are set annually. Local prices in producing areas reflect different subsidy levels and operating margins of local marketing outlets (Ngwao Boswa and Botswana Christian Council). The main export markets are in Europe and North America and include large retail department stores, as well as speciality craft shops. A few top quality baskets remain in Botswana, where they fetch extremely high prices at an annual craft exhibition.

Major buyers, such as Botswanacraft, foresee some difficulties in supply. Buyers in export markets are especially concerned about maintaining consistency of quality and quantity. But this is not easy as basket making remains a secondary, opportunistic activity for many weavers. Since 1976 the buyers have encouraged weavers to improve the quality of their baskets, by means of discriminatory pricing and through regular training courses.

There are currently no reports of demand-side constraints (eg. volatile fashions). However, in the past consumer preference changes in Europe and North America have affected demand levels. There is some evidence of competition from basket weavers in neighbouring countries, such as Zambia and Zimbabwe. In these countries wages are lower and the demand for exchangeable currency (such as Pula) is high. Basket producers are therefore keen competitors with Botswana weavers. However, since the designs used are different and the quality level is reportedly not as good, the degree to which such producers will become serious competitors in the future is unclear.

### Collection

The first stage in the production of baskets is the collection of raw material - *mokola* palm leaf, dye material and, in some cases, grass or vine for making the cores of coils. As noted above, most weavers collect all of the palm leaf they need and many collect dye and other materials at the same time.<sup>3</sup> Weavers are particularly choosy about the quality of the palm leaf, which must be young, supple and tightly folded, with no sharp spines along the edges.<sup>4</sup>

Labour inputs to collect raw materials are highly variable, depending on the proximity and accessibility of desired plant species. Most raw materials are obtained in the flood plain and at some considerable distance from permanent settlements, so a lot of time is used up just getting to and from the main collection sites. Moreover, the time required to gather raw materials varies depending on their relative abundance at a given location and the methods used to collect them (eg. whether a knife or axe is used to cut palm leaf). Data on travel and collection times for different sites were obtained through direct observation, by accompanying women on collection outings as well as recall estimates (Table 7.1).

Table 7.1. Collection times

Labour time	Etsha 5		Danega	
	Wabe	Xomoxau	Ogxe	Nxaxhe
Travel (return hrs)	9.4	10.5	4	8
Collection (hrs)	1.5	1.5	1	3
<b>TOTAL</b>	<b>10.9</b>	<b>12</b>	<b>5</b>	<b>11</b>

There was considerable uncertainty about the amount of material normally collected on one trip (headload), and in particular the number of N5 baskets that may be produced from this amount. An estimate of the number of N5 baskets that may be produced from one headload was obtained

<sup>3</sup>A few weavers, especially the old or infirm, purchase palm leaf and a number of women purchase dye, which is increasingly scarce around settlements. However, reliable information on the prices of dye raw material or intermediate inputs was not available. It was also impossible to determine the quantity of intermediate inputs obtained from a given amount of dye raw material, or the number of N5 baskets that may be produced from the same amount.

<sup>4</sup>Some weavers complain that some of the palm leaf obtained from experimental plantation near Etsha 8 is too stiff and spiny for use in making baskets. This may reflect differences in soil fertility or other factors affecting cultivated and wild palm.



by repeated interviews, using samples of raw and processed palm leaf and a N5 basket as an aid to memory.

Initially, the team accompanied a weaver from Etsha 5 (Mopendi) on a trip to collect *mokola* palm at Wabe. Mopendi was first asked, on the way back from Wabe, to estimate the number of N5 baskets that she could produce from the one headload of raw palm leaf that she herself had collected. She was then asked to process the leaf as usual (involving splitting, boiling and drying the individual leaf segments). This process yielded eight bundles of white palm leaf, at which point Mopendi was again asked to estimate how many N5 baskets she could produce from them (she estimated three baskets). The eight bundles and sample basket were subsequently presented to eight other weavers in Etsha 5, who were separately asked to estimate:

- Travel time to collect palm leaf from the Wabe site;
- Number of bundles obtained from one headload (trip);
- Number of bundles required to make one N5 basket;
- Number of trips made over the last 12 months.

Detailed results of these interviews are presented in Table 7.2, which also shows the implied number of N5 baskets per headload and the implied number of baskets produced per year from the collected palm. Each collector does not necessarily make use of all the palm collected herself. The average number of baskets produced is around 20 per year (Terry, 1984). However the distribution of basket making output among women is very skewed. Some women produce baskets regularly throughout the year others make baskets much more opportunistically, with a lower annual output. Most women make less than ten baskets per year (Terry, 1986)

Table 7.2. Interview results

Interview	Travel time Etsha 5 to Wabe (hrs)	Bundles per trip	Bundles per N5	Total trips per year	N5 baskets per trip	Baskets per year *
A	8	10	2	10	5	50
B	12	10	2	17	5	85
C	11	8	2	12	4	48
D	10	12	3	12	4	48
E	11	15	3	15	5	75
F	11	6	3	15	2	30
G	13	10	3	20	3.3	67
H	11	10	3	12	3.3	40
Average	10.9	10.1	2.6	14.1	4	55.3
Min.	8	6	2	10	2	30
Max.	13	15	3	20	5	85

\* Numbers of baskets potentially produced from collected palm per annum.

Finally, the tools required for collection are indicated in Table 7.3. The average cost of tools per headload (trip) is calculated as a function of the purchase price, useful lifetime, share of use in basket making (versus other domestic and agricultural uses) and the mean number of trips per year (from Table 7.2).

**Table 7.3. Tools for collecting raw materials**

Tools	Cost in 1993 (Pula)	Useful life (years)	Share of use for baskets (%)	Charge per trip* (Pula)
Axe	20	2	25%	0.18
Hoe	20	1	5%	0.07
Knife	5	1	50%	0.18
Sickle	4	5	50%	0.03
<b>TOTAL</b>				<b>0.45</b>

\* Assumes average 14.1 trips per year, from Table 7.2.

### *Processing*

The second stage in basket production involves processing the raw materials. This includes preparing the raw palm leaf, as described above, as well as the preparation and application of various natural dyes used to colour the leaf.<sup>5</sup> Estimates of the time taken to carry out these operations and the tools required were provided by Beth Terry.

Labour inputs for processing vary depending on whether the palm leaf is dyed or left white. All leaf material must be split to begin with and this requires approximately 0.5 hours per headload. For white leaf one additional hour is required to boil one headload. Dyed leaf, assuming that the raw dye material has already been obtained, requires 7 hours per headload to pound the dye into powder, remove the thick edge of each palm leaf segment and then boil the powder and leaf together. This assumes that something else can be done while the pot is boiling.

Dye powder may be used several times. Although its potency and the intensity of colour imparted to the leaf falls with each batch, the different shades can be used to enhance the design. Total labour inputs for processing the raw materials that go into one N5 basket thus depend on the relative proportion of dyed leaf used in an average basket. Interviews with weavers suggest that the proportion of white to dyed leaf used is about 1:1 in Etsha 5 and approximately 2:7 in Danega. Assuming an average of four N5 baskets may be produced from a single headload (from Table 7.2), we obtain a range of estimates of the total time spent processing raw materials, per N5 basket (Table 7.4).

<sup>5</sup>Some processing is required to prepare materials used in the core of basket coils, however, the time and tools required for this are minimal.

**Table 7.4. Labour inputs for processing raw materials**

Location / amount of dye used	Ratio of white-to-dyed leaf	Labour for leaf splitting	Labour for white leaf (hrs)	Labour for dyed leaf (hrs)	Total Labour (hrs)	Hours per N5 basket
All white	1:0	0.5	1.00	0.00	1.5	0.38
Etsha 5	1:1	0.5	0.5	3.5	4.5	1.14
Danega	2:7	0.5	0.22	5.44	6.17	1.56
All dyed	0:1	0.5	0.00	7.0	7.5	1.89

Tools required for processing are indicated in Table 7.5. Tools previously noted as used in collection are not counted here. The average cost of tools per N5 basket is calculated as a function of the estimated purchase price (inflated by 100% from prices recorded in 1984-85 by Beth Terry), their useful lifetime, share of use in basket making (versus other domestic uses) and mean number of baskets produced per year (from Table 7.2).

**Table 7.5. Tools for processing raw materials**

Tools	Estimated cost in 1993 (Pula)	Useful life (years)	Share of use for baskets (%)	Charge per N5 basket* (Pula)
Knife	(see table 7.3)	NA	NA	0.00
Awl	0.30	7	100%	0.00
Mortar & pestle	60	3	5%	0.03
No. 6 pot	30	10	5%	0.01
<b>TOTAL</b>				<b>0.04</b>

\* Assumes average 55 baskets per year, from Table 7.2. If a production rate of 20 baskets per year was used the tools cost would increase to P0.11.

### Weaving

The final stage in production consists of weaving open or closed baskets by using the coil technique. An average of 20 hours work is required to weave a standard N5 basket, regardless of the skill of the weaver (Terry, pers.comm.). Weaving is often carried out intermittently, in spare moments, over a number of days. Few tools are required (Table 7.6).

**Table 7.6. Tools for weaving**

Tools	Charge per N5 basket (Pula)
Awl (see table 7.5)	0.00
Razor blade*	0.03
Knife (see table 7.3)	0.00
<b>TOTAL</b>	<b>0.03</b>

\* 1 blade per basket @ Pula 0.15 for 5 blades. If blades are used for longer, or if weavers use their teeth, then the tool costs for weaving drop to effectively zero.

Finished baskets may be brought by the weaver for sale to one of the main wholesale buyers in the study area (BCC in Etsha and Ngwao Boswa in Gomare), or sold directly to resident government extension officers, teachers or passing tourists. Both BCC and Ngwao Boswa also go on regular buying trips to outlying villages and cattle posts. The skill of the weaver is reflected in the originality of the design, the tightness and evenness of the weave, and the symmetry and balance of the basket. BCC and Ngwao Boswa use the four standard grades devised by Botswana-craft to distinguish different qualities of basket. From lowest to highest quality, these are designated by the codes T, P, IM and SP. Up to 30 different standard sizes are recognized as well as two basic shapes: open (a shallow bowl) and closed (a pear-shaped vase with lid).

Prices paid to weavers vary with the size and shape of the basket. Both BCC and Ngwao Boswa offer substantially higher prices for better quality baskets, although their pricing systems are not identical and there may be variations in grading. In general, Ngwao Boswa offers slightly higher prices for each grade and size of basket.<sup>6</sup> Both buyers increase their prices annually in line with inflation.

**Table 7.7. Producer prices for N5 baskets of different qualities**

Quality	Proportion produced*	1993 PRICES		
		BCC	BCC bonus <sup>▲</sup>	Ngwao Boswa
T	7%	NA		NA
P	81%	7.50		9.30
IM	10%	14.00	18.20	17.30
SP	2%	19.00	28.50	23.50
<b>Wtd. average<sup>v</sup></b>		<b>7.85</b>		<b>9.72</b>

\* Based on recorded purchases by BCC from 09/02/93 to 01/03/93. The ratios of baskets of different quality may differ at Ngwao Boswa as the quality tends to be higher in the Gumare area.

<sup>▲</sup> Bonus prices paid in 1993, subject to minimum five supplied at grade.

<sup>v</sup> Prices weighted by the proportion produced in each grade.

<sup>6</sup>In 1993, for weavers able to supply five or more baskets in the top two quality grades, BCC offered special bonus prices (see Table 7.7), which were higher than the prices offered by Ngwao Boswa to the majority of its suppliers. Exceptional baskets may be submitted to the annual, national basket exhibition in Gaborone, where some are bought at auction for hundreds of Pula each.

Table 7.7 indicates the approximate proportion of baskets produced in each of the four main quality grades, based on a review of purchases recorded by BCC during February 1993. The table also shows wholesale (producer) prices paid by BCC and by Ngwao Boswa in 1993 for one N5 basket in each quality grade, and the estimated weighted average price for all grades.

### Economic returns to basket making

Based on the information described above, we can estimate the gross margins and returns to labour that weavers earn from making baskets. This in turn can help in assessing the potential benefits of palm cultivation and other forms of assistance. Table 7.8 summarises the average cost of tools at each stage of production, per N5 basket. On this basis, the cost of tools appears to be relatively insignificant (less than 3% of the producer price).

**Table 7.8. Average tool costs in basket making**

Production stage	Avg. tool costs per N5 basket (Pula)
Collection	0.11
Processing	0.04
Weaving	0.03
<b>TOTAL</b>	<b>0.18</b>

Table 7.9 shows the average labour inputs at each stage of production, per N5 basket. Different values for Etsha and Danega reflect differences in the time spent to obtain raw materials and the amount of dye used. These differences are relatively minor, however, compared to the amount of time required to weave a basket (20 hours). The relatively few hours allocated to collection reflects the fact that each trip yields enough raw material for four N5 baskets, on average.

**Table 7.9. Average labour inputs to basket making**

Production stage	Average hours per N5 basket	
	Etsha 5	Danega
Collection	2.8	2.0
Processing	1.14	1.56
Weaving	20.0	20.0
<b>TOTAL</b>	<b>23.9</b>	<b>23.6</b>

Finally, we subtract tool costs (Table 7.8) from the weighted average prices paid by BCC and Ngwao Boswa (Table 7.7) to obtain the *gross margin* per N5 basket (Table 7.10). This figure is multiplied by the average number of baskets that one weaver produces in a year to estimate the gross annual income received by one weaver (this figure varies greatly; see above). In addition,

gross margins are divided by total labour inputs to obtain an estimate of returns to labour on an hourly and a daily basis, for weavers in Etsha 5 and Danega.

**Table 7.10. Gross margins and returns to labour from basket making**

Values are averages for all weavers	Etsha 5	Danega
Gross Margin per N5 basket (net of tool costs, Pula)	7.66	9.54
No. of baskets produced per year	20	20
Annual income per weaver (Pula)	153	191
No. of hours to produce one N5 basket	23.9	23.6
Hourly income (Pula per hour)	0.32	0.4
Working hours per day	8	8
Daily income (Pula per day)	2.57	3.24

### Sensitivity analysis

Further manipulations of the model were carried out to assess the relative importance of different variables and the potential for increasing returns to labour in basket making. By far the most significant variable is the quality of baskets, due to large price differentials offered by the main buyers (Table 7.7). For example, weavers qualifying for the bonus prices paid by BCC in 1993 for consistent, high quality baskets could increase their income by almost 300% over the base price paid for "P" grade baskets. Weavers achieving the "SP" grade under Ngwao Boswa's pricing system could anticipate an increase of over 150%. Hence the long-standing emphasis on training by all of the agencies involved in promoting the industry.<sup>7</sup>

Weaving time, at 20 hours on average, is by far the most significant labour input to basket making (albeit perhaps less strenuous than collection). However, this labour demand is fairly fixed for this type of basket. Lower labour costs are possible by switching to the production of other types of baskets, such as large, loosely woven baskets as found in southern Zimbabwe or twined and twilled baskets typical of the Binga area in Zimbabwe. However, these baskets would fetch lower prices so the differences in overall returns to labour are unclear. On the other hand, there is much less to gain from reducing other labour inputs. For example, if the time spent travelling to raw material collection sites is reduced to zero (equivalent to 100% use of domestically cultivated palm), total returns to labour rise by less than 25% over the base case. Reducing the amount of dyed leaf used (in order to reduce processing time) has even less impact.

### Cost-benefit analysis of palm cultivation

<sup>7</sup>It is assumed that demand for higher quality baskets is sufficient to absorb any increase in output with no decline in prices.

With the increasing scarcity of suitable wild palm near settlements and the greater distance that weavers are forced to go to collect it, there is growing interest among the main buying agencies in promoting the cultivation of *mokola* palm. It is therefore worth looking in more detail at the potential benefits of reducing collection times through cultivation and the likely costs of doing so.

As noted above, the potential benefits of cultivation can be expressed in terms of reduced travel times.<sup>8</sup> Table 7.11 indicates the minimum and maximum returns to labour (Pula per hour) using cultivated and wild palm, in Etsha and Danega. A range of values is given to account for different assumptions about the time required to collect palm leaf and the amount of material obtained during one trip.

The difference in returns to labour is a measure of the benefit of reducing travel time to zero, assuming that cultivated palm is immediately accessible in gardens located near the home. As shown in the table, the potential gain in returns to labour through the use of cultivated palm does not exceed 24%, under the most optimistic assumptions. This reflects the relatively modest share of travel time in total labour inputs for basket making.

**Table 7.11. Returns to labour from wild and cultivated palm**

Source of palm	Etsha 5		Danega	
	Min Pula/hr	Max Pula/hr	Min Pula/hr	Max Pula/hr
Cultivated	0.36	0.34	0.45	0.39
Wild	0.33	0.27	0.43	0.34
Difference (equals benefit of cultivation)	0.03	0.06	0.02	0.05
% difference	9%	23%	4%	16%

On the cost side, palm cultivation requires fences to protect the young plants from livestock. However, *mokola* palm matures quickly; in plantation it is assumed to produce leaves suitable for making baskets from the third year. A proposal prepared in 1993 by BCC provides a detailed estimate of the costs of supplying and installing fencing for 200 households (weavers), estimated at P 11,000 for wire and gates, or P 55 per household. Total labour inputs are estimated at 20 days per household to provide fence posts, install the fencing and plant and tend the palm seedlings.

<sup>8</sup>Clearly there are other benefits from reducing the number of long treks that women have to make. By contrast, women noted the social benefits of group trips as an opportunity to be together with friends. However these trade-offs are difficult to quantify.

**Table 7.12. Cumulative labour savings from cultivating palm and cost per hour saved**

Year	Discount factor (r=5%)	Etsha 5		Danega	
		Minimum discounted hours/yr	Maximum discounted hours/yr	Minimum discounted hours/yr	Maximum discounted hours/yr
1	1.00	0	0	0	0
2	0.95	0	0	0	0
3	0.91	17	95	7	73
4	0.86	16	91	7	69
5	0.82	15	86	7	66
6	0.78	15	82	6	63
7	0.75	14	78	6	60
8	0.71	13	75	6	57
9	0.68	13	71	5	54
10	0.64	12	68	5	52
<b>Total discounted hours saved</b>		<b>115</b>	<b>646</b>	<b>49</b>	<b>492</b>
<b>Cost (Pula per hour saved)</b>		<b>0.48</b>	<b>0.09</b>	<b>1.12</b>	<b>0.11</b>

\* Minimum hours saved assumes min. travel time, max. baskets per headload and min. trips (baskets) per year. Maximum hours saved assumes the opposite. Cost per (discounted) hour saved assumes a capital cost of P55 per household for fencing.

Table 7.12 shows the total labour savings obtained through cultivation over a ten year period. Labour savings represent travel hours saved from not having to collect wild palm (actual harvest time remains the same).<sup>9</sup> There are no savings in the first two years, while the palm matures, but from the third year it is assumed that all leaf is obtained from cultivated palm. Note that labour savings are discounted (at 5%) to reflect the fact that benefits received in later years are "worth" less, from today's perspective.<sup>10</sup>

Finally, we can compare the potential benefits of cultivation, expressed in terms of increased returns to labour from reducing travel time to zero, to the costs of cultivation, expressed in terms of the cost of fencing per discounted hour saved. This comparison is shown in Table 7.13, which

<sup>9</sup>Labour required to install fences and tend the plantation is excluded here. Including it would of course reduce the net labour savings from cultivation.

<sup>10</sup>Discounting future labour savings increases the present cost of cultivation per hour saved. However, it would be inappropriate to assume that poor farmers exposed to very high livelihood risks would value a current cost and a future benefit in the same terms.



indicates that the costs of cultivation exceed the potential benefits in every case. Note that we have deliberately excluded the additional labour costs of cultivation from the analysis; adding these costs would further undermine the case for cultivation.

**Table 7.13. Cost-benefit analysis of palm cultivation**

	Etsha 5		Danega	
	Min (Pula/hr)	Max (Pula/hr)	Min (Pula/hr)	Max (Pula/hr)
Benefit (tbl 7.11)	0.03	0.06	0.02	0.05
Cost (tbl 7.12)	0.48	0.09	1.12	0.11
Net Benefit (B - C)	(0.45)	(0.02)	(1.10)	(0.06)

Note, however, that Table 7.13 also indicates that the costs and benefits of cultivation begin to converge under the "maximum hours" scenario, i.e. when we assume maximum travel times and minimum number of baskets per trip (i.e. per headload of raw material). This implies that cultivation will be most attractive to older/weaker weavers who live relatively far from wild sources of palm and lack the strength to bring home large loads. Hence, presumably, the greater interest in cultivation apparent among weavers in Etsha, for many of whom it is already or will soon become a viable economic proposition.

This transition point has already been reached for the most sought-after dye materials, which are increasingly purchased by weavers from a few bulk suppliers willing and able to travel more than one day's walk to obtain them. Most of the latter are men with access to other means of transport, such as dugout canoes.

This suggests the need to target technical assistance or funding for cultivation to communities and/or individual weavers most likely to respond. In general, we would expect the latter to be older (or infirm) weavers living in villages lying outside the flood plain (eg. Etsha or Gomare), rather than young weavers living in Danega or other settlements located within the flood plain.

#### **Basket making versus other economic activities**

Estimates of returns to labour in basket making may be compared to the economic benefits that women obtain in other activities, in order to illustrate the relative importance of basket making in their livelihoods and the likelihood of a good response to additional external support for the basket industry. A range of estimates of returns to labour were collected from different sources and for three major forms of employment: agriculture, beer brewing and drought relief.

#### *Agriculture*

The main economic activity of women (and men) in western Ngamiland is agriculture. Agricultural practices and crop choice vary mainly by proximity to inundated areas. Thus farmers living further from the flood plain (eg. Etsha) mainly grow pearl millet on sandy soils and a number of farmers till by hand. Farmers living in or nearer to the flood plain (eg. Danega)

mainly grow maize on heavy, alluvial soils and rely heavily on animal traction for tillage.

Economic returns to agriculture in the area are reported in the Farm Management Survey report of 1988. Mean gross margins in agriculture are estimated at about P6 per person-day. Adjusting this figure to account for price inflation between 1988 and 1993 yields an equivalent value of approximately P9.50 per day<sup>11</sup>.

### Beer

In addition to farming, and especially during the post-harvest (dry) season, women earn cash income from a wide range of off-farm activities. Beer brewing and basket making are reported to be the most important of these. Therefore, as well as collecting data on the economics of basket making, the study team also conducted interviews in Etsha 5 (10 women) and in Danega (2 women) on the costs and benefits of beer production.

A popular fermented drink is *kgadi* beer, which many local women make from the fruit of the *Grewia bicolor* tree, a species common to the drylands of western Ngamiland. *Kgadi* beer is fermented in small batches overnight, by combining dried fruit, sugar, water and a small amount of starter (yeast culture from a previous batch) in a drum or other container. The "live" beer is sold at home, by the mug, to casual visitors. Estimated returns to labour in brewing *kgadi* beer vary widely but average about P1.20 per hour, assuming an average of 7.5 hours to prepare and sell one batch (Table 7.14).

### Drought relief

In recent years, both women and men have also benefited from publicly funded labour based relief projects, which offer casual employment for road-building and other local infrastructure projects. In 1993, the official wage for a six hour day of unskilled work under the drought relief programme was P4.5. To compare these different activities to basket making, and to account for differences in the total amount of time spent on each activity, estimated daily returns are converted into hourly equivalents, and vice versa. A standard working day is assumed to be eight hours long, except for drought relief work, which assumes six hours per day. These data are presented in Table 7.15.

Table 7.15. Returns to labour: baskets, beer, agriculture and drought relief

Activity	Gross margin (Pula/day)	Gross margin (Pula/hour)
Basket making		
Etsha 5	2.57	0.32
Danega	3.24	0.40
<i>Kgadi</i> beer brewing	9.68	1.21
Agriculture	9.50	1.19
Drought relief*	4.50	0.75

<sup>11</sup>This figure is based on an aggregate crop income per manday figure for two survey sites at Matsaudi and Tubu. Total incomes of all surveyed crops (N= 10) are estimated (outputs x local prices) and related to estimates of labour inputs (family and hired) derived from focused assessments at each site.

Table 7.14. The economics of brewing Kgadi beer

Brewer	Fruit (P)	Sugar (P)	Drum * (P/brew)	Water (litres)	Unit cost (P/litre)	Sale price (P/litre)	Gross margin (P/litre)	Gross margin <sup>▲</sup> (P/brew)	Labour input <sup>▼</sup> (hours)	Gross margin (P/hour)
Nguda	7	4.5	.05	50	.23	.50	.27	12.11	11	1.10
Medhi	5	4.5	.03	25	.38	.67	.29	6.43	7	.92
Naledi	5	4.5	.03	25	.38	.67	.29	6.43	7	.92
Eva	5	4.0	.02	15	.60	.67	.07	0.93	5.4	.17
Kayuo	2	4.5	.03	27	.24	.40	.16	3.85	7.3	.53
xxx	2	4.5	.03	25	.26	.50	.24	5.38	7	.77
Morepula	2.25	4.5	.03	25	.27	.67	.40	8.98	7	1.28
Tumoneni	2.25	2.65	.03	25	.20	.67	.47	10.64	7	1.52
Dierenge	7	4.5	.05	50	.23	.67	.44	19.76	11	1.80
Mujabura	2	4.5	.03	25	.26	.50	.24	5.38	7	.77
Kazembe	2	2.65	.03	25	.19	.80	.61	13.79	7	1.97
Kirumpe	1	2.65	.03	25	.15	1.00	.85	19.19	7	2.74
Mean	3.54	4.00	.03	28.5	.28	.64	.36	9.40	7.6	1.21
Std. Dev.	2.03	.79	.01	10.0	.12	.15	.20	5.66	1.6	.68

\* Assume Pula 50 purchase price, ten year life and 100 brews per year.

▲ Assume 10% loss of liquid in brewing.

▼ Assume 3 hours to brew; hours to sell proportionate to volume (benchmark 8 hours for 50 litres).

1983

1983

Table 7.15 indicates that returns to labour vary widely among different economic activities. This is not altogether surprising; since local labour markets are poorly developed and opportunities for paid employment are extremely limited, we would expect returns to labour to vary, even for a single class of labour. Nevertheless, it is striking that average returns to labour in basket making, in both Etsha and Danega, are significantly lower than returns to any of the other activities.

A variety of interpretations are possible: the model of basket making may have under-estimated actual returns to labour (by over-estimating the average weaving time or under-estimating the proportion of high quality baskets, for example) or basket making is a marginal activity relative to other income generating opportunities (we reject a third possibility, that returns to other activities are all over-estimated by the same amount). With respect to the second interpretation, a possible explanation for the relatively low returns is that basket making is a low-risk activity which requires little in the way of capital investment, compared to agriculture or beer brewing. This hypothesis would be reinforced if it were observed that weavers are, on average, poorer than non-weavers. However preliminary observations suggest that this is not the case as a wide range of women in both villages were engaged in regular weaving.

Another possible explanation for the disparity in labour returns between different livelihood options is that they are not alternatives. As we have seen (see section 6), women combine a variety of different activities. Basket making and beer brewing are not directly competitive, as baskets can be weaved while beer is being sold. In the dry season, the major period when basket making and brewing occurs (see section 6), these activities are not competitive with agriculture. The interannual variation of options is also not taken into account in the aggregated figures presented in Table 7.15. Returns to agriculture drop dramatically in dry years, making alternative, climate-independent activities such as basket making more attractive alternatives.

## 8. OPTIONS FOR RESOURCE CONSERVATION AND MANAGEMENT

Women's livelihoods are diverse in both sites studied on the edge of the Okavango delta. They commonly rely on a mix of wild foods, agricultural produce, remittances, trading, drought relief and wage labour. Household decision-making continually adjusts to the changing nature of the environment and local economies.

In both sites studied the palm and dye materials used in basket making have become less abundant over the last decade or so. This over-exploitation partly stems from the international demand for the locally made baskets. Some of the resource degradation can also be attributed to the demands local communities make on wild species. And whilst the basket weavers receive relatively low returns per basket made, they rely on this income-generating activity to minimise risk during times of stress: returns to agriculture drop dramatically in dry years, making alternative, climate independent activities such as basket making more attractive alternatives.

There were, however, significant differences in wild resource management between the two study sites. Whereas an effectively open access situation prevailed at Wabe, the palm resources were more carefully managed in Danega. Greater resource control and management (regulations and sanctions) among the Danega people, combined with a relatively small and discrete population, ensures a more sustainable use of the palm resource.

Where local resource control has ceased and more destructive extraction practices are used without fear of sanction, palms are over-exploited and villagers spend more time collecting palm materials. Two management options have been identified to relieve pressure on these wild resources:

- *Palm cultivation.* With the increasing scarcity of suitable wild palm near settlements and the greater distance that weavers are forced to go to collect it, there is a growing interest among the main buying agencies in promoting the cultivation of *mokola* palm. However, the economic analysis presented here suggests that the costs of palm cultivation exceed the potential benefits. The cost benefit analysis suggests that cultivation will be more attractive to older/weaker weavers who live relatively far away from wild sources of palm and lack the strength to bring home large loads. This social group is most likely to respond to technical assistance and funding for palm cultivation.

- *Developing local systems of resource conservation and management.* This option hinges on facilitating the spread of the resource conserving features of the palm management systems practised by the people of Danega. Local management systems are tuned to the needs of local communities and often enhance their capacity to adapt to dynamic social and ecological circumstances. Despite the pressures which increasingly undermine these local systems of knowledge and management, it may be possible to extend resource conserving practices from village to village. Outside agencies may need to give more attention to, and allocate more resources to, building local institutional capacities for the sustainable management of wild species through culturally appropriate regulations and sanctions.

Each option will need to be debated locally among all stakeholders before embarking on jointly negotiated actions for the conservation and sustainable use of wild resources.

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