XIMENIA HARVESTING AND POST-HARVESTING PRACTICES IN NORTHERN NAMIBIA

RECOMMENDATIONS FOR QUALITY AND FAIR TRADE SUPPLY OF XIMENIA KERNELS

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May 2006

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ACKNOWLEDGMENTS

The author wishes to thank the people who contributed to this survey. Those who agreed to be interviewed and those who participated in the harvesting and decorticating assessments.

I particularly wish to thank Mr. Ephraim WEYULU, agricultural extension technician of the Ministry of Agriculture, Water and Forestry at Eenhana, and Mrs. WEYULU who also works at the Ministry of Agriculture at Eenhana and the Tulongeni Twahangana Project.

I thank the Namibian Botanical Research Institute for providing help in literature search.

I wish to thank French Cooperation which financially supported the survey through a project grant to CRIAA SA-DC.

I thank my colleagues at CRIAA SA-DC, especially Saskia den Adel and Michel Mallet.

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BACKGROUND

Ximenia species are widespread across Southern Africa especially in Botswana, Zimbabwe, South Africa and Namibia. Ximenia has been traditionally used for different purposes as edible fruit, seed oil and live fences.

Recently, a new interest has been given to this indigenous natural resource (*Ximenia Americana*) since a commercial opportunity for cold-pressed virgin oil is being developed. Such an interest brings the need to know more about the way rural communities use it.

This survey on Ximenia harvest and post-harvest practices in the North Central Regions of Namibia aims to contribute to improve the ability of poor rural communities to meet their basic human needs in an environmentally sustainable way by securing better market access and better prices through an improved supply of Ximenia kernels.

The specific objectives of this survey were:
1- To document and illustrate harvest and post-harvest practices of Ximenia fruits, seeds and kernels
2- To improve the quality of the kernels supply
3- To assess the productivity of Ximenia harvesting and decorticating for Fair Trade assessment
4- To support the Tulongeni Twahangana Project (TTP).

1. METHOD

11. Literature search

Literature search has provided some information on the description and the distribution of Ximenia species and the vernacular names and traditional uses. Our main documentation is from "Distribution of Ximenia in Namibia" by Herta Kolberg from the NBRI, and from Webpages of the Royal Botanic Gardens of Kew (SEPASAL Web Interface)[1], of the Food and Agricultural Organization[2] and PhytoTrade Africa[3].

Also the "Annual progress report for Tulongeni Twahangana Project – TTP" shows the activity of this community organization (based at Eenhana – Ohangwena Region) in organizing the supply of Ximenia kernels to be pilot processed into oil in Windhoek at the Katutura Artisans' Project.

12. Fieldwork

Fieldwork was conducted between the 13th and the 15th of March 2006 at Eenhana and the 17th of May 2006 around Eenhana. A first meeting held on the 13th with Mr. Ephraim WEYULU, agricultural extension technician of the Ministry of Agriculture Water and Forestry at Eenhana, aimed to introduce this survey and to organize two assessments for harvesting Ximenia fruits and for cracking Ximenia kernels. These two assessments took place on the 15th with nine villagers involved. This was followed on the 17th of May 2006 by interviewing a sample of women producing Ximenia kernels around Eenhana.

Eenhana constituency has been chosen for the fieldwork because it is a major density area for the supply of Ximenia kernels in the North Central Regions of Namibia, for the contact we have with Mr. Ephraim WEYULU and for having already supplied some Ximenia kernels to the Katutura Artisans' Project.

[1] : www.kew.org/sepasalweb/sepaweb
[2] : www.fao.org/docrep
[3] : www.phytotradeafrica.com

2- XIMENIA HARVEST AND POST-HARVEST PRACTICES

21- General information

From the meeting with Mr. Ephraim WEYULU, agricultural extension technician at Eenhana, the following information was obtained:

a- No studies had been done on Ximenia harvest and post-harvest practices in the North Central Regions of Namibia.

b- The relation between the soil types of the area (heavy sandy soil) and the distribution of Ximenia around Eenhana should be investigated.

c- The Ximenia harvesting and cracking tasks are mostly done by women after they have worked in their crop fields.

d- There are five main steps: 1-Harvesting, 2- Drying, 3- Cracking, 4-Sorting, 5-Bagging.

e- The kernels are decorticated just before they are sold to avoid infestation from insects.

f- Purchase of kernels should be announced at least three weeks in advance, in order to give people enough time to decorticate.

We also met Mrs. WEYULU who also works at the Ministry of Agriculture at Eenhana and helps the Tulongeni Twahangana Project:

a- Last year without any advertising people brought some kernels even from far. The message that they can get some money “was spreading like fire”.

b- The money is used for buying food and clothes and paying school and hospital fees.

c- The competition between people and goats for fruits is limited because the animals are generally kept out of the cultivated areas (often by children) during the cropping season, which is also the time where the Ximenia trees are fruiting.

d- Fruits are traditionally harvested ripe after they have fallen on the ground, but some farmers are picking them right on the trees to be the first to harvest. This might influence the ripeness of the fruits and the kernels.

22- Women Interviews

Below is presented the summary of two interviews with Ximenia kernels women-producers. The main questions were about harvesting, decorticating and the price of the kernels. To conclude we asked if they had any issues to raise to us.

Woman A - around 45 years old, at Ondigwanyama

Harvest:
After good rains, she starts harvesting from end of January to March. She picks the fruits on the ground because that is where they are ripe.
There is a bit of competition with the goats in April when the fruits start to be dry.
She harvests alone but on weekends her children are also picking some fruits.

Decorticating:
She decorticates during the day or at night when there is the moon light. She does it alone or with her children but only the one from 12 years old because the younger ones can not do a proper job. This task is not easy because of trying to produce whole kernels.

Price:
She said that the price is low compared to the labour input and the risks (snakes, getting lost in the bush, carrying the fruits on the head). Last year she earned N$25 selling 5kg of Ximenia kernels. She used the money to buy a bag of maize and to buy some soap for bathing her three school children.

Issue:
We need some collecting points to be organized for the transport of the kernels.

Woman B - around 65 years old), Eenyama

Harvest:
She harvests the fruits on the ground from April to June. The children help her for this task on weekends. There is a competition with goats, mices and ants.

Decorticate:
She decorticates alone during the day and the children that are able to crack help after dinner.

Price:
To produce kernels is time consuming. You can be bitten by scorpions or snakes while harvesting or hurt your fingers while cracking. She earned a bit more N$100 last year selling some kernels. She spent this money in buying maize flour and basic necessities (soap,…).

Issues:
Who is buying the oil and for which purpose? How is it processed? What is done with the cake?

We can see that the results of these two interviews are really close to each other, especially about the involvement of their children, about the time needed for this activity and about how they use the money they earned for.

23- Harvest assessment

To assess the productivity of Ximenia harvesting, nine villagers were asked to collect Ximenia fruits for 45 minutes. They were provided with big white bags in a place where we were sure to find some Ximenia trees.

The harvesters comprised of three age groups with 1 person under 25, 4 between 25 and 40 and 4 above 40, 2 males and 7 females (two with a baby). According to the agricultural extension manager, this sample is representative because this task is carried out by mature women (even if some children might also help for this task).

From the quantity of harvested fruits recorded per person, the average productivity of harvesting per hour is calculated as 18.1kg. One woman was lucky to find a place with a lot of fruits and harvested at least twice more than the other villagers.

However, this result has to be interpreted carefully because it is influenced by the time in fruiting season and by the year of fruiting season. Also it does not take into account the time for the harvesters to walk from their house to the Ximenia trees.

Table 1: Ximenia harvesting productivity assessment conducted on the 15th of March 2006 around Eenhana

NAME	AGE	VILLAGE	GENDER	HARVESTING		
				Fruits (kg)	Time (min)	per hour (kg)
Shafuda KANISIA (with baby)	37	Ondingwanyama	F	13.2	45	17.6
Pernalia NDONGO (with baby)	46	Ondingwanyama	F	27.6	45	36.8
Vanyika LEENA	51	Ondingwanyama	F	10.3	45	13.7
Hileni SHILAMBA	50	Ondingwanyama	F	12.9	45	17.2
Maria KASHIHAKUMWA	33	Omhito	F	13.8	45	18.4
Helvi HALWEENDO	33	Omhito	F	8.7	45	11.6
Mannase VILHO	18	Onkongo	M	12.7	45	16.9
Paulus MOYOVE	27	Ondingwanyama	M	12.8	45	17.1
Elise HAMUTENYA	54	Onakalunga	F	10.0	45	13.3
AVERAGE PRODUCTIVITY PER HOUR				**18.1**		

24- Drying assessment

This assessment aimed at estimating the weight of nuts (fruit stones) compared to the weight of ripe fresh fruits (partially dried as collated on the ground).

Table 2: Breakdown of weight distribution of Ximenia fruits/nuts

SAMPLE	Fruits (kg)	Nuts (kg)	w/w (%)
a	13.2	6.8	51.5
b	27.6	11.9	43.1
c	10.3	5.7	55.3
d	12.9	7.3	56.6
e	13.8	5.9	42.8
f	8.7	4.9	56.3
g	12.7	5.9	46.5
h	12.8	5.5	43.0
i	10.0	6.0	60.0
TOTAL	122.0	59.9	49.1

This figure shows that on average 50% of the weight of a ripe Ximenia fruit is represented by the nut and 50% by the pulp and the skin.

After collation, the fruits are left to dry on the ground at the homestead. A few days are enough to make them fully dry. Generally harvesters do not find necessary to remove the dry skin and pulp before cracking the nuts. However, during our study, the survey villagers packed the dried fruits in a bag and stamped on it for a few minutes in order to rub the dry skin and pulp off the nuts.

25- Decorticating assessment

To assess the productivity of Ximenia decorticating, nine villagers have cracked an unlimited quantity of kernels over a period of two hours and then after sorted out the kernels and shells at the premises of the Ministry of Agriculture at Eenhana

The tools used to crack the pips are a stick and a stone or a flat piece of wood as a base. Villagers are sitting on the ground with the piece of wood or the stone between the legs. The pip is placed on the base and held between two fingers and cracked using the piece of wood (see pictures overleaf).

Figure 1: Pictures of some Ximenia pips being cracked during the decorticating assessment in the premises of the Ministry of Agriculture at Eenhana

Figure 2: Picture of some Ximenia pips being cracked during our visit on the field at Ondigwanyama

The people were given two hours to crack the pips and then the time they needed to sort the pips they cracked during these two hours.

The next table shows the assessment of the productivity of this task. The main results are as follows:

- an average of 2.2kg of pips can be cracked in an hour,
- an average of 1.7kg of whole kernels are sorted out of the shells in an hour,
- an hour is needed to get 0.5kg of whole kernels from the pips,
- so two hours are needed to get a kilogram of Ximenia kernels from the pips.

Table 3: Assessment results of Ximenia pips decorticating (cracking and sorting out)

NAME	AGE	VILLAGE	GENDER	DECORTICATING					
				PIPS CRACKING		PIPS SORTING		KERNELS PRODUCTION	
				TIME (Min)	PIPS (kg)	TIME (min)	WHOLE KERNELS (kg)	Per Hour (kg)	Per Kg (Min)
Shafuda KANISIA (with baby)	37	Ondingwanyama	F	120	4.2	35	1.30	0.50	119
Pernalia NDONGO (with baby)	46	Ondingwanyama	F	120	3.1	28	1.02	0.41	145
Vanyika LEENA	51	Ondingwanyama	F	120	3.5	26	1.11	0.46	132
Hileni SHILAMBA	50	Ondingwanyama	F	120	4.4	49	1.28	0.45	132
Maria KASHIHAKUMWA	33	Omhito	F	120	4.6	53	1.20	0.42	144
Helvi HALWEENDO	33	Omhito	F	120	4.1	57	1.31	0.44	135
Mannase VILHO	18	Onkongo	M	120	6.4	74	1.99	0.62	97
Paulus MOYOVE	27	Ondingwanyama	M	120	4.7	85	1.28	0.37	160
Elise HAMUTENYA	54	Onakalunga	F	120	5.4	57	1.62	0.55	109
AVERAGE PRODUCTIVITY PER HOUR					2.2		1.72	0.47	130

From the results shown in the table 4, the average weight of a Ximenia nut can be calculated. The data show that on average around 33% of the weight of these pips are the kernel and around 63% the shell. The total is not 100% because of losses during decortication.

Table 4: Breakdown of weight distribution in some Ximenia pips

OPERATOR	NUTS (kg)	WHOLE KERNELS (kg)	*% (w/w)*	BROKEN KERNELS (kg)	*% (w/w)*	SHELLS (kg)	*% (w/w)*	Total %
A	**4.2**	1.30	*31.0*	0.09	*2.1*	2.78	*66.2*	99.29
B	**3.1**	1.02	*32.9*	0.01	*0.3*	1.93	*62.3*	95.48
C	**3.5**	1.11	*31.7*	0.05	*1.4*	2.16	*61.7*	94.86
D	**4.4**	1.28	*29.1*	0.23	*5.2*	2.80	*63.6*	97.95
E	**4.6**	1.20	*26.1*	0.32	*7.0*	2.78	*60.4*	93.48
F	**4.1**	1.31	*32.0*	0.01	*0.2*	2.49	*60.7*	92.93
G	**6.4**	1.99	*31.1*	0.10	*1.6*	4.09	*63.9*	96.56
H	**4.7**	1.28	*27.2*	0.21	*4.5*	3.08	*65.5*	97.23
I	**5.4**	1.62	*30.0*	0.20	*3.7*	3.44	*63.7*	97.41
AVERAGE			***30.1***		***2.9***		***63.1***	96.1

26- Storage assessment

There are two types of storage: one for the pips and one for the decorticated kernels.

We did not manage to see many storage places and how these raw materials are packed. In most of the case, they are kept under a shade and both pips and kernels are stored in plastic or steel containers.

Figure 3: Pictures of storage of Ximenia nuts and kernels at Ondigwanyama

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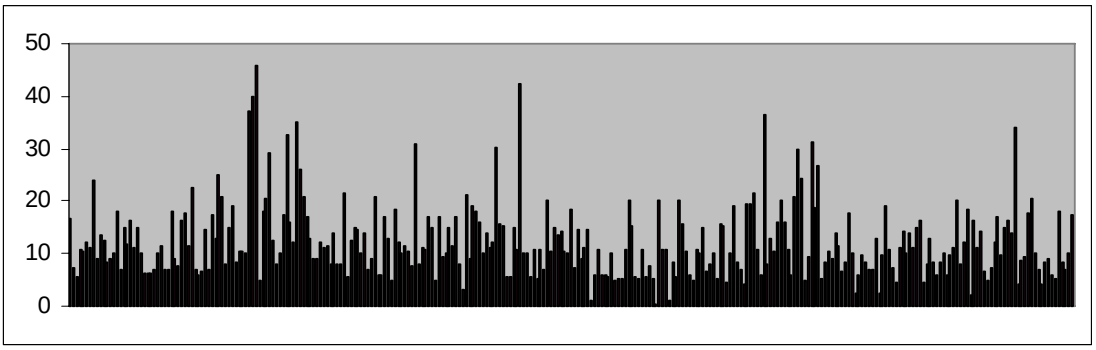
27- Income assessment

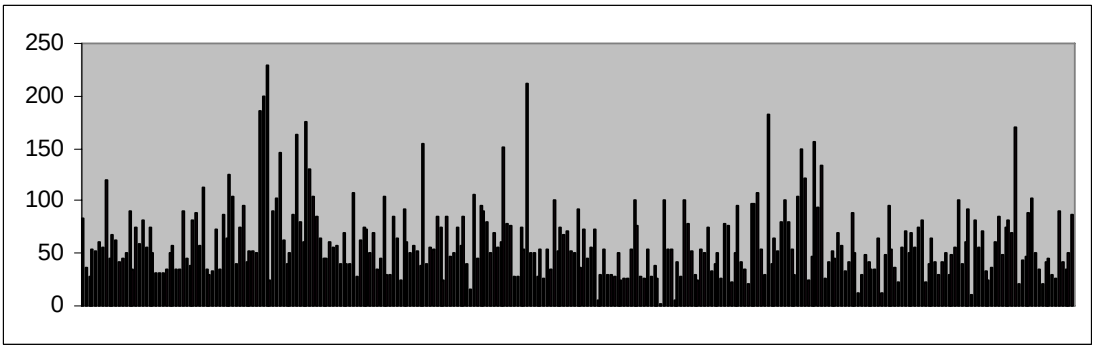
In order to assess the income earned by the communities with the Ximenia kernels business, we have studied the delivery record of the 20th of April 2005 at Eenhana from the Tulongeni Twahangana Project (TTP).

Figure 4: Chart of quantity (kg) of kernels delivered per villager the 20th of April 2005



297 people delivered 3652.8kg of Ximenia kernels at Eenhana the 20th of April 2005 with an average of 12.3kg per person, ranging from 0.4kg to 46kg.

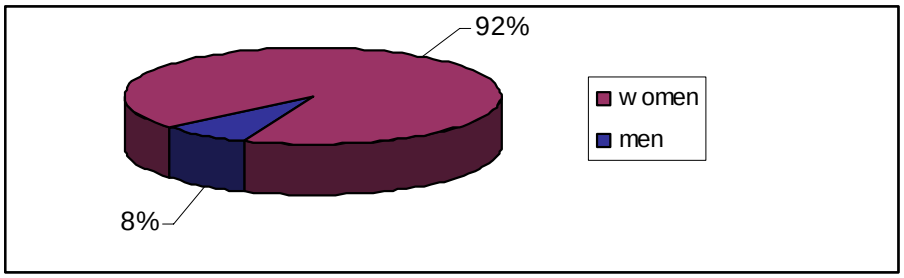
Figure 5: Chart of the income (N$) earned per villager for the kernels delivered on the 20th of April 2005



After having delivered 3652.8kg of Ximenia kernels at Eenhana the 20th of April 2005, the villagers earned N$18264 with an average of N$61.5 per person, ranging from N$2 to N$230.

The gender distribution among Ximenia kernels suppliers shows that this activity is mostly done by women. Indeed, on the delivery record of the 20th of April, out of 252 names recorded, 231 were women and 21 men.

Figure 6: Chart of the gender of the Ximenia kernels suppliers at Eenhana the 20th of April 2005



3- RECOMMENDATIONS

31- Improving quality

At this stage of the study, the following recommendations are formulated to improve the quality of the Ximenia kernels supply, which is crucial to assure a good quality of Ximenia oil.

a- Harvest:
- To harvest only the fruits on the ground, to ensure that they are fully ripe

b- Drying:
- To avoid contamination of the dried fruits before decortication, drying on a clean surface (plastic sheet,…) out of reach of animals.

c- Decorticating:
- To use a clean stick and piece of wood as a support (a brick base can contaminate the kernels with sand and dust)
- To keep clean hands while handling the kernels

d- Storage:
- To wait for the announcement before starting to decorticate the kernels, to avoid a too long storage period which may affect the quality
- To use a clean container to store the decorticated kernels
- To store the kernels in a dark or shady covered place with enough ventilation

e- Transport:
- To use new bags to pack and deliver the kernels

32- Assessing a fair price for the kernels

We have assessed that in an hour of work, a woman can produce 0.5kg of kernels. The price for 1kg is N$5.00, so she will earn N$2.5 per hour. According to the Namibia Agricultural Union, the minimum wage for farm workers is N$2.2 per hour.

If we consider a fair price as equal or higher than the minimum wage, the remuneration for 1kg of Ximenia kernels is fair. However, we should consider the fact that the harvest time is not included in this figure.

List of tables and figures