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ZAMBIA

Terminal report*

Prepared for the Government of the Republic of Zambia
by the United Nations Industrial Development Organization

Based on the work of N. M. Musonda and P. Bauchau
experts in food processing

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1. INTRODUCTION

Information contained in this report reflect the status of early 1990 and has not been updated.

The development objective of the project was to promote rural women's engagement in small-scale juice production activities based on locally available surplus fruits for local consumption.

Village Industry Service (VIS) has been promoting rural industries which utilise local raw materials for import substitution, which are resulting in local production of many items in short supply. The institution was appointed as the focal point, by the government, to support women and the major beneficiaries of VIS work are rural women. It was, therefore, most appropriate that this project was attached to VIS.

The immediate objectives of the project were stated as follows:

- i) To establish technical and financial specifications of a fruit juice producing pilot cottage industry;
- ii) To specify the output, activities and inputs to actually establish a pilot plant; monitor financial and technical operation and make adjustments to local conditions.
- iii) To train VIS technicians and women entrepreneurs on a system of input procurement, marketing of products and local production of equipment.
- iv) To determine the prototype juice production project for duplication.

The project was started on 20th February, 1989 and was to run for a period of 12 months. An international food technologist was employed for a period of 4 man months to be taken in split missions. A national food technologist was also employed for the project period to assist the international food technologist in his duties.

2. PRODUCTS

The products produced in the project were fruit juice, jam and wine. All three are fruit juice products. The women were taught how to make each one of these products using manually operated equipment and fire wood as the source of power.

The principle of preservation for jam is the high sugar concentration which does not allow the growth of micro-organisms combined with high processing temperatures which kill micro-organisms, the air-tight seal of the jars prevents recontamination of the jam.

For fruit juice, pasteurization kills micro-organisms and an air-tight seal prevents re-contamination.

In the case of wine, preservation is helped by the high alcohol level which is not conducive to microbial growth. The specific methodologies used in processing the products are given in the attached Fruit Juice Processing Manual.

3. RAW MATERIAL SPECIFICATIONS AND PROCUREMENT

3.1 Fruits

Several fruits besides the wild fruits are found in Zambia. Some of these are:

Bananas	Pawpaws	Pineapples
Guavas	Tomatoes	Mulberries
Mangoes	Water melons	Tangerines
Lemons	Limes	
Oranges	Avocado Pears	

A fruit survey was carried out and the results are shown in Table 3.1. and 3.2. The fruits found to be most abundant in the area were guavas, mangoes and bananas. Although tomatoes were not included because the survey emphasised fruit trees, they are quite abundant when in season. A lot of tomatoes are grown by the women themselves in small gardens.

Fruit surveys involving tree counts can be misleading because some of the trees may not fruit. As it turns out, there is not as much fruit in the Kayosha area as initially thought. Fruits are cheaper when obtained from nearby commercial farms than from the local villages.

The fruits found to be most appropriate for this project were: guavas, mangoes, tomatoes, oranges and lemons. These fruits should be bought and processed when they are in peak season because at this time they will cost the cheapest. The fruits will be cheaper when obtained from nearby commercial farms than when obtained from within the villages. Table 3.3. shows prices of the various fruits when they were in peak season. It is important to note that due to a high level of inflation these prices could increase by more than 100% for the next peak season.

The fruits should be well ripened but not overripe and should also be free of damages. For oranges and lemons it is important for the fruits to be juicy. Some fruits may not be juicy and the yield of juice per unit will be very low and therefore increase the cost of raw material input because more oranges or lemons would need to be bought.

TABLE 3.1: FRUIT TREE SURVEY AT KAPINI - MATURE TREES

Village	Item	Mango	Banana	Guava	Orange	Lemon	Pawpaw	Lime	Peach	Comment
Mwachi- mondo	No of plants	800+	1000+	1200	30	20	4	Nil	Nil	There is too much water in the area for fruit plants such as pawpaw.
	Fruiting time	Dec-Jan	Cont.	Feb-May	May-June	Feb-June	Cont.	Nil	Nil	
	Period of growth	4-5 years	18 mon	4-5 years	4-5 years	4-5 years	18 mon	---	---	
Lekano	No of plants	380	200	50	60	20	6	4	36	Would like to grow more fruit plants
	Fruiting time	Dec-Jan	Cont.	Feb-May	May-June	Feb-June	Cont.	May-July	May-July	
	Period of growth	4-5 years	18 mon	4-5 years	4-5 years	4-5 years	18 mon	4-5 years	4-5 years	
Nyeleti	No of plants	300	200	350	6	10	2	Nil	Nil	Very interested to grow more fruit plants like pawpaw and oranges
	Fruiting time	Dec-Jan	Cont	Feb-May	May-June	Feb-June	Cont	---	---	
	Period of growth	4-5 years	18 mon	4-5 years	4-5 years	4-5 years	18 mon	---	---	

Mwalil- anda	No of plants	100	415	3	14	3	Nil	Nil	Nil	Difficult to grow fruits because people are careless with livestock animals
Mulowa	No of plants	200	160	40	Nil	Nil	Nil	8	Nil	Have not taken care of fruit trees
	Fruiting time	Dec- Jan	Cont	Feb- May	---	---	Cont	---	---	
	Period of growth	4-5 years	18 mon	4-5 years	---	---	18 mon	---	---	Animals destroy the fruit
Kapini	No of plants	80	60	Nil	Nil	Nil	8	Nil	Nil	
	Fruiting time	Dec- Jan	Cont	---	---	---	Cont	Nil	Nil	
	Period of growth	4-5 years	18 mon	---	---	---	18 mon	---	---	

**TABLE 3.2: FRUIT TREE SURVEY AT KAPINI - YOUNG TREES
2-3 YEARS OLD AND YOUNG BANANA AND PAWPAW TREES**

No of Young village	Mwachi-mondo	Malekano	Nyeleti	Mwali-landa	Mulowa	Kapini
Mango	400	100	100	80	60	40
Banana	1000	200	80	300	80	40
Guava	800	150	120	50	10	2
Orange	10	10	Nil	Nil	20	Nil
Lemon	2	Nil	2	Nil	Nil	Nil
Pawpaw	Nil	Nil	Nil	Nil	Nil	Nil
Lime	Nil	Nil	Nil	Nil	Nil	Nil
Peach	Nil	34	Nil	Nil	Nil	Nil

TABLE 3.3 PRICES OF FRUITS IN PEAK SEASON, 1989

Fruit	Month	Price ZK/Kg	Specification
Guava	April	1.50	Ripe, no damage
Tomato	August	3.00	Ripe, no damage
Oranges	May	9.00	Ripe, juicy, no damage
Lemons	May	4.50	Ripe, juicy, no damage
Mangoes	January	1.00	Ripe, sweet, no damage

3.2 Sugar and Citric Acid

White granulated sugar is needed for all the products. Sugar has been in short supply from time to time and it has been necessary to buy directly from the sole manufacturer, the Zambia Sugar Company. This arrangement can continue for the women so long as they present business certificates when they order. The women will also need to write an official letter of introduction in order to purchase the sugar. At times of more critical shortages of sugar it is recommended that VIS assist the women entrepreneurs to obtain the sugar.

Citric acid has relatively been easy to obtain. Most chemists will have citric acid and Lusaka Pharmacy Factory Ltd in Lusaka makes some.

3.3 Chemicals

Sodium metabisulphate and sodium benzoate are sometimes difficult to get. They can sometimes be obtained from chemists and chemical companies but sometimes they may have to be imported.

Other chemicals such as alkaline blue solution, pectinol and nutrient salts (wine nutrients) have to be imported. For ingredients that have to be imported VIS could assist by importing them and VIS can add a service charge to cover operating expenses. Table 3.4 shows some ingredients and chemicals with their estimated costs.

TABLE 3.4 SOME CHEMICALS, THEIR ESTIMATED COST AND THE SUPPLIER

(Address of Suppliers given Part D)

Item	Month	I/L	Unit	Price ZK	BF	US\$	Supplier
Acidometer	Mar/89	I	PC	-	500	13	Girbel
Wine yeast	Mar/89	I	25g	-	100	3	Girbel
Bakers yeast	Jan/90	L		30	-	1	Grocery
Pectinol	Mar/89	I	25g	-	150	4	DGF
Nutrient	July/89	I	1kg	-	100 0	25	DGF
Salt	July/89	I	1kg	-	150	4	DGF
Citric acid	April/89	L	1kg	148	-	15	Lusaka Pharmacy Cairo Chemists
Sodium	Dec/89	L	1kg	125	-	-	
Meta-bisulphite	May/89	L	50kg	195	-	-	Lusaka Pharmacy
Sugar	Jan/89	L	50kg	825	-	-	Zambia Sugar

*Includes measuring cylinder as well as alkaline blue solution

I = Imported material price quoted in Belgium francs (BF)
(US \$1 = 40 Belgium francs).

L = Local Price quoted in Zambian Kwacha (ZK)
Before June, 1989, US \$1 = K10
June - Nov. 1989, US \$1 = K16
Dec. 1989 to Jan. 1990 US \$1 = K23

4. PACKAGING REQUIREMENTS

The packaging requirements are mainly in the form of glass products. Although there is a glass making factory in Zambia (Kapiri Glass Products), difficulties have been experienced in obtaining glass packaging products.

Fruit juice bottles have been difficult to get because the mould for the Fanta, Coca cola and Tarino and Quench bottles are patented. Because of patent regulations even used bottles cannot be used legally. The bottle tops are crown corks made by Ndola Crown and can be obtained more easily. Jam jars do not fall under any patent regulations. Technically it should, therefore, be easy to obtain them. It is however, important that one orders when there is a large order that has been made. The machines that Kapiri Glass Products has are large and it is financially not possible for them to make bottles on a small order. They do, however, try to make extra bottles to sell to small scale entrepreneurs when they get a large order but this is not very reliable.

The bottle tops for jam jars are more readily available from International Enclosures which has a factory in Lusaka.

Wine bottles, as such, are not in Zambia. Kapiri Glass Products makes the modified Simba Wine bottle which uses metal pilfer seals. The pilfer seals are available from International Enclosures. The Simba bottles come in either clear glass or opaque brown. Problems are experienced in buying these bottles due to the scale at which they are produced. One has to order in the range of 200,000 - 30,000 bottles to justify the cost of running the machinery. Again Kapiri Glass products tries to produce extras when there is a large order to cater for small scale entrepreneurs. However, bottles are not always available when small scale entrepreneurs need them.

Alternatively used wine bottles have been obtained from hotels and restaurants. Due to the poor economic situation imported wine sales have gone down. This should be good news for local wine makers, but ironically it also means less wine bottles can be salvaged from hotels and restaurants.

VIS with the Small Industry Development Organisation (SIDO) can help by getting together and putting forward money to buy these packaging materials. Both organisations have members who are experiencing problems of obtaining glass packaging materials and they can sell the bottles to their members with an added service charge to cover operating expenses. This way the small scale entrepreneurs would have packaging materials when they need it. Table 4.1. gives various glass packaging material and price estimates.

Table 4.1. Glass Packaging materials from Kapiri Glass Products and estimated prices as of July, 1989

Price	Kind of Seal per 1000 Unit	Item Selling
750 ml modified Simba wine	10,000	Pilfer seal
300 ml Tarino	4,600	Crown cork
300 ml Fanta/Coca Cola	4,600	Crown cork
750 ml Plain Crush	4,300	Plastic Pilfer Seal
500g Jam jar	2,800	Twist off cap and screw on cap

5. EQUIPMENT

5.1 Locally Produced/Procured Equipment

A number of items such as aluminium cooking pots can be obtained locally. Some are made locally by metal smiths, others can be bought from retail shops that import them. Pasteurizing tanks and baskets can be made by local metal smiths.

The fruit press and pulper which were imported can be made locally, according to findings from the Technology Development and Advisory Unit (TDAU) of the University of Zambia. However, this would be at a much higher cost, up to eight times more than importing. This is due to the high level of inflation in the country, combined with a shortage of foreign exchange that makes it difficult to obtain imported raw materials like stainless steel.

It was estimated to cost K72,640,000 (August 1989) to make the fruit press and pulper after modifications to make them easier to produce locally.

There has been a more than 40% devaluation on the Kwacha since this quotation in August, 1989 and that would mean the cost of making the products has increased further.

It is important not to forget that the initial set of equipment produced even for the modified versions of the equipment will be costly. This is because the costs include developmental costs as well as the cost of testing this equipment. TDAU is probably the best equipped institution to do this right now. Once the proper specifications for the equipment have been established the production costs will come down because only manufacturing costs will be involved.

5.2 Imported Equipment

Several pieces of equipment would still be imported. If not, they are included here because the retailers selling them have to import them and they are therefore subject to similar foreign exchange restrictions. These are kitchen thermometers, weighing scales, crown corker, wine corking machines as well as the fruit press and pulper if they are not made locally. 10 Kg weighing scales can occasionally be obtained from the Zambia Scale Company and Avery Scale (Zambia) Ltd. Mostly both companies specialize in bigger industrial scales. Table 5.1. shows a list of equipment and suppliers.

Table 5.1 Equipment and Utensil List and Names of Suppliers

Item	I/L	Price Unit Month	Unit	ZK	BF	US\$	Supplier
Pulper	I	Mar/89	-	-	16000	400	Girbal
Fruit Press	I	Mar/89	-	-	10000	250	Girbal
Cork Closer	I	Mar/89	-	-	2000	50	Girbal
Cork Closer (small)		Mar/89	-	-	700	18	Girbal
Rotating brush	I	Mar/89	-	-	900	23	Girbal
Store brush	I	Mar/89	-	-	375	9	Girbal
Siphon	I	Mar/89	-	-	410	10	Girbal
Crown Corks closer	I	Mar/89	-	-	1125	28	Girbal
Bottle drains (50 bottles)	I	Mar/89	-	-	975	24	Girbal
Cork remover	I	Mar/89	-	-	22	6	Girbal
Bubbler	I	Mar/89	-	-	75	2	Girbal
		July/89	-	-	30	1	DGS
Bunting cloth	I	Mar/89	Sq/m	-	560	14	Girbal
Rubber cork for bubblers	I	Mar/89	-	-	150	4	Girbal
Densitomete	I	Mar/89	-	-	500	13	Girbal
15L barrels	I	Mar/89	-	-	210	5	Girbal
5L Jugs	I	Mar/89	-	-	375	9	Girbal
Refractometer	I	July/89	-	-	12000	300	DGS
50Kg scale	I	July/89	-	-	600	15	DGS
	L	Feb/89	-	1750	-	175	Zambia Scale Service
10 Kg scale	I	July/89	-	-	1500	38	DGS
	L	Feb/89	-	1750	-	1250	Zambia Scale Service

10 Kg scale	I	July/89	-	12500	-	1250	Zambia Scale Service
Pasteurising tank	L	Mar/89	-	2000	-	200	Zongendawa
Knives Cutting board	L	April/89	-	8.50	-	0.85	Limbada
	L	April/89	-	39	-	3.95	Paperman Ltd.
Wooden Spoon	L	April/89	-	5	-	0.50	Kamwala Market
Plastic barrel (40L)	L	April/89	-	800	-	80	Karina
Wooden barrel (200 L)	L	August/89	-	150	-	9	Gilbeys
Cement	L	April/89	50Kg	30	-	3	Chilanga Cement
	L	Sept/89	50Kg	49	-	3	Chilanga Cement
Crushed stones	L	April/89	1 cubic metre	600	-	60	Kafue Road
Wine Corks	I	Mar/89	500	-	3600	90	Girbal

 I = Imported material price quoted in Belgium francs (BF)
 US \$1 = 40 Belgium francs
 L = Local price quoted in Zambian Kwacha (ZK)
 Before June 1989 US \$1 = K10
 June-Nov 1989, US \$1 = K16
 Dec. 89 - Jan 1990 US \$1 = K23

5.3 Importing Procedures

Importation of products can be done in one of two ways. One is through banks and the other is through private importing companies. The various steps that are taken are as follows:

Through the Bank

You can apply (bid) to be allocated foreign exchange through your bank, stating what you are purchasing and the source. A quotation from the supplier is required at this stage.

The bank submits the bid along with other bids to the Bank of Zambia.

FEMAC, (The Foreign Exchange Management Committee) which is responsible for allocation of foreign exchange at the bank of Zambia sits fortnightly to allocate foreign exchange to the various bidders. Priority is given to the Agricultural and Manufacturing sectors.

If the bid is successful your bank is notified and they, in turn, notify you. Then an L.C. (Letter of Credit) is prepared which is sent to the bank that your banker has an account with, instructing them to pay the supplier upon honouring the order. Another LC is sent to the suppliers, informing them that the money was ready and payment would be made as soon as the goods were shipped.

Importing Through Another Company

There are a number of importing companies in Zambia. An example is Baid and Tutlock Zambia Limited in Lusaka and Ndola.

You make an order to the company which puts in an application through its bank.

This application (bid) goes through the same procedure as above.

The importing company will let you know when goods can be made available so that you may pay for the goods on arrival.

6. WORKSHOP AND STORAGE FACILITIES

A processing shelter was built for the pilot fruit juice processing project. The shelter was to be primarily used for processing fruit juice and jam. In the case of wine, however, a storage room is far more important than a processing shelter because wine would have to be fermented and matured for a period of 2 - 6 months.

The storage room should have shelves for storing chemicals and some ingredients like citric acid, yeast and sugar. In the seller there should be room for storing bottles of wine.

7. MARKET

7.1 Market Potential

There are at least brands of locally produced wines on the market and several imported wines. A good local wine has a lot of potential as a substitute for imported wines which are much more expensive and are subject to foreign exchange restrictions. At this point, close to 380 bottles of wine have been sold.

Some Government Department stores such as NIEC and Mwaiseni as well as private motels and restaurants have indicated an interest to purchase the wine provided the quality is maintained.

At a projected production level of 12 barrels of wine per year and 133 bottles (750 mls) per barrel, the total production expected is 1,596 bottles. The expected retail price is K70/bottle and this would result in expected sales for a year of

K111,720. With more barrels this production can easily be doubled or trebled.

7.2 Marketing Technique

The proper marketing techniques for the wine should be given adequate attention. Bearing in mind the limitations faced, such as inefficient transport for identifying potential customers, the customers should be encouraged to pick up the deliveries themselves, except for those within easy reach for the women.

8. FINANCIAL SOURCES FOR THE WOMEN ENTREPRENEURS

The women will not be able to obtain loans from financial institutions such as Banks because of lack of security and collateral. It is, however, possible through VIS for the women to obtain a loan of up to K40,000 from VIS revolving funds. The loan would be payable with an approximately 20% interest which is much lower than the current bank rates of about 35%.

Other sources of funding would be international organisations which support development project, the Small Industries Development Organisation (SIDO), various church groups and other non-governmental institutions.

9. PROFILE OF POTENTIAL ENTREPRENEURS

The entrepreneur should be persistent and one who strives for an improved quality. She should be able to set goals, plan ahead and monitor the results. In addition, the entrepreneur should have self-confidence and should have some interest in food processing as a business. The entrepreneur should not necessarily have a high educational level, but it would be advantageous for her to be able to communicate easily in English. This is an important criteria when purchasing and selling materials. English is the most widely used language in Zambian business places.

The potential women entrepreneurs should not be limited only to groups of women, but also to family groups or individuals who show potential. There are usually fewer social problems to tackle when dealing with a family group or an individual. The work will be more efficient if the members of each group is limited to a maximum of 5 women. The costs of production can be kept down with smaller groups, and there would be more individual accountability.

10. REQUIREMENT FOR PROTOTYPE PLANT FOR MAKING WINE

10.1 Equipment

<u>Equipment</u>	<u>Cost in US \$</u>
1 pulper	400
1 press	250
1 Refractometer	300
1 cork closer	50
1 crown closer	30
2 bottle drainers	50
30 bubblers	50
2 Acidometers	25
20 140L Barrels	1,000
1 50 kg scale	40
1 10 kg scale	200
1 small precision scale	500
some utensils	500.00
miscellaneous	<u>1,000</u>
	<u>4,435</u>

10.2 Materials

<u>Item</u>	<u>US \$</u>
Building	5,000
Materials	
4,000 Corks	1,000
Chemicals	<u>500</u>
	<u>6,500</u>

10.3 Other Considerations

Transport is generally a problem and availability of public system or possibility of arrangements should be considered. If there is none, check if VIS is giving transport assistance in your vicinity.

A working start up capital of about K40,000 will also be required.

11. ANALYSIS OF THE ECONOMIC SITUATION AND ITS EFFECT ON THE SUBJECT

The economic situation in Zambia has fluctuated widely during the project period. Prior to June 1989, the exchange rate was fixed at K10 to US \$1. In June the exchange rate was devalued to K16 to US \$1 and by December 1989, it was K23.50 to US \$1. This trend is expected to continue. The inflation rate in the country has been very high and was expected to reach 200% by the end of 1989. There have been serious shortages of foreign exchange in the country which have led to a rationing of foreign exchange through a bidding system at the Bank of Zambia. The above economic climate has affected the project in the following ways:

- a) The manufacturing industry in Zambia is highly dependent on imported inputs and lack of foreign exchange had led to frequent stoppages of production and many times production levels stayed below capacity. Because of this, a lot of scouting has been required before suppliers of various projects are identified.
- b) The high inflation rate made project items bought in Zambia very costly. Pricing of items tends to follow unofficial rather than official exchange rates. Since the money in the project is exchanged at the official rate, this would also mean that there is less money than would otherwise be in real market terms.
- c) There have been frequent shortages of raw materials and building materials which have made it difficult to obtain these when needed. The decontrol of prices is expected to stimulate production in the manufacturing and agricultural sectors which, in the long run, is a very important move for stabilizing the economy of the country.

12. SOCIO-CULTURAL ENVIRONMENT AT KAPINI AND ITS EFFECT ON THE PROJECT

The Community Development Association (CDA) at Kapini is a local non-profit organisation. Its membership comprises locals as well as people from the surrounding villages. In its constitution, the CDA has the role of being the mother body of all other projects and/or programmes in the community. As such, the CDA assumes a leadership role to all projects in the area. The CDA also manages and administers projects on behalf of the community.

The pilot fruit juice processing project aspires to establish a viable business enterprise for the women involved in the project and the women would take a leadership role in managing the enterprise independently. This takes away the leadership role that the CDA plays with respect to projects in the community and has led to the questioning of whether the project benefits the community at large or just the few individuals (women) directly involved in the project.

However, since the women are part of the community that the CDA represents, the benefits of a viable enterprise to the women will be benefits to the community at large. The enterprise would put money in the women's pockets and this would result in a higher standard of living for the women and their families. The community would benefit by virtue of the economic activities that the enterprise would generate in the area. Some friction has been felt between the women on the project and the CDA over a monetary contribution that the CDA has demanded from the project. The women do not see the need for this contribution and would prefer to make contributions to the CDA at their discretion. Because the CDA represents the community at large it is very important for the women to have CDA's support in order for the project to succeed. A compromise has been reached and it has been decided that the women will donate 10% of their net profit to the CDA and an agreement to this effect was signed.

Since the CDA is a non-profit organisation the contribution can assist to cover some of the CDA running expenses and also in initiating self-help projects in the community. The traditional leadership role that men assume in the society may contribute to some of the problems the project may face initially. The CDA management committee is comprised of mostly men and besides their constitutional mandate they traditionally would assume the leadership role over the women in the community. Establishing an all female enterprise therefore, creates a social conflict that may not be that obvious.

Without compromise between the women feeling they can manage on their own, and the men feeling without their leadership, the project would not succeed. It is therefore very important to reach a compromise that still benefits the women while also integrating the CDA leadership role in the community.

The traditional set up is that the men are the heads of the household and as such they may have a major role in how the money earned would be spent. While some of the women felt this may cause conflict at home most felt it could be resolved through discussions with their husbands.

By February 1990, the women had realised the business potential of their enterprise and were able to take the option of not taking any pay in order to recycle the money they had made into more production. This was a very pragmatic decision which the women came to on their own. The women in the project now strongly feel they have gained useful experience in the past year to be able to increase their returns in the coming year.

The Kapini case is a special case in view of the fact that it is a conglomerate of 7 villages with 7 headsmen to deal with. The Institute for Cultural Affairs (ICA) and the CDA assume very strong leadership roles in this community. In other communities, the Ruling Political Party assumes a more important leadership role, through the ward and section chairmen of the Party and also through the Women's League wing of the Party.

13. CONCLUSION

The fruit juice processing project has met its development objective; that of promoting rural women's engagement in small scale juice production activities based on locally available surplus fruits for local consumption. A lot of interest has been aroused in fruit juice processing and at least one more project has been proposed at the VIS. Other individuals and groups have also shown interest.

The setting up of a small wine enterprise at Kapini has shown that it is possible to set up such an income-generating venture at village level, involving only women. The project is potentially capable of producing a gross of K111,720 and a net profit of K43,399 per year. This net profit is money that could be used to finance loans for obtaining equipment.

Some social issues have surfaced which were not earlier anticipated due to the fact that the group involves only women. This makes it important to monitor the development of the Kapini project in order to assess the full social impact that the project may have.

14. RECOMMENDATIONS

a) The project needs to be closely monitored and assisted for at least one to two more years. This being a pilot project at village level, a lot has yet to be learned both in how best to tackle such a project and also in how to tackle the social problems that arise from a project such as this one.

b) Acquisition of Raw Materials

Fruits may be obtained easily from within the village or nearby farms where the fruits would be cheaper. Transport assistance may sometimes be necessary to do this. Acquisition of other raw materials such as sugar and chemicals will also need VIS assistance. Often repeated visits are required for this, which makes it difficult without readily available transport. VIS could also assist in purchasing these items on behalf of their clients and providing the items with an added service charge.

c) Importation of Products

The importation procedures are quite elaborate and VIS should assist in the importation of products, not only for this group, but for other VIS clients as well. These items can be made available to entrepreneurs with an added service charge.

d) Packaging Material

Acquisition of glass packaging material is a major constraint. This is mainly due to the large scale of production for the machinery that Kapiri Glass Products has in order to justify the production of products on order. It would be helpful

if VIS or VIS and SIDO would get together and purchase large orders of wine bottles or jam jars. These can then be availed from VIS and SIDO whenever the entrepreneurs need them.

For fruit juice bottles, if the current effort to encourage fruit juice production is to continue, Kapiri Glass Products should be encouraged to purchase a mould for plain unpatented fruit juice bottles (190-300 mls). This would ensure availability of bottles for such an industry to develop. VIS assisted by UNIDO could lobby for this to happen.

e) Selection of Entrepreneurs

A proper selection criteria for entrepreneurs should be established in order to ensure the success of projects. The numbers of individuals in a group should not exceed 5 in order for work to be done more efficiently. Individuals and small family groups should also be considered. With small groups there will be more accountability and the business will be more efficient.

f) Training Sequence

A 2 - 3 week training period should be mandatory before any processing of products for sale takes place. This is because bad habits are difficult to break once formed. The training programme should include general information on record keeping and food processing as an industry as well as marketing requirements. Practical should be included to bring out the following points to do with food processing: hygiene, raw material selection, quality control during production, packaging and marketing of the products. These factors can then be consolidated when they actually start producing the products for the project.

g) Financial Support

It will be difficult for the women to obtain financial support from the banks due to lack of collateral and security. However, if VIS makes good viable project proposal, the banks indicate they would consider the application for financing, even without collateral. This approach is already available within VIS. For example some women groups have been able to obtain loans from commercial banks for the purchase of equipment for hammer mills, sawing machines and knitting machines. However one finds that the banks have still requested the clients to come up with 30% of the loan money. The most sure source of funding for women at this level would be the VIS revolving fund but this is also limited.

VIS should also consider giving such women entrepreneurs loans through their revolving funds. Other sources of finance such as international agencies, non-governmental organisations and church groups should be approached by VIS on behalf of the entrepreneurs.

h) Provision of Petty Cash

This recommendation applies to the officials, such as the National Expert or field officer working on such a development project. A provision of petty cash should be given to ensure the smooth running of the project. The economic situation in Zambia has been fluctuating a lot, making it difficult to get things done under the normal UNDP procedures.

i) Extension of Project

Finally, it is recommended that the project be extended for at least one more year.

The economic climate in Zambia has been very unstable during the course of this period. The exchange rate of US dollar - Zambian Kwacha has fluctuated for 1:10 at the beginning of the project to the current rate of 1:23. This trend is expected to continue. Because of the uncertainties in the country and the difficulty of getting foreign exchange, many industries have faced difficulties which have led to shortages of various items from time to time. This contributed to difficulties faced by the project in obtaining some items.

This being a pilot project involving women at village level, a lot has yet to be learned with regard to the technical and social problems that may arise from a project such as this. For example some friction has already been felt between the CDA and the women over the changes in leadership role and handling of money. It remains to be seen what impact the project will have on individual households and on the community as a whole.

Wine, the product that has gained prominence in the project, takes a long time to be ready. It takes at least four months in this climate before it is ready for tasting and ideally after bottling it should be allowed to mature for at least two months to one year to be of good quality. An extension of the project would be necessary to make the proper technical and operational adjustments suitable to local conditions. Otherwise everything will be rushed at the expense of the project. The extension will also give more reliable technical and financial specifications for similar projects.

Different fruits are available at different times of the year for restricted periods of time. The economics of wine production work best at peak fruiting times when the fruit is the cheapest. To make proper adjustments over the trials of this year, it would be necessary for the project to run for another year. That way the project would have the benefit of a second fruiting season for each type of wine produced. The wine is being made from local fruits and hardly any literature is available for reference and the best quality will be arrived at through a process of trial and error.

There is need to establish 2 separate groups in order to improve the efficiency of operation. However for this to take place it would be necessary to build 2 separate processing and storage shelters. Additional equipment and utensils would also be required.

ESTIMATED COSTS FOR FORMING 2 SEPARATE GROUPS

<u>Equipment</u>	<u>Cost in US \$</u>
1 pulper	available
1 press	available
1 refractometer	300
1 cork closer	50
1 crown closer	30
2 bottle drainers	50
30 bubblers	50
2 acidometers	25
20 140 L barrels	1,000
1 50 Kg scale	40
1 10 Kg scale	200
1 small precision scale	500
some utensils	500
miscellaneous	1000
	3,745

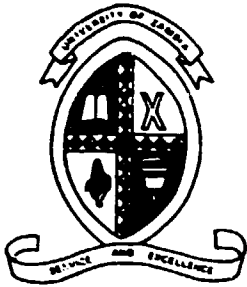
<u>Materials</u>	<u>US\$</u>
Building materials	10,000
Bottles	100
chemicals	500
miscellaneous	3000
TOTAL COST	13,600

PART DAddresses of Suppliers

The following are the addresses of possible suppliers of raw materials, chemicals, utensils and equipment. However supplies are not always available and it may be necessary to get in touch with more than one supplier at any given time. The suppliers that have been found more reliable than others are indicated with asterisks.

1. Andee's Hardware Ltd. P.O. Box 30629, Lusaka.
Hardware supplies, roofing nails.
 2. Avery Zambia Ltd. P.O. Box 31779, Lusaka.
Supply of weighing scales and repair.
 3. *Cairo Chemist Ltd. P.O. Box 31067, Lusaka.
Citric acid, food colours and some chemicals.
 4. *Chilanga Cement P.O. Box 99 Chilanga.
Cement
 5. *E.W. Tarry Zambia Ltd. P.O. Box 30038, Lusaka.
Nails, locks, woods preservative, paint.
 6. Galco Zambia Ltd. P.O. Box 30075, Lusaka. Mungwi Road,
Plot NO. 7437.
Corrugated iron sheets for roofing and other purposes.
 7. *Grocery stores.
Dry yeast.
 8. International Chemicals Zambia Ltd. P.O. Box 32071, Lusaka.
Chemical and scientific supplies.
 9. *Karina and Co. P.O. Box 32944, Lusaka.
Plastic drums, also has metal workshop for construction of
simple equipment on request.
 10. Kayosha area and *surrounding farms.
Fruits, building sand and river sand.
 11. Kapiri Glass Products Ltd. P.O. Box 810096, Kapiri Mposhi,
Zambia.
Glass products, bottle packaging materials.
- NOTE: For bottles need to order 200 000 - 300 000 units due to the capacity of production of machines. Can order smaller amounts only when there are left overs from large company orders but this is difficult to predict.
12. *Kenneth Kaunda Foundation, Marketing Division, Box 32708,
Lusaka.
Stationary, note books, rulers etc.

13. *Kingstons Zambia Ltd. P.O. Box 30651, Lusaka.
Stationary, office glue.
14. *Limbada's Hardware Ltd. P.O. Box 30014 and 30651, Lusaka.
Nails, locks, screws, door hinges, shelf brackets etc.
15. *Lusaka Pharmacy (1965) ltd. 7323 Moobola road, light
Industrial Area, off Lumumba road. P.O. 31580, Lusaka.
Citric acid, sodium benzoate, sodium metabisulphate.
16. Maloba Machine Industries Ltd. P.O Box 50984, Lusaka. New
Lumumba Road, Chinika 1.
Specialists in Building and steel fabrication.
17. *Mistry House Hardware Ltd. P.O. Box 30658, Lusaka.
Tools, hardware, paints Plastic basins, door locks
18. Ngongo Hardware and maintenance, P.O. Box 33996, Lusaka,
Zambia.
Plumbing, general jobbing.
19. *Speed Print (1974) Ltd. P.O. Box 30664, Lusaka.
Rubber stamp, date stamp, signs etc.
20. *Steel Fabrications Ltd. P.O. Box 30355, Lusaka.
Round steel bars for burglar bars and reinforcement of
concrete structures.
21. Sunmoon Hardware Ltd. Cha Cha cha road, P.O. Box 33237,
Lusaka.
Nails, door hinges, taps etc.
22. Tap Building Products Ltd. Head Office: Lusaka P.O. Box
31522, Chester House (4th Floor) Cairo road. Sales Office:
P.O. Box 31522, Lusaka (Chilanga off Kafue road); P.O. Box
510525, Airport road Chipata.
Asbestos roofing materials and pipes.
23. *Zambia Forest Industries Corporation Ltd. P.O. Box 71566
Ndola
(Head Office); Sales Depots:
Lusaka Box 34590
Kitwe Box 20626
Choma Box 630369
Wood products for construction and furnishings.
24. *Zambia National drug company, P.O Box 31343; Lusaka.
Chemical and Scientific supplies
25. Zambia Scale Service, P.O. Box 31041, Cha Cha cha road,
Lusaka.
Supply of weighing scales and repairs.
26. Zambia Sugar Company, P.O. Box 30489, Lusaka, Zambia.
Sugar.



The University of Zambia

Lusaka Campus

P.O. Box 32379
Lusaka, Zambia
Telephone: 213221
Telegrams: UNZA - Lusaka

Technology Development and Advisory Unit

Your reference

Our reference

Date

Tel. extension 469

U2/082489/ck

24th August, 1989

To: Mrs. Musonda,
Mr. P.C. Bauchau,
C/o UNIDO TF # 87/903,
UNDP,
P.O. Box 31966,
LUSAKA.

RE: PROPOSAL FOR PHASE I OF THE UNIDO PROJECT ON
FRUIT PRESSING EQUIPMENT.

Reference is made to our letter of intend dated 31st may and the subsequent discussions on 23rd August.

In the discussions mentioned it was proposed:

- A. To make a prototype of a wooden portal press.
- B. To make a prototype of a pulper with wooden rollers and without knives.
- C. That TDAU would reduce its involvement in the field testing to 5 days, being responsible only for the technical judgement.
- D. That TDAU will write only one report containing a technical assessment of the prototypes.

Taking into consideration of these remarks, the letter of intend remains effective.

The consequences for the estimated time and costs are given below:

	<u>Time</u>	<u>Costs before devaluation</u>	<u>Costs now</u>
Production of the necessary equipment	5 weeks	K13,000.00	K20,800.00
Lab testing of the equipment	3 weeks	27,600.00	44,160.00
Implementation of redesign suggestions			
Field testing			
Fruits needed*		p.m.	p.m.
Preparation of report	3 days	4,800.00	7,680.00
TOTAL	43 days	K45,400.00	K72,640

*The fruits will be provided by the UNIDO project.

2/....

- 2 -

24th August, 1968

Compared with the original proposal the costs are reduced with more than 40%. However, the devaluation has to be accounted for which brought the total amount to K72,640.00.

If the proposal is approved within 2 weeks, TDAU will be able to finish the prototypes by the 15th of October. The whole program can then be finished by the 6th of November. The report will be presented on 17th of November.

Yours sincerely,

Dr. A.M.C. Lemmens
A/Manager
TECHNOLOGY DEVELOPMENT & ADVISORY UNIT (TDAU)

Conditions of payment:

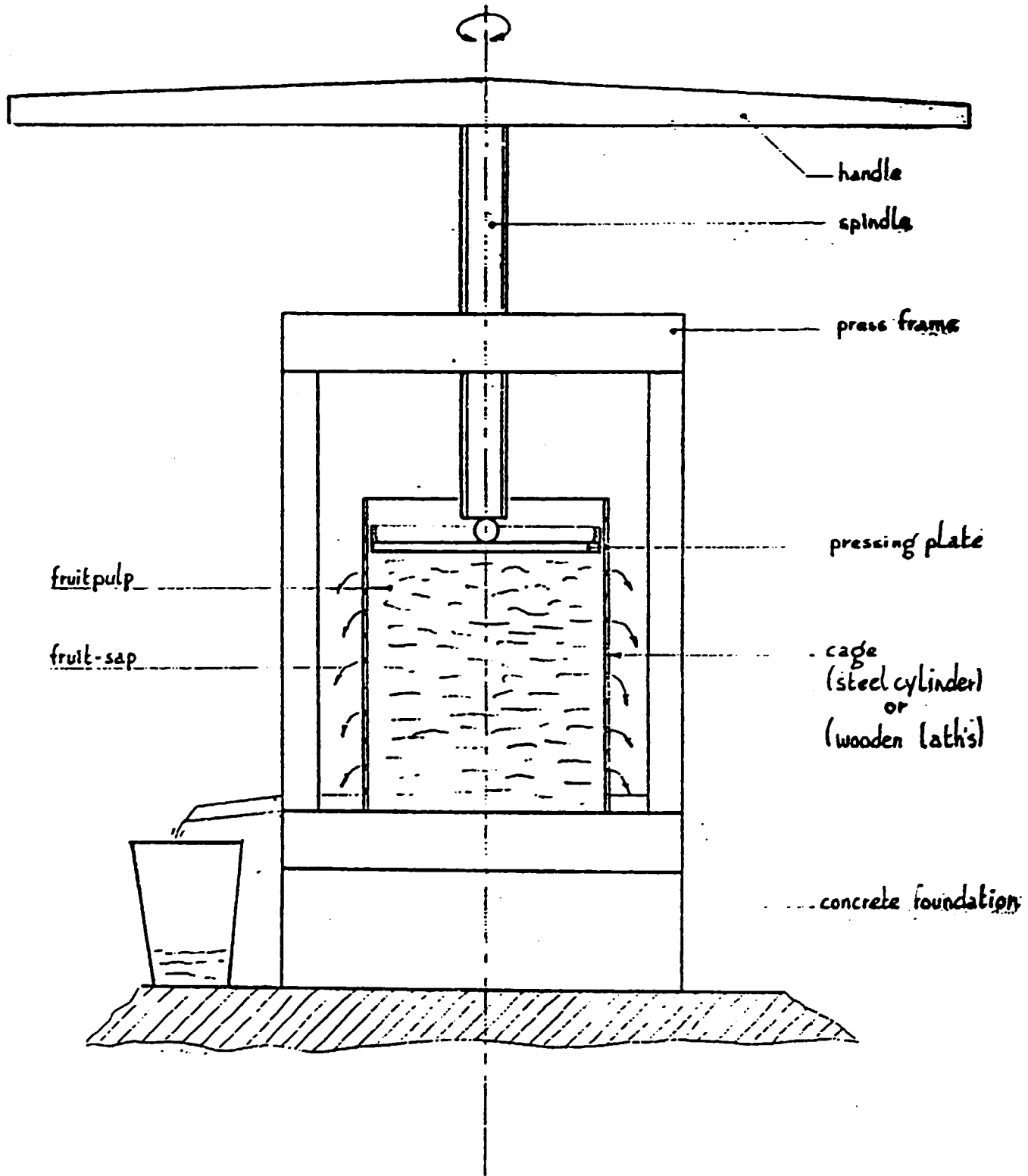
25% should be paid at the start of the program.

75% has to be paid within two weeks after presenting the final report.

Payments can be made:

- a. Cash
- b. Cheque payable to the Manager of TDAU
- c. Transfer to Barclays Bank
Northend Branch
Acc. 4524678

Prices quoted are valid for 4 weeks after the date of this letter. Thereafter they are subject to general changes in prices and wages.



Cross-bar or Straight-side press

THE PORTAL PRESS

AGREEMENT betweenThe Kayosha Club and the Community Development Association(C D A)in Kapini

In order to respect the social structure of the community and to show their willingness to work in harmony the **Kayosha Club** and the CDA have agreed:

- 1) The Kayosha Club will donate to CDA 10% of its net profit. The balance sheet of the Club will be established every three months by Village Industry Service (VIS). And 10% of the profit will be deposited on CDA's bank account.
- 2) The CDA will give all the possible assistance to the Kayosha Club to develop its activities e.g. utilisation of the building and facilities, utilisation of land for fruit trees plantation etc.

Kapini 31st of August 1989

For CDA

P. N. Mutandwa P/CHAIRMAN

N. Mutandwa

.....

For Kayosha Club

.....

Mrs. N. Mutandwa

Mrs. N. Mutandwa

FRUIT JUICE PROCESSING MANUAL

(TF/RAF/87/903)

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PART A: PROCESSING**1. Introduction**

Three fruit products are covered in this manual. Jam, fruit juice and wine. The jam depends on a high sugar content for preservation. Fruit juice is preserved through pasteurisation and using an air tight seal (crown cork) which prevents recontamination of the juice. The nectars are drinks which normally contain about 30% of fruit solids and they are drunk immediately after opening. The fruit wine is made by a process of fermentation and the high alcohol content of wine keeps its quality. Once the wine is open however, it will not keep for a long time.

2. Hygiene

Hygienic conditions are important in food plants not only because of public health and good appearance factors, but also because of hygienic practices contribute to better quality.

2.1 Hygiene and behaviour of personnel

Do not process food if:

- :you have wounds
- :you have respiratory diseases
- :you have communicable diseases

Try to wear:

- :a cap or a scarf. It will reduce the hazard of finding hairs in the finished products.

Always:

- :clean your hands before starting to process food products.

2.2 Plant and equipment cleaning

Clean up should be frequent and thorough and at least once a day.

Dilute chlorine is a good, cheap and usually available sterilizing agent.

Equipment should be dismantled before cleaning for a better result.

2.3 Waste disposal

A positive way to dispose of waste is to use them to make compost. The compost pit will be established at a certain distance (minimum 25 metres) from the processing area.

2.4 Access to the plant

Access to the processing area should be restricted to the workers engaged in food processing activities.

3. Jam making

3.1 Preparation for jam making

Before starting follow the following check list, to ensure that you have every thing that you need and continue the processing without interruption.

1. Enough fire wood or charcoal.
2. Enough clean drinkable water.
3. A clean plant, tables, equipment and utensils.
4. All necessary ingredients, jars and covers.
5. All necessary utensils and equipment.
6. Enough people to help you.
7. Enough time to complete your planned production.

Recipe

(For about 8 jars of 450g)

2.5 Kg fruit
 2.5 Kg sugar
 14 g citric acid
 15 g pectin

If you don't use pectin your jam will be liquid but the taste will be the same.

3.2 Procedure

a. Preparation

1. Prepare the pulp, weigh and cover it.
2. Weigh the sugar and cover it.
3. Weigh the citric acid and dilute it in 3 tablespoons of water. Cover it.
4. Weigh pectin and mix it with five tablespoons of sugar. Cover it.
5. During the preparation of all the ingredients, the helper will start the fire and will put on it a pot full of water with the jars and the caps.

b. Cooking

1. Put the pulp on a strong fire and start boiling it.
2. Add the pectin slowly while stirring very strongly.
3. Add the sugar and boil until reaching the desired texture.
4. Remove the foam.
5. Add the citric acid, fill the jars and close them.

6. Invert the jars for one minute.

c. Other operations

1. After inverting the jars, clean them immediately with clean hot water.
2. Glue a label on the jar indicating the type of production and the batch code number
3. Write in your record book all the data concerning each batch with the same code number used on the labels.
4. Store the jars in the shade and don't move them for at least five days
5. During the cooking, the helper will start the cleaning of the equipment and utensils which are not necessary any more.

4. Juice making

4.1 Preparation for juice making

Before starting, follow this check list

1. Enough fire wood or charcoal.
2. Enough clean drinkable water.
3. Clean plant, tables, equipment and utensils.
4. All necessary equipment and utensils are there.
5. All necessary ingredients are there.
6. There are enough bottles and crown corks.
7. There are enough people to help you.
8. You have enough time to complete your production.

4.2 Some recipes

Guava nectar

2.5 Kg guava pulp
1.2 Kg sugar
8.5 L water
6 g citric acid

Mango nectar

5 Kg mango pulp
1.5 Kg sugar
8 L Water
75 g citric acid

Papaya nectar

6 Kg papaya pulp
1 Kg sugar
8 L water
10 g citric acid

Lemon and Lime juice

5 Kg lemon or lime juice
 5 Kg sugar
 7 g benzoate

4.3 Procedure**a. Preparation**

1. Prepare the juice, weight and cover it.
2. Weigh the sugar and cover it.
3. Weigh the citric acid and cover it.
4. Measure the water.
5. During the preparation of the ingredients, the helper will start the fire under the pasteurisation tank containing the bottles placed in the pasteurising baskets.

b. Processing

1. Put the water and the sugar on a strong fire.
2. When the water starts to boil add the pulp and the citric acid.
3. Continue the cooking until a temperature of 90 degrees Celsius.
4. Fill the hot bottles and close them immediately.
5. Put the bottles in the pasteurising tank full of boiling water and keep them immersed for 10 minutes.
6. Remove the bottles and immerse them in cold water for 20 minutes.

c. Other operations

1. Glue a label on each bottle indicating the type of juice, the date of preparation, the batch code number.
2. Write in your book all data concerning each batch with the same code number used on the labels.
3. During the final pasteurisation of the day, the helper will start the cleaning of the equipment and utensils used.

5. Wine Making

One can make wine from many fruits. Only experience will tell which fruit wine is best appreciated by your consumers.

5.1 Recipe for guava and tomato wine

100Kg fruit pulp
 25 Kg sugar (exact amount to be calculated)
 25 g yeast
 15 g nutrient salts
 Citric acid (amount to be calculated)
 3 g pectinol

Alkalineblue solution (to determine citric acid amount need drops)

This is a general recipe. The exact amount of ingredients such as sugar and citric acid are determined by calculation during the processing procedure. The recipes for other fruits like mangoes would have to be established through a process of trial and error.

Other chemicals required for clarification of the wine are about 24 g each of gelatin and tannin.

5.2 Processing Method for Guava and Tomato Wines

Procedure for a wine with 12% of alcohol level prepared in a 140 litre barrel.

1.0 Preparation

- 1.1 Wash and rinse an open 200 L barrel, the pulper and utensils.
- 1.2 Wash, rinse, trim and cut in halves about 105 kg of well ripen fruit.

2.0 FIRST FERMENTATION (Open barrel)

- 2.1 Pulp the fruit through the pulper; weigh 100 kg of pulp and place it in the fermentation barrel.
- 2.2 Dissolve 4 kg of sugar in 30 litres of warm water (40 to 50 C) and add it to the pulp.
- 2.3 Add 9 gm of sodium metabisulfite dissolved in some water.
- 2.4 Add 3 gm of pectinol.
- 2.5 Add 5 gm of yeast.
- 2.6 Mix very well and cover the barrel with bunting cloth.
- 2.7 Allow a maximum of 3 days fermentation while mixing the pulp 3 times a day.

Note: Verify that all the data have been recorded in the log book or the production sheets.

3.0 SECOND FERMENTATION

- 3.1 Wash and rinse the press, a 140 litre barrel with a lid and the necessary utensils.

- 3.2 Extract the juice through the press. Measure exactly the number of litres obtained and pour the juice in a 140 litre barrel.
- 3.3 Read the sugar content of the juice with the refractometer (should be about 10%).
- 3.4 Calculate the amount of sugar to be added as follows:
- Multiply the sugar percentage found in the juice by the amount of juice (in litres) and divide the result by 100 to find the amount of sugar already in the juice.

Example: If the % read on the refractometer is 9.5% and the number of litres of juice is 75 litres, then the quantity of sugar is $(9.5\% \times 75 \text{ litres} = 7.125\text{kg})/100$

The ideal amount of sugar in 75 litres of juice is should be between 6 and 12 kg. If it is not the case it means you made a mistake and you have to check again all your figures.

- To have a wine with 12% of alcohol level, you must have a total of 28 kg of sugar in a 140 litres barrel.

To know how much sugar you must add for the second fermentation, subtract the amount (in kg) of sugar found in the juice from 28 kg. In the example given above, you should add 20,875 kg of sugar: $28\text{kg} - 7.125 \text{ kg} = \underline{20.875\text{kg}}$

- 3.5 Calculate as follows to determine the amount of citric acid you need to add:
- Fill the small graduate OL cylinder up to the mark "0" with the extracted juice.
 - Add slowly the alkaline blue solution drop by drop until the solution remains green after shaking the tube.
 - Read the level of the solution in the cylinder; the number read gives the grammes of acid per litre present in the juice. (Example 5.2 g/litre)
 - Multiply the figure (eg.5.2) by the amount of litres of juice (e.g.75 litres) to find the amount of acid in the 75 litres. In our example $5.2 \text{ g/l} \times 75 \text{ l} = 390 \text{ grammes}$ of citric acid. The ideal amount is between 250 and 500 grammes.
 - To have a wine with 12% alcohol level, you must have a total of 1,260 grammes of citric acid in a 140 litres barrel.

In the example given you should add 870 grammes of citric acid:
 $1,260\text{gm} - 390\text{gm} = 870\text{gm}$

- 3.6 Dissolve the sugar and the citric acid in 30 litres of hot water (with the temperature between 40 - 50 C) and pour it into the barrel.
- 3.7 Add 15 grammes with the temperature between of nutriment salts.
- 3.8 Add 20 grammes of yeast.
- 3.9 Fill the barrel with tepid water (the temperature should be about 30 C) up to the 140 litres mark. Mix very well.
- 3.10 Put the lid that is equipped with a bubbler. Allow the mixture to ferment until no more gas passes through the bubbler.

Note:

- i. Check once a week the water level in the bubbler.
- ii. Verify that all the data have been recorded in the log book.

4.0 CLARIFICATION

After 2 months when you think the fermentation is completed (the length of the period will vary with the season), siphon a sample of wine and fill a bottle for testing purpose. After a few days, check if there are no bubbles (which means the fermentation is completed). If you see bubbles, continue the fermentation for another month. When the fermentation is completed start the clarification.

- 4.1 dissolve 18g of tannin in a cup of wine and mix the solution in a full barrel of wine. Allow to stand for one day.
- 4.2 Dissolve 18g of gelatin in a cup of hot water and mix the solution in the barrel. Allow to stand for one week.
- 4.3 Make the first clarification by siphoning (sucking) the upper part of the barrel into an empty clean barrel.
- 4.4 Repeat the steps 4.1 and 4.2 with 6g of tannin and 6g of gelatin. After two weeks check if the wine is clear by filling a bottle for the testing purpose. Allow it to stand for 3 days, if there is no sedimentation the wine in a barrel is ready for bottling. If not make a third testing without tannin and gelatin.

5.0 BOTTLING

When the sample does not show any sign of sedimentation you can start the bottling.

- 5.1 Clean enough amount of bottles (about 150) for the whole barrel (140 litres).

- 5.2 Soak the corks in tepid water for 30 minutes.
- 5.3 Start the filling of the bottles. But make sure not to reach the bottom of the barrel.
- 5.4 Close the bottles with corks.
- 5.5 Label the bottles the same day with the code number written on the label.
- 5.6 Keep the bottles on horizontal position to cover the cork by wine) in a cool, dark place.

6. **INGREDIENTS PREPARATION**

1. **LEUKOL** (Potassium Metabisulfite)
(Contains 50 - 55% of SO₂)
Use 6gm per 100 litres or 9gm per 140 litres barrel.
Dissolve in tepid water.
2. **XYLINE SP** (Alcalin Detergent)
For barrels washing.
Dissolve 100gm of xylene in 2 litres of hot water.
3. **CLARIBEL** (Bentonite+Gelatine+Spray-Dried Blood)
For wine clarification
Dose: 25gm per 140 litres
Dissolve 25gm CLARIBEL in 150ml of cold water.
Incorporate the prepared Claribel in the wine by small portions at the time of drawing off. It is important to finalise the intimate mixing very quickly.
Wait four or five days before drawing off.
4. **YEAST** (For wine Making)
Ideal working temperature: 22 C
Dose: 20gm/100L or 25gm/140L
Preparation: Dissolve the yeast in 10 times its weight of tepid water containing 5% of sugar.
Allow 20 minutes before mixing the mixture with the must.
5. **PECTINOL** (Pectinase)

Will hydrolyse the pectin, reduce the Viscosity and allow an easier clarification.
Dose: 3gm/100L.
Preparation: Dissolve the pectinol in 10 times its weight of water or must.

PART B: RECORD KEEPING**7. BUSINESS ADMINISTRATION****7.1 Production Records**

Keeping production records is very important. The records will help you to control the quality of your product. For example the production sheet for wine should be filled in every time you process some wine, or carry out some additional processing on the wine. It should never be left until another time because this can cause confusion.

It would be useful to make a production sheet for any product that you make. If you are not sure about what to include in your production sheet ask for some assistance from someone who knows how to make the particular product.

EXAMPLE OF INFORMATION TO INCLUDE IN CASH BOOK

Date	Balance K	Details	Receipt No.	Quantity	Income	Expenditure K
18/11/89	700	Wine	002	10 bottles	700	-
19/11/89	500	Sugar	003	10 bottles	-	1200
10/12/89	6500	Wine	004	100 bottles	7000	-

Date	Details	Receipt No.	Quantity	Income ZK	Expenditure ZK	Balance ZK
18/11/89	Wine	002	10 bottles	700	-	700
19/11/89	Sugar	003	10 bottles	-	1200	500
10/12/89	Wine	004	100 bottles	7000	-	6500

EXAMPLE OF INFORMATION IN STOCK BOOK

(each item is recorded on a separate page or card)

Article: Sugar

Recorder: level 100kg

DATE	PARTICULARS	IN	OUT	BALANCE KG
6/10/89	Purchase	200 kg	-	200
10/12/89	Used	-	50 kg	150
14/12/89	Used	-	50 kg	(recorder)
16/12/89	Purchased	100 kg	-	1100

7.2 Cash Book

A cash book should be opened from the very beginning of your project. This cash book will have a record of all cash transactions that have taken place in the project. Every time money is received or paid out this should be recorded in the cash book. See the cash book sample below .

The cash book entry includes a cash balance which always gives the cash status of the project at any given time.

EXAMPLE OF INFORMATION TO INCLUDE IN CASH BOOK

Date	Details	Receipt No.	Quantity	Income ZK	Expenditure ZK	Balance ZK
18/11/89	Wine	002	10 bottles	700	-	700
19/11/89	Sugar	003	40 kg	-	680	20
10/12/89	wine	004	100 bottles	7000	-	7020

EXAMPLE OF INFORMATION IN STOCK BOOK

(each item should be recorded on a separate page or card)

Date	Particulars	In kg	Out	Balance kg
6/10/89	purchase	200	-	200
10/12/89	used	-	50	150
14/12/89	used	-	50	100 (recorder)
16/12/89	purchase	1000	-	1100

7.3 Stock Book

This book is also important because it contains all information on the stock available in order to be able to order in time before stocks completely run out. If stocks are allowed to run out before re-ordering, you will run into production problems. For example, you will not be able to make wine if you don't have enough sugar or yeast. Every time some ingredients are used this should be recorded. The stocks should not be allowed to go below a certain level before reordering.

7.4 COSTING

When you cost a product what you are doing basically is to take into account all the costs that have gone into producing

that product. For example cost of materials, transport, labour, fuel, packaging, etc.

It is important that all the costs incurred in producing a product are taken into account. Only then can you determine the real cost of producing your product.

To the cost of production for the product cost of selling the products and a profit margin should then be added in order to come with the actual sales price for the product.

When the product is sold what you receive will be called your revenue. The revenue includes all costs of production as well as the profit. The cost of production and sale is subtracted from the revenue to arrive at the profit.

RETAINED EARNINGS

When you receive your profit it is not advisable to pay it all out to the members of the group, some of this money should be retained and channelled into more production. This way you will be able to increase your production.

EXAMPLE OF COSTING FOR JAM

(Costing for 8 450g jars of jam)

	Cost K
Fruits	75.00
Sugar	80.00
Citric acid	2.07
Pectin	3.00
Transport	2.00
8 Jars	36.80
8 bottle tops	16.00
Labour	5.00
Fuel	5.00
Total	224.87

Cost of production for 8 jars = K224.87
 Cost of production for 1 jar = K 28.11
 25% profit mark up = K 7.03
 Suggested sales price = 28.11 + 7.03 = 35.14 per jar.

7.5 **MARKETING AND SOURCING**

Because of a general transport problem in Zambia, good planning will be required in order to cut down on transport costs.

It will be good to encourage customers to come and buy from the project site unless you have readily suitable transport.

Buying of all raw materials should be set for specific days to avoid separate trips which can be expensive. Some products may require that you write a letter of introduction before you can purchase the products. If you run into problems you should visit the Village Industry Service (VIS) and ask for their assistance.

PART C: REGISTRATION AND IMPORTING PROCEDURES

8. REGISTRATION PROCEDURES

- 8.1 Get a trade name registered with the Ministry of Commerce and Industry. The Registration forms for this can be obtained at the Ministry.
- 8.2 Write an application letter to Village Industry Service addressed to the Chairman. This letter should state the nature of the business or project to be undertaken.
- 8.3 A contact form will then be sent to the applicants provided the project falls under VIS operations.
- 8.4 The contact forms should be filled in and signed by the District Executive Secretary of the area. Then the forms should be sent back to VIS with an administrative fee of K10.00. This fee is non-refundable.
- 8.5 The application forms then go through the Project Appraisal Committee Meeting and if the project is found to be viable registration forms will be sent to the applicant.
- 8.6 After filling in registration forms and declaration forms the applicant will pay a fee of K50.00 for the certificate to be issued. The applicant is requested to send a photocopy of the VIS certificate to VIS.
- 8.7 After this a manufacturing licence can be issued by the Ministry of Commerce and Industry.

9. MANUFACTURING STANDARDS

There are currently no standards specified for Jam, fruit juice and wine at the Zambia Bureau of Standards.

However it is still necessary to have food products analyzed at the Food laboratory at the University Teaching

Hospital or at the National Council for Scientific Research.

The analytical results are necessary to certify that the food products you produce are safe for human consumption.

Samples can also be sent to VIS to have the analysis done. The manufacturer should however be prepared to pay the fees for analysis.

10. IMPORTING PROCEDURE

The importing procedure is quite elaborate and it may be better for you to request VIS to assist. When there are several entrepreneurs requiring the same products the transportation cost may also be reduced by making a larger order jointly through VIS. The various steps for importing are as follows:

Through the bank

You can apply (bid) to be allocated foreign exchange through your bank stating what you are purchasing and the source (supplier). A quotation from the supplier is required at this stage.

The bank submits the bid for foreign exchange along with other bids to the Bank of Zambia.

FEMAC, the committee responsible for allocation of foreign exchange at the Bank of Zambia sits fortnightly to allocate foreign exchange to various bidders. Priority is given to the Agricultural and Manufacturing Sectors.

If the bid is successful your bank is notified and they in turn notify you. Then a LC (Letter of Credit) is prepared which is sent to the bank that your bank has an account with instructing them to pay the supplier upon honouring the order. Another LC is sent to the supplier informing the company that the money was ready and payment would be made as soon as the goods were shipped.

Importing through another company

- Make an order to the company which puts in an application through its bank.
- This bid goes through the same procedure as above.
- The company will let you know if goods can be made available and you may pay for the goods on arrival.

PROCESSING RECORD FORM

TYPE OF WINE: _____ CODE NUMBER: _____

PRICE OF FRUIT (ZK): _____ PER 100 KG

FIRST FERMENTATION: _____ DATE: _____

RESPONSIBLE PERSON: _____

WEIGHT OF FRUIT TO BE PROCESSED: _____ KG

WEIGHT OF FRUIT AFTER PULPING: _____ KG

AMOUNT OF WATER ADDED: _____ LITRE

WEIGHT OF SUGAR ADDED: _____ KG

WEIGHT OF METABISULFATE ADDED: _____ GM

WEIGHT OF PECTINOL ADDED: _____ GM

WEIGHT OF YEAST ADDED: _____ GM

SECOND FERMENTATION: _____ DATE: _____

RESPONSIBLE PERSON: _____

(a) AMOUNT OF JUICE EXTRACTED: _____ LITRE

(b) REFRACTOMETER READING: _____ %

(c) SUGAR CONTENT: (a) X (b) = _____ / 100 = _____ KG

WEIGHT OF SUGAR TO ADD TO 140LITRE BARREL:

28KG - (c)KG = 28 - _____ = _____ KG

(d) ACIDITY READING: _____ GM PER LITRE

(e) TOTAL ACID CONTENT:(a) X (d) = _____ X _____ = _____ GM

WEIGHT OF ACID TO ADD TO 140LITRE BARREL:

1,260 - (e) = _____ GM

WEIGHT OF NUTRIENT SALT TO ADD: _____ GM

WEIGHT OF YEAST TO ADD: _____ GM

FIRST CLARIFICATION: _____ DATE: _____

RESPONSIBLE PERSON: _____

WEIGHT OF TANNIN ADDED: _____ GM

WEIGHT OF GELATIN ADDED: _____ GM

SECOND CLARIFICATION: _____ DATE: _____

RESPONSIBLE PERSON: _____

WEIGHT OF TANNIN ADDED: _____ GM

WEIGHT OF GELATIN ADDED: _____ GM

THIRD CLARIFICATION: _____ DATE: _____

RESPONSIBLE PERSON: _____

BOTTLING: _____ DATE: _____

RESPONSIBLE PERSON: _____

SIZE AND NUMBER OF BOTTLES:

_____ LITRE OF BOTTLE: _____ BOTTLES

_____ LITRE OF BOTTLE: _____ BOTTLES

_____ LITRE OF BOTTLE: _____ BOTTLES