

# **Feasibility Study**

## **Production of wines and jams by Jerusalem Women's Processing Group – Chipata, Zambia**

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## **Executive summary**

This feasibility study was conducted to determine the viability of a cooperative fruit wine and jam processing enterprise located at Jerusalem, Zambia. The feasibility of the proposed enterprise was assessed in four core areas namely market and financial feasibility, technical feasibility, resource and environmental feasibility and social and institutional feasibility.

Based on the existing demand for fruit wines and jams, manifested through the sales currently achieved by the Jerusalem Women's Processing Group, a market opportunity for the production of good quality fruit wines and jams to compete on a commercial scale with similar products in the retail outlets in the Chipata area was identified. The analysis of the financial feasibility of the proposed enterprise revealed that (based on the assumptions that were made) the enterprise is potentially profitable and could greatly contribute to improving the incomes of the involved parties.

As a result of a lack in a comprehensive analysis of the current natural resources that are available in Zambia this feasibility study has made a number of assumptions regarding the environmental and/or natural resource feasibility of the enterprise. Based on the limited information it was concluded that the proposed enterprise could be environmentally feasible.

Processing technology that is ideally suited to the specific technical requirements of the proposed processing enterprise at Jerusalem, Zambia is readily and inexpensively available. The location at Jerusalem is suited to the establishment of a processing enterprise of this nature since it is reasonably well located with regards to resources and distribution channels. The procurement of some inputs, especially packaging, and the transportation of finished products to the market from Jerusalem are, however, detractors of the location at Jerusalem.

Taking the net social benefit of the proposed processing enterprise into consideration it can be concluded that the processing enterprise is anticipated to be socially and institutionally feasible. The women directly involved and their communities would benefit in a number of direct and indirect ways from the establishment of the proposed enterprise.

Based on the framework set out in this feasibility study it can be concluded that the proposed processing enterprise at Jerusalem is feasible. This positive result of the feasibility analysis is, however, heavily dependant upon the assumptions made during the study and on conditions (political, environmental, economical etc.) remaining relatively stable within the enterprise's operating environment. If either the assumptions or the operating environment were to differ substantially from actual circumstances the actual feasibility of the processing enterprise at Jerusalem could differ from the current result.

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# 1 Project summary and terms of reference

The Commercial Products from the Wild Group (CPWild Group) and the World Agroforestry Centre are jointly investigating the feasibility of possible enterprises based on indigenous forests and woodlands products in Tanzania, Zambia, Malawi and Zimbabwe. A critical element of these studies is a series of feasibility studies based on selected potential products for each target country.

Based on a general scoping study it was decided to investigate the feasibility of a producer cooperative selling primarily wines and jams produced by the Jerusalem Women's Processing Group outside Chipata, Zambia.

## 2 Zambia country overview



Figure 1 – Map of Zambia ([www.cia.gov/publications/factbook](http://www.cia.gov/publications/factbook))

## 2.1 General

Zambia is a landlocked independent republic with a democratic government. It lies south of the Democratic Republic of Congo and Tanzania, west of Malawi, north of Zimbabwe and Namibia and east of Angola and forms part of the Southern African Region. The capital city is Lusaka and other major cities are Ndola and Kitwe.

The South Africa Company administered the territory of Northern Rhodesia from 1891 until the country was taken over by the UK in 1923. Northern Rhodesia gained independence from the UK in 1964 and the country's name was changed to Zambia. Elections in 1991 brought an end to one-party rule in Zambia. ([www.cia.gov/publications/factbook](http://www.cia.gov/publications/factbook)).

## 2.2 Economy

Despite progress in privatization and budgetary reform, Zambia's economic growth remains below the 5% to 7% necessary to reduce poverty significantly. Privatization of government-owned copper mines relieved the government from covering mammoth losses generated by the industry and greatly improved the chances for copper mining to return to profitability and spur economic growth. Copper output increased in 2003 and is expected to increase again in 2004, due to higher copper prices. The maize harvest doubled in 2003, helping boost GDP by 4.0%. Cooperation continues with international bodies on programs to reduce poverty, including a new lending arrangement with the IMF expected in the second quarter, 2004. A tighter monetary policy will help cut inflation, but Zambia still has a serious problem with fiscal discipline ([www.cia.gov/publications/factbook](http://www.cia.gov/publications/factbook)).

The Zambian economy is primarily dependent on the services sector, which accounted for 57% of the US\$8.6 billion GDP in 2003. The industrial and

agricultural sectors contributed 28% and 15% to the GDP respectively <http://www.mbendi.co.za/>.

Zambia's main export items include copper, cobalt, electricity, tobacco, flowers and cotton. These items are exported to countries such as South Africa, Malawi, St Pierre & Miquelon, Japan, Egypt, UK, Thailand, China and the Netherlands. The country imports products such as machinery, transport equipment, petroleum products, electricity, fertilizer, foodstuffs and clothing. Import partners include South Africa, the UK and China. <http://www.mbendi.co.za/>

### **3 Methodology**

A feasibility study is generally defined as a structured way to efficiently organize the information that is needed for confident decision-making regarding the profitability and technical/financial/social/environmental viability of a specific proposal.

The general approach used in the assessment of project feasibility assesses four main focus areas of enterprise development as proposed by Lecup and Nicholson (2000):

- The market and economic environment
- The scientific and technological environment
- Resource management and the environment
- The social and institutional environment

A feasibility study could follow the structure of the diagram in Figure 2 (Adam & Doyer, 2000). A critical output from the study would be an indication of the viability of an indigenous fruit processing industry. If viable, the results from this study can be used to compile a comprehensive business plan for such an industry.

For this study the following organizations were consulted:

- ICRAF country office (Chipata, Zambia)
- Jerusalem Women's group (Jerusalem village, Chipata, Zambia)
- Shoprite (Chipata, Zambia)
- Mama Rula's guesthouse
- Dr. Chris Hansmann (ARC Infruitec-Nietvoorbij, South Africa)

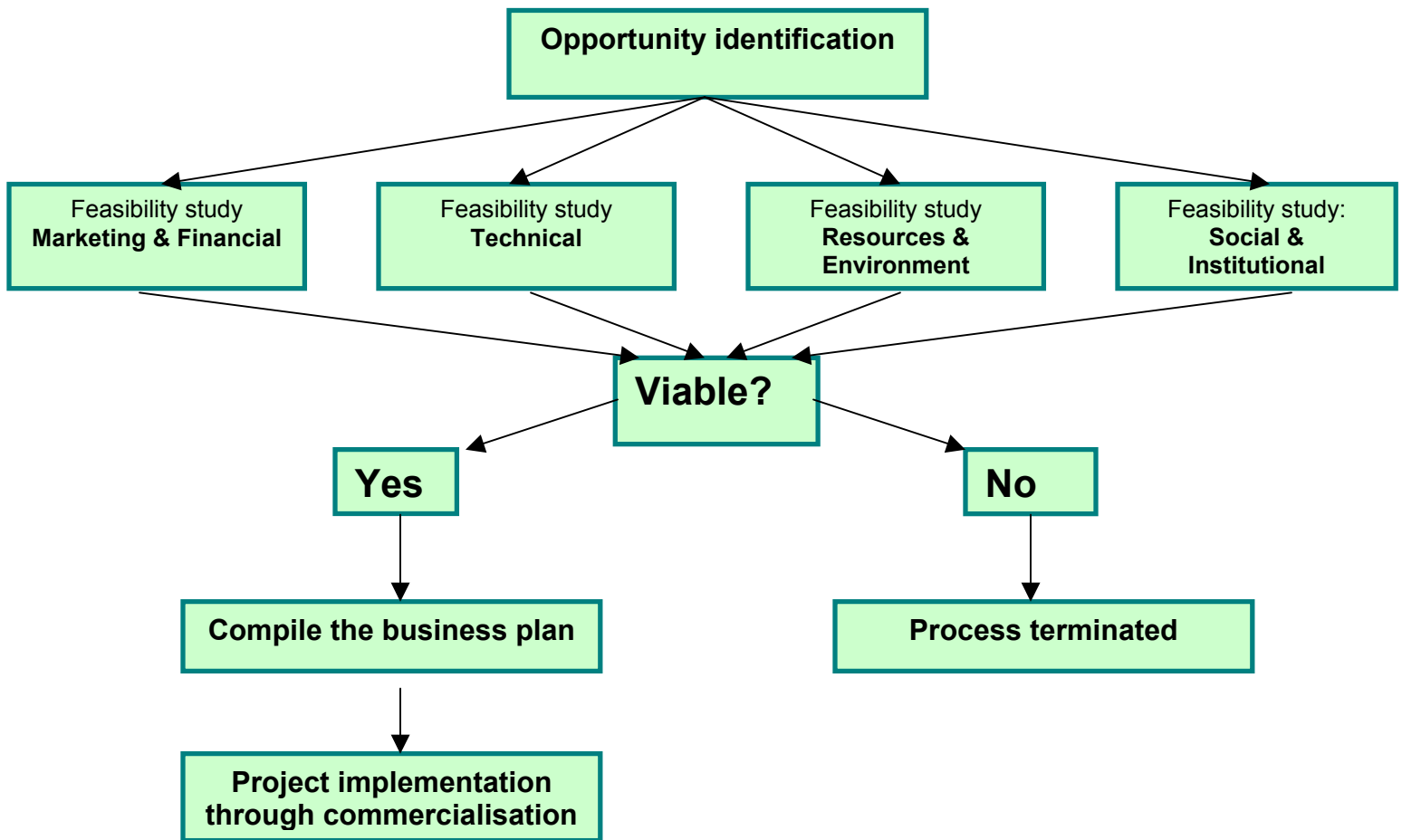


Figure 2 - Flow diagram for the exploration of new opportunities

## **4 Jerusalem Women's Processing Group**

### **4.1 Overview**

The Jerusalem Women's Processing Group (JWPG) is a group of women established in the Jerusalem village approximately 30km's from Chipata through the efforts of ICRAF – Chipata. The purpose of establishing the processing group was to train the women in the vicinity of the village in the processing of fruit to improve their nutritional status, to create income-generating opportunities and to encourage the preservation and planting of trees, especially indigenous trees.

### **4.2 Current products and markets**

#### **4.2.1 General**

Table 1 gives a summary of the products currently processed by the JWPG. The fruits are procured locally and the products are processed with rudimentary cooking utensils. There are currently no dedicated facilities for the production of these products and product quality can be questioned.

**Table 1 – Current species and respective products processed by JWPG**

| <b>Species</b>       | <b>Product</b> |
|----------------------|----------------|
| Banana               | Wine           |
| <i>Piriostygimia</i> | Wine           |
| Mango                | Wine<br>Jam    |
| <i>Uapaca</i>        | Wine<br>Jam    |
| <i>Ziziphus</i>      | Wine<br>Jam    |
| <i>Flacourtia</i>    | Wine<br>Jam    |
| <i>Parinari</i>      | Wine<br>Jam    |
| Baobab               | Wine<br>Jam    |
| Marula               | Wine<br>Jam    |
| <i>Strychnos</i>     | Wine           |

#### **4.2.2 Current markets**

The current market for the products produced by the Jerusalem Women’s Processing Group include consumption at home, selling unpackaged products from their homes (by the teaspoon full, selling into containers brought by the customers) and selling some of the produce through a village shop.

The market within the town of Chipata has not been significantly penetrated and this market as well as the tourist market hold potential for the products of the processing group.

### 4.2.3 Cost benefit analysis

The production costs of the two products currently produced by the Jerusalem Women's Processing group are detailed in table 2. It should be noted that no cost has been attached to the fruit pulp, packaging and marketing since the women indicated that they procure fruit at no cost and currently don't package much of their produce since it is either sold loose or into the containers of their customers.

**Table 2 – Estimated current production costs for wine and jam produced by JWPG**

| Wine               | Unit       | Price per unit | Unit required per | USD/batch | USD/liter | Percentage of |
|--------------------|------------|----------------|-------------------|-----------|-----------|---------------|
|                    |            | USD            | 20 liter batch    | USD       | USD       | costs         |
| <b>CONSUMABLES</b> |            |                |                   |           |           |               |
| - Fruit pulp       | USD/kg     | 0.00           | 5.00              | 0.00      | 0.00      | 0.00          |
| - Water            | USD/liter  | 0.00           | 20.00             | 0.00      | 0.00      | 0.00          |
| - Yeast            | USD/cup    | 0.10           | 2.00              | 0.21      | 0.01      | 6.38          |
| - Sugar            | USD/kg     | 0.73           | 4.00              | 2.92      | 0.15      | 89.36         |
| - Packaging        | USD/bottle | 0.00           | 20.00             | 0.00      | 0.00      | 0.00          |
| - Marketing (15%)  | USD/bottle | 0.00           | 1.00              | 0.00      | 0.00      | 0.00          |
| - Charcoal         | USD/batch  | 0.14           | 1.00              | 0.14      | 0.01      | 4.26          |
| - Transport        | USD/batch  | 0.00           | 1.00              | 0.00      | 0.00      | 0.00          |
|                    |            |                |                   | 3.26      | 0.16      | 100.00        |
| Jam                | Unit       | Price per unit | Unit required per | USD/batch | USD/kg    | Percentage of |
|                    |            | USD            | 10 kg batch       | USD       | USD       | costs         |
| <b>CONSUMABLES</b> |            |                |                   |           |           |               |
| - Fruit pulp       | USD/kg     | 0.00           | 6.00              | 0.00      | 0.00      | 0.00          |
| - Lemon juice      | USD/cup    | 0.31           | 1.00              | 0.31      | 0.03      | 6.41          |
| - Sugar            | USD/kg     | 0.73           | 6.00              | 4.38      | 0.44      | 90.68         |
| - Packaging        | USD/bottle | 0.00           | 20.00             | 0.00      | 0.00      | 0.00          |
| - Marketing        | USD/bottle | 0.00           | 1.00              | 0.00      | 0.00      | 0.00          |
| - Charcoal         | USD/batch  | 0.14           | 1.00              | 0.14      | 0.01      | 2.89          |
| - Transport        | USD/batch  | 0.00           | 1.00              | 0.00      | 0.00      | 0.00          |
|                    |            |                |                   | 4.83      | 0.48      | 100.00        |

Production costs are estimated at US\$ 0.16/litre of wine and US\$ 0.48/kg of jam. It should further be noted that the cost of sugar is the largest contributor to the total product costs contributing at least 90% to the total product costs.

The JWPG indicated that they could produce and sell up to 160 litres of wine and 20 kg of jam per processor per month in the Jerusalem area. From information supplied by the women's processing group an abridged annual income statement for both wine and jam have been prepared. These statements are indicative of the costs, expenditures and profits for the respective products at the mentioned production level and at selling prices for the respective products of US\$0.47 per litre of wine and US\$ 0.94 per 500g jar of jam.

**Table 3 – Estimated current incomes, expenditures and profits for wine based on village sales of 1 920 litres (12 x 160 litres) per annum per processor**

| <b>Wine</b>           | <b>Unit</b> | <b>Value</b> |
|-----------------------|-------------|--------------|
| Income                | USD         | 900.00       |
| Expenditures          | USD         | 313.33       |
| Profit                | USD         | 586.67       |
| Profit as % of income | %           | 65.19        |

**Table 4 – Estimated current incomes, expenditures and profits for jam based on village sales of 240 kg (12 x 20 kg) per annum per processor**

| <b>Jam</b>            | <b>Unit</b> | <b>Value</b> |
|-----------------------|-------------|--------------|
| Income                | USD         | 450.00       |
| Expenditures          | USD         | 115.83       |
| Profit                | USD         | 334.17       |
| Profit as % of income | %           | 74.26        |

### 4.3 SWOT

A situation analysis of the JWPG was conducted by means of a SWOT analysis. This analysis made it possible to identify the strengths and opportunities that can be used for the up scaling of their enterprise. It also made it possible to highlight the weaknesses and potential threats that might prevent a new enterprise from becoming successful. These strengths, weaknesses, opportunities and threats are presented in table 5.

*Table 5 – SWOT analysis of JWPG*

|   |   |
|---|---|
| <b><u>Strengths</u></b> <ul style="list-style-type: none"><li>• Basic technology</li><li>• Fruit relatively available</li><li>• Women have been trained in processing</li></ul> | <b><u>Weaknesses</u></b> <ul style="list-style-type: none"><li>• Limited production</li><li>• Limited quality control</li><li>• Distance from sizable market</li><li>• Under developed market, especially for jam</li><li>• Products are not widely known</li></ul> |
| <b><u>Opportunities</u></b> <ul style="list-style-type: none"><li>• Local market</li><li>• Tourist market</li><li>• Unique tourist product</li></ul>                            | <b><u>Threats</u></b> <ul style="list-style-type: none"><li>• Poor product quality</li><li>• Inconsistent supply of products</li><li>• Sourcing of appropriate quality and priced packaging</li></ul>   |

#### **4.4 Problems faced by processing group**

The women from the processing group pointed the following problems out:

- Packaging and labels expensive and very difficult to acquire
- Buyers bargain for prices (Consumers can't always afford the asking price)
- Manual processing is time consuming
- Some species of fruit are not easily available and must be bought from the market
- Need quality certification to win customer confidence
- No organised or collective marketing

#### **4.5 Feasibility study scenario**

The analysis of the feasibility of small-scale processing and co-operative marketing of fruit products for JWPG will be assessed based on the following market expansion scenario:

- The women would continue to process and sell 160 litres of wine and 20 kg of jam per processor per month in the Jerusalem area.
- Five of them would form a cooperative structure to expand their market and start selling their products in Chipata.
- The cooperative would collectively sell 400 litres of wine and 200 kg of jam in Chipata per month. This would require that they each of the processors produce an addition 80 litres of wine and 40 kg of jam per month (one extra 20 litre batch of wine and one extra 10 kg batch of jam per women per week)
- These women would then invest in all the necessary equipment to conduct the processing.

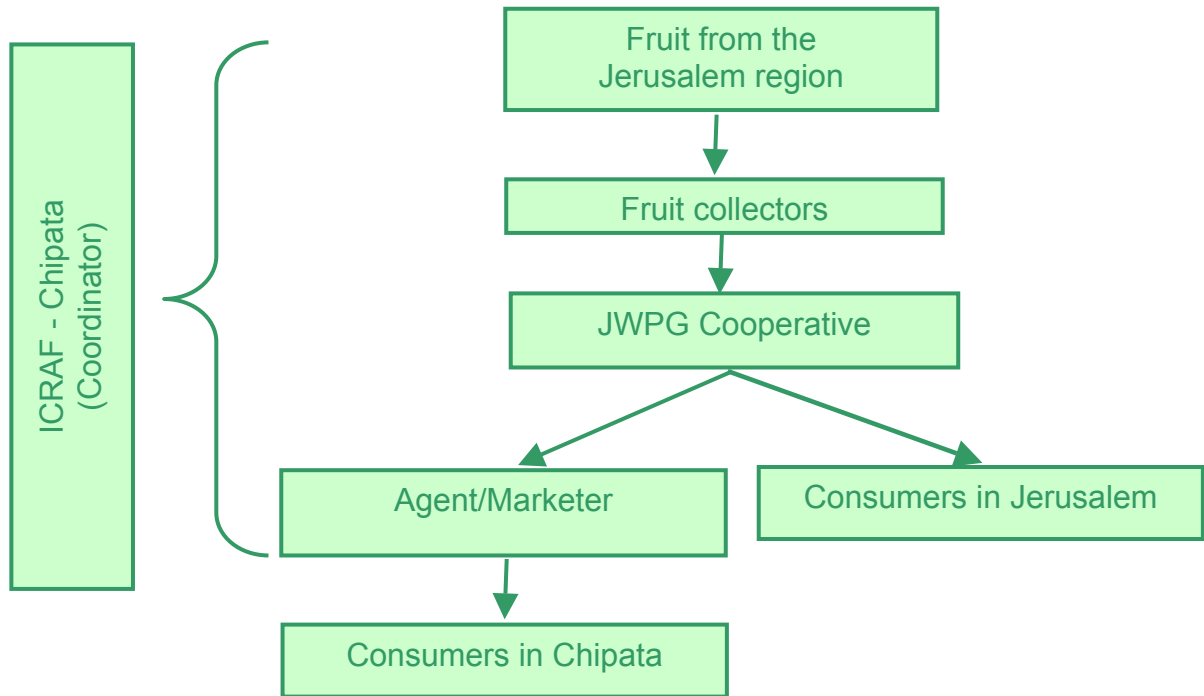
- The products destined for sale in Chipata will conform to national standards as set by Bureau of Standards, packaged in high quality packaging and labelled.
- Whilst the processing group undertakes the processing they hire (on a commission basis of 15% of profit for wine and 10 % profit for jam) a marketer/agent to market their products to supermarkets and guesthouses in Chipata.

## **5 Feasibility analysis**

### **5.1 Marketing and financial feasibility**

#### **5.1.1 Product supply chains**

Figure 3 gives a summary of the product supply chain. The JWPG would be responsible for the collection of fruits from the Jerusalem area and the processing of products. A marketing agent would find markets for the products and inform the group of new orders. ICRAF can serve as a coordinator in the process until the enterprise is well establish and can function independently.



**Figure 3 – Fruit juice product supply chains**

### 5.1.2 Raw material supply

The procurement of raw material inputs must be studied before investing in processing equipment. Raw material input supply is of great importance because the transformation of inputs is one of the basic tasks performed in processing. If inputs are defective, problems will occur in processing and marketing.

Efficient procurement is dependant on five basic characteristics:

- Sufficient quantity of inputs
- Correct quality of inputs
- Time sensitivity
- Reasonable costs
- Efficient organization

Raw material supply is discussed in more detail under ecological feasibility.

### **5.1.3 Market analysis**

The market analysis entails investigation into the major current players and competition in the market, the market volume and value and forecasts and trends as well as market opportunities in the specific sector.

#### *5.1.3.1 Major current players and competition in the market*

Competition in the jam and fruit wine market in Chipata consists of home based industries that sell their products primarily from their premises and industrial manufacturers that sell their products primarily through formal retail outlets. Information regarding the informal trading of products, primarily, home-based products is not easily available and therefore only information from the formal retail outlets was collected.

Table 5 gives a summary of the jam products that were found in the Chipata Shoprite, the primary retail outlet in Chipata for industrially produced products. No fruit wines are available from the Chipata Shoprite but table 6 presents the price of a comparative wine product.

**Table 5 – Competitor jams in Shoprite, Chipata**

| Brandname | Type        | Source       | Packaging | Size | Price (US\$) |
|-----------|-------------|--------------|-----------|------|--------------|
| All Gold  | Strawberry  | South Africa | Tin       | 450g | 2.06         |
| All Gold  | Apricot     |              |           |      | 1.72         |
| Hugo      | Mixed       |              |           |      | 1.35         |
| Rivonia   | Marmalade   | Zambia       | Plastic   | 500g | 1.20         |
|           | Mango       |              |           |      |              |
|           | Guava jam   |              |           |      |              |
|           | Guava jelly |              |           |      |              |

**Table 6 – Competitor wines in Shoprite, Chipata**

| Brandname | Type                 | Source       | Packaging | Size  | Price (US\$) |
|-----------|----------------------|--------------|-----------|-------|--------------|
| Overmeer  | Special Late Harvest | South Africa | Bottle    | 750ml | 5.75         |

#### **5.1.4 Consumer analysis**

Three main groups of consumers have been identified as the target consumers for the respective products produced by the JWPG Cooperative:

The first group are the current clients and consumers of the JWGP in the Jerusalem area. They consist mainly of rural people with little or no income, who are under educated. These people prefer to buy wine and jam directly from the JWPG and supply their own containers. They buy in small quantities for immediate consumption (e.g. buy a teaspoon of jam at a time)

The second group is the local consumers in Chipata. These potential consumers can be characterised as a group consisting mainly of native Zambians and vary from very poor and under educated consumers to wealthier and more educated consumers and from rural consumers to urban consumers.

The third group is the tourists groups that pass through Chipata. These consumers are predominantly young adults travelling through Chipata. Many of these groups are parties of overland safaris travelling from Nairobi in Kenya through east and southern Africa to Cape Town in South Africa. Generally these potential consumers are middle class consumers that are well educated, health conscious and socially aware. The size of this consumer group is estimated at between two and seven overland safari groups per week consisting of between 15 and 20 people per group.

#### *5.1.4.1 Major influences on the buying decision*

Based on unstructured interviews, conversations and observations the following major influences on the buying decision of the respective consumer groups were identified:

The following influences are applicable to all groups of consumers:

- Price
- Quality and product attributes (taste, flavour, colour, packaging etc.)
- Consistency and reliability of supply

Besides the abovementioned influences the more affluent and relatively sophisticated consumers may also take some of the following factors into account when purchasing the products.

- Novelty (taste, colour, product) of the product
- Social profile and/or history of product
- Nutritional and/or health attributes of the product

#### *5.1.4.2 Conclusions from the consumer profile*

It can be concluded that the potential consumers of the mentioned products vary from native Zambians to tourists from around the world, from very poor consumers to relatively wealthy consumers, from uneducated to well educated. The primary factors that are anticipated to have an influence on the buying decision of the different customers include the price of the product, the quality of the product and the intrinsic attributes of the products. More sophisticated consumers may also take the novelty, social profile and nutritional attributes of the product into consideration.

#### **5.1.5 Financial analysis**

##### *5.1.5.1 Key assumptions*

Key assumptions regarding the production costs were made based on research conducted in Chipata. Table 7 presents a summary of production costs for the products destined for Chipata. The costs of fruit pulp (it is assumed that the group might have to buy better quality fruits), packaging and marketing are included for the products destined for Chipata. These items were excluded for the locally sold products in table 2 (see section 4.2.3)

**Table 7 – Projected production costs for wine and jam produced by JWPG for the Chipata market**

| <b>Wine</b>        | Unit       | Price per unit<br>USD | Unit<br>required per<br>20 liter batch<br>20l batch | USD/batch<br>USD | USD/liter<br>USD | Percentage<br>of<br>costs |
|--------------------|------------|-----------------------|---|------------------|------------------|---------------------------|
| <b>CONSUMABLES</b> |            |                       |   |                  |                  |                           |
| - Fruit pulp       | USD/kg     | 0.17                  | 5.00  | 0.83             | 0.04             | 3.60                      |
| - Water            | USD/liter  | 0.00                  | 20.00   | 0.00             | 0.00             | 0.00                      |
| - Yeast            | USD/cup    | 0.10                  | 2.00  | 0.21             | 0.01             | 0.90                      |
| - Sugar            | USD/kg     | 0.73                  | 4.00  | 2.92             | 0.15             | 12.59                     |
| - Packaging        | USD/bottle | 0.73                  | 20.00   | 14.58            | 0.73             | 62.97                     |
| - Charcoal         | USD/batch  | 0.14                  | 1.00  | 0.14             | 0.01             | 0.60                      |
| - Transport        | USD/batch  | 1.46                  | 1.00  | 1.46             | 0.07             | 6.30                      |
| - Marketing (15%)  | USD/batch  | 3.02                  | 1.00  | 3.02             | 0.15             | 13.04                     |
|                    |            |                       |   | 23.16            | 1.16             | 100.00                    |
| <b>Jam</b>         | Unit       | Price per unit<br>USD | Unit<br>required per<br>10 kg batch                 | USD/batch<br>USD | USD/kg<br>USD    | Percentage<br>of<br>costs |
| <b>CONSUMABLES</b> |            |                       |   |                  |                  |                           |
| - Fruit pulp       | USD/kg     | 0.17                  | 6.00  | 1.00             | 0.10             | 5.80                      |
| - Lemon juice      | USD/cup    | 0.31                  | 1.00  | 0.31             | 0.03             | 1.81                      |
| - Sugar            | USD/kg     | 0.73                  | 6.00  | 4.38             | 0.44             | 25.37                     |
| - Packaging        | USD/bottle | 0.42                  | 20.00   | 8.33             | 0.83             | 48.32                     |
| - Charcoal         | USD/batch  | 0.14                  | 1.00  | 0.14             | 0.01             | 0.81                      |
| - Transport        | USD/batch  | 1.46                  | 1.00  | 1.46             | 0.15             | 8.46                      |
| - Marketing (10%)  | USD/batch  | 1.63                  | 1.00  | 1.63             | 0.16             | 9.44                      |
|                    |            |                       |   | 17.25            | 1.72             | 100.00                    |

The introduction of fruit, packaging, marketing and transport cost over and above the existing costs increases the production costs substantially. Production costs for wine is estimated at US\$ 1.16/litre and for jam at US\$ 1.72/kg. Although the cost of sugar remains a significant cost the largest cost of the “improved” product becomes the cost of packaging, which at the very least, contributes 25% to the final cost of the products.

#### 5.1.5.2 Summary of financial analysis

A financial analysis of the products to be sold in Chipata by the JWPG was conducted. Income from the sale of products in Jerusalem by the individual

processors has been excluded from this analysis as it is expected that sales might differ from processors to processor. The individual processors also do not sell collectively in Jerusalem.

*Income statements*

Abridged income statements for the wine and jam products to be sold in Chipata have been prepared (Tables 8 and Table 9). These statements are indicative of the costs, expenditures and profits for the respective products at a production level of 400 litres of wine and 400 jars of 500g per month that are packaged in high quality packaging, transported from the Jerusalem village to Chipata and marketed by an marketing agent for the processing group. The selling prices for the respective products are US\$2.86 per litre of wine and US\$ 1.20 per 500g jar of jam.

These income statements represent the income of the cooperative and exclude the individual incomes that the five members generate from the sale of products in Jerusalem.

**Table 8 – Projected incomes, expenditures and profits for wine sold in Chipata**

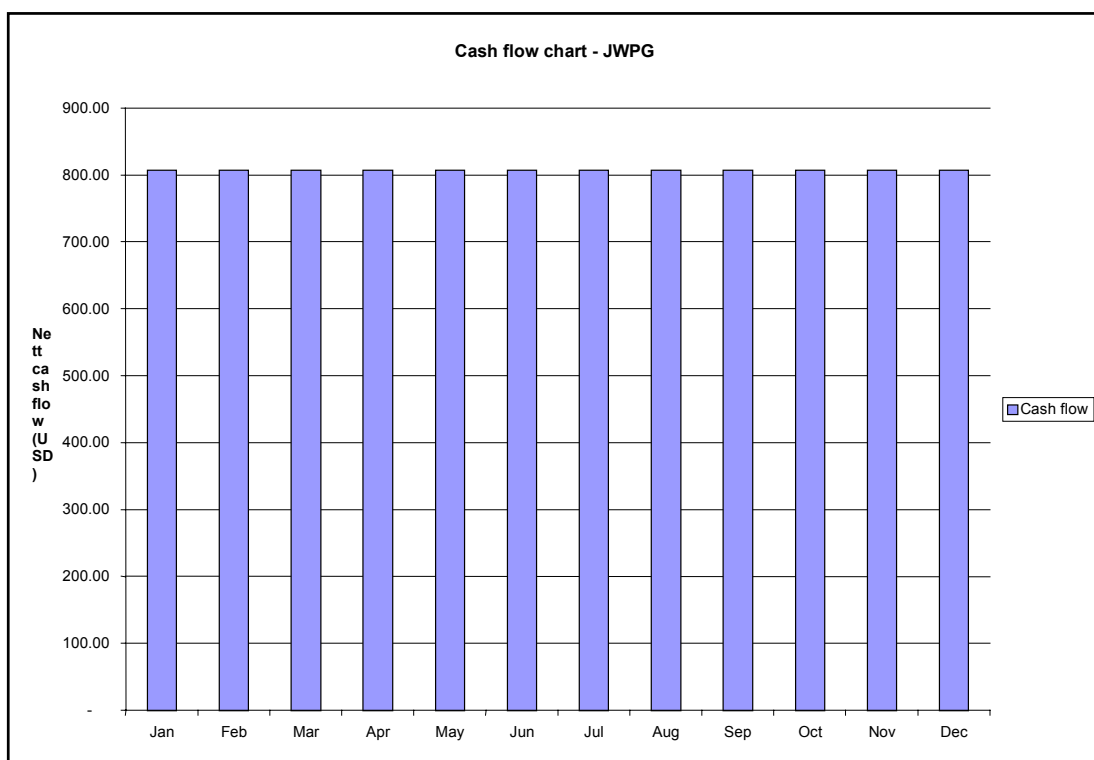
| <b>Wine</b>  | <b>Unit</b> | <b>Value</b> |
|--------------|-------------|--------------|
| Income       | USD         | 13,750.00    |
| Expenditures | USD         | 5,515.28     |
| Profit       | USD         | 8,134.72     |
| Profit       | %           | 59.16        |

**Table 9 – Projected incomes, expenditures and profits for jam sold in Chipata**

| Jam          | Unit | Value   |
|--------------|------|---------|
| Income       | USD  | 5750.00 |
| Expenditures | USD  | 4196.11 |
| Profit       | USD  | 1553.89 |
| Profit       | %    | 27.02   |

Cash flow projections

Figure 4 shows a steady cash flow throughout the year. This cash flow could be influenced by the availability of raw material. Factors such as droughts could impact severely on fruit availability and cash flow stability.



**Figure 4 – Cash flow projections**

### Break-even analysis

The break-even analysis was conducted by:

- Determining the break-even price whilst keeping the initial level of sales constant.
- Determining the break-even quantity whilst keeping the initial price level constant.

The break-even analysis yielded the following results:

- Based on an annual production of 4 800 litres of wine the break-even price is **± US 1.17 per litre.**
- Based on a fixed price of ± US\$ 2.86 the break-even quantity is approximately **34 litres of wine.**
- Based on an annual production of 4 800 500 g bottles of jam the break-even price is **± US 0.87 per bottle of jam.**
- Based on a fixed price of ± US\$ 1.20 the break-even quantity is approximately **170 500 g bottles of jam.**

### Net present value

The net present value analysis was conducted by assuming the following:

- That each of the five processors would invest in US\$ 113 worth of equipment. This would give an initial investment of US\$ 565 for the JWPG.

From the analysis of the projected net present value five years after the initial investment it is evident that the net present value for the product is positive. According to the net present value (NPV) decision rule that specifies that ventures with a positive NPV should be accepted it can be concluded that the JWPG enterprise is financially viable.

### Sensitivity analysis

The sensitivity analysis was conducted by:

- Determining the percentage that each variable cost item contributes to the total variable cost.

A summary of cost contributions is included in table 7. It shows that packaging materials are the largest cost item in terms of variable costs for wine (63 %) and jam (48 %). Sugar is the second highest cost item for jam at 25 %.

Fruit pulp contributes only 3.6 % to the costs of wine and 5.6 % to the costs of jam. This illustrates the point that the processing of fruits contribute significantly to value addition.

## **5.2 Technical feasibility**

The assessment of the technical feasibility entails investigation into the suitability of the proposed technology for members of rural target groups, the processing location and processing technology required, the status of the infrastructure and the level and availability of human resources/skills and expertise.

Further aspects of the technical feasibility analysis include:

- Processing, storage and transportation requirements;
- Identification of the gaps between the current situation and the skills to be developed and improved;
- Identification of the current practices of production, processing and marketing;
- Study of the physical infrastructure

### 5.2.1 Processing

Complicated equipment is not required for the processing of jam and wine. Most of the cooking utensils can be purchased from the local Shoprite in Chipata (Table 10 provides a price list of the required utensils). It might be necessary to obtain high quality stainless steel pots from outside Chipata as only low quality aluminum pots are available. Aluminum pots could pose a health hazard as aluminum from the pot can dissolve into the cooking mixture at low pH.

**Table 10 – List of cooking utensils required for JWPG enterprise**

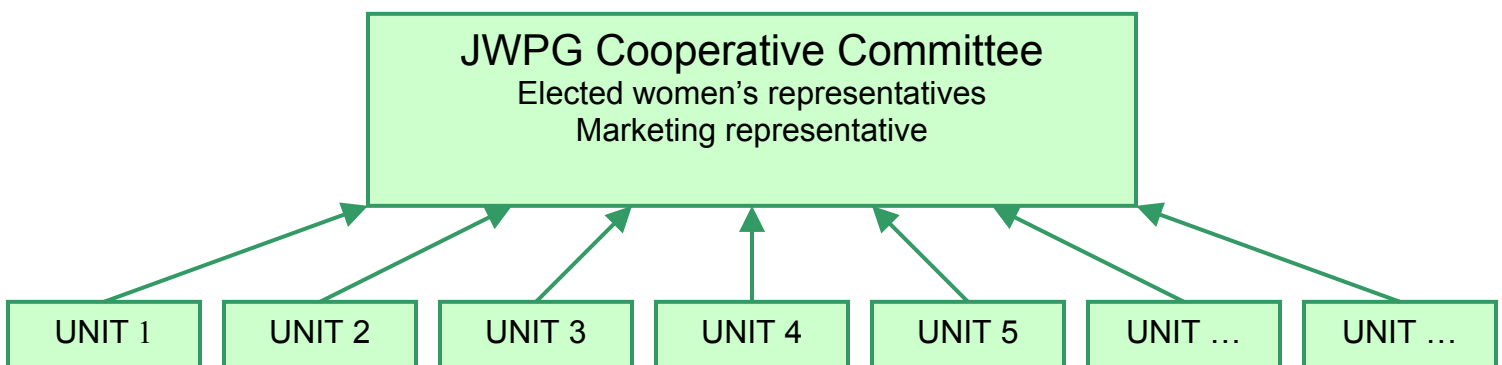
| Input                  | Source              | Price (US\$) |
|------------------------|---------------------|--------------|
| Basin                  | Shoprite            | 0.66         |
| Measuring beaker       | Shoprite            | 2.92         |
| Plastic sieve          | Shoprite            | 0.66         |
| Spoon (stir)           | Shoprite            | 1.44         |
| Spoon (soup)           | Shoprite            | 1.44         |
| Measuring cups         | Shoprite            | 1.77         |
| Stainless steel cup    | Shoprite            | 0.83         |
| Tray                   | Shoprite            | 1.88         |
| Cutting board          | Shoprite / Artisans | 3.33         |
| Knife                  | Shoprite            | 1.67         |
| Pots (Stainless Steel) |                     | 95.00        |
| Wooden spoon           | Shoprite / Artisans | 0.83         |
| Spoons                 | Shoprite            | 1.46         |
| TOTAL                  |                     | 113.89       |

## 5.2.2 Structure of production and supply chains

The cooperative structuring of the enterprise will bring many benefits to the processing group(s) that include:

- Collective bulk procurement of inputs (especially packaging).
- Collective marketing of final products under a single brand name.
- Standardization of final products.
- Collective transportation of final products.

The structure that is envisaged for the processing cooperative is depicted in Figure 5.



**Figure 5 – Cooperative structure for women's processing groups**

As the processing enterprise expands more processing units can be added to the cooperative structure all of which can be managed by a management committee consisting of women from the various processing units and the marketing representative that markets the products on behalf the processing cooperative. The organisation of the various processing groups into such a structure would remove many of the barriers to success that the individual processing units would encounter such as low levels of production, high transportation costs, high input costs, discontinuity of production, discontinuity in product quality etc.

Upon the establishment of the abovementioned cooperative the supply chain of the final products would flow from the various processing units through the cooperative to the marketing agent to the respective retail outlets and finally to the consumers. The marketing agent and the management of the cooperative will oversee the communication of demand (quantities and quality) from the consumers to the respective processing units.

### **5.2.3 Inventory management**

Inventory management is an important part of the processing procedure, especially since raw material is highly perishable. It is therefore necessary to determine how quickly raw material must be processed into a product to ensure the desired levels of quality.

With the assistance of the marketing agent it is foreseen that the processing group would only produce products on demand with little if any spare stock capacity. This would prevent the build-up of stock that could spoil and it would also make it easier to schedule the collection of raw materials.

### **5.2.4 Packaging and other processing inputs**

#### *5.2.4.1 Functions performed by packaging*

Packaging performs many very important functions as an integral part of a final product. These functions are:

- Packaging protects the quality of the product
- Packaging provides consumers with convenience
- Packaging conveys a certain image
- Packaging can also be informative with regards to the product
- Packaging adds value to a product through differentiation

#### *5.2.4.2 Packaging choice*

For the wines and jams produced by the JWPG to compete in Chipata, careful consideration should go into choosing packaging. The following aspects need to be considered when selecting the right packaging:

- Requirements of the consumer and the distribution channels.
- Requirements imposed by the intrinsic nature of the product.
- Packaging characteristics determined by government regulations.
- The possibility of unmet consumer needs that could be satisfied with a different type of packaging.
- The effect of transportation infrastructure conditions on packaging requirements.

It is recommended that the group should invest in a high quality label for their products that would give them a corporate identity. Such a label could also explain where the product is coming from and how it was made. This would increase the product's novelty and attraction for tourists.

High quality packaging would also convey a quality message that would make the product more appealing to consumers. The fact that the products are made at community level might deter some consumers from buying it due to perceived quality concerns but high quality packaging and an attractive product would help to remedy this fear.

#### *5.2.4.3 Procurement of packaging, ingredients and chemicals*

Much of the proposed packaging material, ingredients and other inputs needed in the processing of fruit wines and jams are either unavailable, of substandard quality or very costly in Chipata. For the cost effective production of high quality fruit wines and jams those production inputs that are difficult to procure in

Chipata will have to be procured from larger centres like Lusaka or Lilongwe or imported. These types of production inputs can typically be procured through regional distribution networks.

### 5.2.5 Distribution

Currently there is a limited distribution network that has been established for the products produced by the JWPG. This network currently distributes products directly to consumers from the women's homes as well as to a village shop where, amongst others, the processed fruit products are sold. No distribution channel has been established between the Jerusalem village and Chipata. When collective production and marketing commences a distribution system will need to be established to access the market opportunities in Chipata. The most obvious channel of distribution is the delivery of the produce directly to the marketer/agent appointed by the JWPG via hired transport travelling between Jerusalem and Chipata (Figure 6).

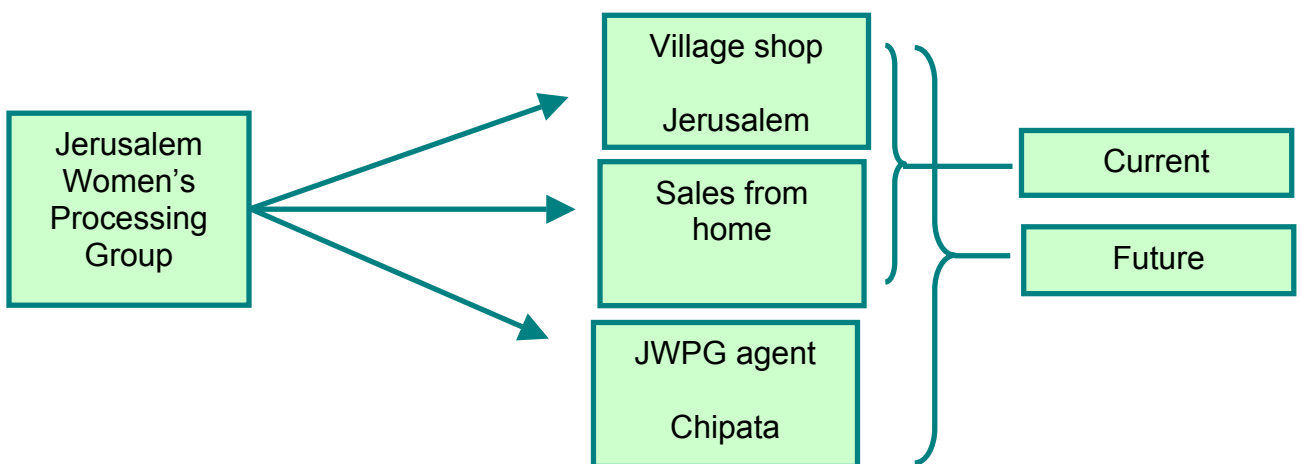


Figure 6 – Possible distribution chains

The ultimate choice of distribution channel will depend on the profits that can be gained as a result of using a specific channel, the initial costs required to establish a distribution channel and the ease with which an effective and efficient distribution system can be established.

### **5.3 Resource and environmental feasibility**

The assessment of resources and the environment entails investigation into the availability (in time: seasonality; in space: time needed to find and harvest); of the raw materials; the regenerative potential and the impact of harvesting on the survival of the species and the impact of harvesting on the environment.

How to develop products without destroying the resource base is a fundamental concern of the market analysis and development methodology. A product will be considered for development only if its resource base will not suffer as a result of an increase in the harvesting rate or if harvesting can be supplemented or substituted by cultivation. Therefore, it is important to get a clear picture of the status and quantity of natural resources before starting an enterprise. This can also be a tool to monitor environmental impact once an enterprise gets under way.

#### **5.3.1 Raw material supply**

The procurement of raw material inputs must be studied before investing in a processing plant. Raw material input supply is of great importance because the transformation of inputs is one of the basic tasks performed in a processing facility. If inputs are defective, problems will occur in processing and marketing.

Efficient procurement is dependant on five basic characteristics:

- Sufficient quantity of inputs
- Correct quality of inputs

- Time sensitive operations
- Reasonable costs
- Efficient organization

#### 5.3.1.1 Raw material quantity

It is estimated that 260 kg of fruit pulp per month will be required to manufacture 1,040 litres of wine per month (sum of collective and individual production for five processors) and 180 kg fruit pulp per month to manufacture 300 kg of jam (sum of collective and individual production for five processors). At a conversion rate of 50% pulp per fruit it equates to 880 kg of fruit per month or 10.56 tons of fruit per year. This will have to be sourced over and above the current volume of fruit that each women process for products sold in Jerusalem.

Information on the quantity of fruit that is available for processing in the vicinity of Jerusalem is not available. The enterprise would however not require large volumes of fruit as illustrated by the following example:

*It is estimated that an average Uapaca fruit weighs 25 g and up to 6000 fruits have been recorded per tree with an average yield of 2000 fruits per tree. This equates to an average yield of 50kg of fruit per tree per fruiting season. To supply in the total fruit needs (individual processing for Jerusalem and collective processing for Chipata) of the five women who are members of the cooperative a total of 880 kg of Uapaca fruit needs to be sourced per month from **18 trees**.*

The supply of raw material is also very dependent on climatic factors and sustainable forestry practices. Drought and poor management would see feasible supplies of raw material diminish drastically. This would result in a feasible enterprise becoming infeasible overnight. Commercial cultivation and

harvesting could supplement the raw material supply from wild populations and reduce risks associated with fluctuations in fruit supply.

#### *5.3.1.2 Raw material quality*

The quality of the raw material that can be sourced from the communities in which the resources reside is highly variable. In the absence of a strictly controlled production process that ensures a constant supply of high quality raw material it is to be expected that the raw material quality would be variable. Factors affecting the quality of the raw material are timing of harvest, harvesting methods, handling of the fruit, transportation of the fruit and storage conditions of the fruit.

The above-mentioned constraints could be solved through the development of harvesting indexes for various fruits. The women of the JWPG should work with ICRAF to develop better harvesting methods based in ripeness indexes that would ensure a supply of high quality raw material.

#### *5.3.1.3 Appropriate timing*

Fruit trees only bear fruit for a limited time during a year limiting the availability of raw material to a couple of months per year. Considering that the group would produce products on demand and not carry a large stock of processed products it would have to process the fruits that are available during the time when processing should take place. Figure 7 shows that it is possible to have an all year round production of products based on the availability of different fruits at different times of the year.

| Scientific name                | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Chichewa Name  |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------|
| <i>Annona seneghalesis</i>     |     |     |     |     |     |     |     |     |     |     |     |     | Mpoza          |
| <i>Azanza garckeana</i>        |     |     |     |     |     |     |     |     |     |     |     |     | Mato wo        |
| <i>Adansonia digitata</i>      |     |     |     |     |     |     |     |     |     |     |     |     | Malambe        |
| <i>Flacourtia indica</i>       |     |     |     |     |     |     |     |     |     |     |     |     | Nthudza        |
| <i>Parinari curatellifolia</i> |     |     |     |     |     |     |     |     |     |     |     |     | Maula/Mbula    |
| <i>Strychnos cocculoides</i>   |     |     |     |     |     |     |     |     |     |     |     |     | Mate me        |
| <i>Syzygium cordatum</i>       |     |     |     |     |     |     |     |     |     |     |     |     | Mafo wo        |
| <i>Uapaca kirkiana</i>         |     |     |     |     |     |     |     |     |     |     |     |     | Masuku         |
| <i>Vangueria infausta</i>      |     |     |     |     |     |     |     |     |     |     |     |     | Nziru          |
| <i>Vitex doniana</i>           |     |     |     |     |     |     |     |     |     |     |     |     | Chidyankhandwe |
| <i>Ziziphus mauritiana</i>     |     |     |     |     |     |     |     |     |     |     |     |     | Masawo         |
| Mangoes                        |     |     |     |     |     |     |     |     |     |     |     |     | Mango          |
| Citrus                         |     |     |     |     |     |     |     |     |     |     |     |     | Lalanje        |
| Avocado                        |     |     |     |     |     |     |     |     |     |     |     |     | Peyala         |

**Figure 7 – Availability of fruits during the year**

#### 5.3.1.4 Reasonable cost

Supply of and demand for indigenous fruit should be the main, if not the only, determinant of the price. This will ensure that the communities responsible for collecting the indigenous fruit receive a fair price and are not exploited. It will also ensure that fruit is purchased at a reasonable cost so that the processing enterprise stays viable, assuming that all other conditions remain the same.

#### 5.3.2 Environmental sustainability

Currently there is a lack of a comprehensive analysis of the current natural resources that are available (in terms of species, distribution and quantities) in Zambia. Furthermore no research appears to have been done to investigate the long-term sustainability of harvesting (i.e. long term availability of inputs) nor the impact that harvesting will have on the regenerative potential of the respective species.

## **5.4 The social and institutional feasibility**

The assessment of the social and institutional environment entails investigation into the indirect benefits of the project for the community; the contribution of the project to the income of the community members; the potential for creating employment and the gender impact that the project is bound to have.

Social and institutional criteria are as important as the economic, resource management and technical criteria of a potential enterprise. Potential activities should help, or at least not harm, the most economically vulnerable members of the community.

### **5.4.1 Socio-economic characteristics of the Zambian population**

Zambia has a population of approximately 10.3 million people that are predominantly rural with 36% of the population living in urban areas. The Zambian population is currently growing at 1.52% per annum. Average life expectancy is 35.18 years; the birth rate is 39.5 and the mortality rate 24.3 per 1000 of the population. Zambia has a broad based population pyramid with almost 46% of the population 14 years old and younger. The adult HIV prevalence rate in Zambia is estimated at 22% and an estimated 86% of Zambians live under the poverty line.

(<http://www.nationmaster.com>, <http://www.cia.gov/cia/publications/factbook/>)

Unemployment in Zambia is rife and was estimated at 50% in 2000. The services sector is the primary sector of the Zambian economy contributing 57% to the GDP whilst industry contributed 28% and agriculture 15%.

(<http://www.cia.gov/cia/publications/factbook/>)

#### 5.4.2 Socio-economic characteristics of rural Chipata

Chipata used to be known as Fort Jameson when Zambia was still Northern Rhodesia and was an important trading post in the early part of the century. Chipata is a small, but important town acting as the gateway to South Luangwa and as a border town before Malawi.

The Chipata district falls in the Eastern Province of Zambia and is predominantly a rural district with only 20% urbanization (Table 10). There are also many small-scale rural farmers in the area rearing livestock and growing a variety of crops primarily for their own use.

**Table 10 – Population of Chipata district**

| Area       | Rural population | Urban population | Total population |
|------------|------------------|------------------|------------------|
| Number     | 294 429          | 73 110           | 367 539          |
| Percentage | 80.11            | 19.89            | 100.00           |

<http://www.zamstats.gov.zm>

#### 5.4.3 Direct and indirect benefits for the Jerusalem community

The direct benefits for the Jerusalem community who are associated with the processing of fruit include the creation of employment opportunities, the creation of a market for currently under-utilized resources and on the job training of participants in growing, harvesting, processing, packaging and marketing of processed fruit products.

The indirect benefits of the processing enterprise include a possible decrease in the number of households that are classified as living under the ultra-poverty and poverty line in the respective communities as a result of the increased income (both direct and indirect). As a result the level of malnutrition and the severity of

the impact HIV/AIDS, which are both prevalent, can be alleviated – although marginally.

Future cultivation of indigenous trees by rural farmers would increase the benefits derived from the processing enterprise. Through a system of small grower co-operatives farmers can provide the enterprise with a more sustainable and guaranteed supply of raw material.

#### *5.4.3.1 Contribution of the processing activities to the improvement of livelihoods*

Following an interview with the members of the JWPG it came to the fore that their current processing activities have indeed impacted positively on their livelihoods. The general feeling amongst the women participating in the interview was that the introduction of the fruit processing technology had improved their livelihoods in the following ways:

- Women are able to acquire livestock
- Women are able to buy clothing
- Women are able to send children to school

With the suggested improved scenario where the market is expanded to include Chipata town a marked increase in the earnings from processing fruit is expected. The cooperative group would earn US\$ 9 688/annum or US\$ 1 937/annum per processor (five members). This would increase the individual income of the cooperative members from US\$ 920 /annum per processor to US\$ 2 857 /annum.

This increase in income is significant, especially when seen against the average income earned by rural Zambians. The impact is more evident if it is taken into consideration that 63.6% of the Zambian population lives with less than USD 1 per day and 87.4% with less than USD 2 per day and that 86% of Zambians live

under the poverty line. ([http://www.nationmaster.com/graph-B/eco\\_gro\\_nat\\_inc\\_cap](http://www.nationmaster.com/graph-B/eco_gro_nat_inc_cap)).

#### *5.4.3.2 Processing's potential for creating employment at community level*

Over and above the processing of fruit into various products the women involved in the processing group are also involved in a number of other activities. These include:

- Farming with different crops
- Small livestock production
- Knitting
- Processing
  - Hammer mill
  - Oil press
    - Sunflower
    - Groundnut
    - Soja
    - Pumpkin seed

The improved processing and marketing of fruit products as envisaged in this feasibility study has the potential of creating a number of direct and indirect employment opportunities at community level. These include the collection of fruits, the processing of the fruit and the marketing of the final products.

#### *5.4.3.3 Gender impact of the processing enterprise*

Women are bound to benefit the most from the commercialisation of indigenous fruit by the JWPG. Although both men and women will be free to participate directly and indirectly in the processing enterprise women in the area are more likely to be the main participants as a result of their current involvement in fruit processing activities. Over and above the fact that women and children are the

primary collectors of fruit women are also well represented in the processing groups in the respective communities.

## **6 Conclusions**

A feasibility study is generally defined as a structured way to efficiently organize the information that is needed for confident decision making regarding the profit potential and technical, financial, social and environmental viability of a specific proposal.

This feasibility study was conducted to determine the feasibility of a producer cooperative selling primarily wines and jams produced by the Jerusalem Women's Processing Group outside Chipata, Zambia.

Based on the framework set out in this feasibility study the following conclusions can be made regarding the feasibility of the proposed products.

### **6.1 Market and financial feasibility**

Based on the existing demand for fruit wines and jams, manifested through the sales currently achieved by the Jerusalem Women's Processing Group, a market opportunity for the production of good quality fruit wines and jams to compete on a commercial scale with similar products in the retail outlets in the Chipata area was identified. These products are anticipated to find a ready market from both local consumers and tourists passing through Chipata.

The analysis of the financial feasibility of the two proposed products revealed that, based on the assumptions that were made, the proposed products are potentially profitable and generate significantly improved incomes for the women's processing group.

The positive market and financial feasibility assessment is however dependant on the following:

- Stable economic conditions
- An environment conducive to conducting business
- No serious new direct competitors
- Continuous and reliable production of high quality products
- Reliable procurement of production inputs and relatively reliable and stable prices
- Professional management of the business (in all aspects from input procurement to production management to marketing management to financial management)

## **6.2 Resources and environmental feasibility**

As a result of a lack in a comprehensive analysis of the current resources of fruit that are available in Chipata it is difficult to comprehensively assess and draw conclusions regarding the environmental and/or natural resource feasibility of the proposed products. The implication is that no clear-cut conclusions can be made with regards to the quantity and quality of fruits that are available, what a reasonable cost for the fruit is nor how and when the fruit will be procured outside of the current arrangements. The lack of information also means that no clear conclusions can be made regarding the long term sustainability of harvesting (i.e. long term availability of inputs) nor the impact that harvesting will have on the regenerative potential of the respective species.

This feasibility study has assumed, as a result of a lack of information, that sufficient quantities of high quality fruit will be available to fuel processing of the respective products at a reasonable cost and that fruits can be harvested sustainably and without adverse impact on the regenerative potential of the trees.

### **6.3 Technical feasibility**

The equipment necessary to produce the envisaged products are easily obtainable, relatively inexpensive, and can be used for the small-scale household production of fruit wine and jam products.

Furthermore the location at Jerusalem is suited to the establishment of a processing enterprise of this nature since it is reasonably well located with regards to resources and distribution channels. The procurement of some inputs, especially packaging, and the transportation of finished products to the market from Jerusalem are detractors of the location at Jerusalem.

The technical feasibility of the intended enterprise is primarily dependant on:

- The selection of appropriate processing technology
- Choosing an appropriate location for processing after taking into consideration the infrastructure and human resources that are available, the, accessibility to raw materials and markets
- Management capacity to manage the whole process from input procurement through processing to the final marketing of the products.

Taking all the abovementioned factors into consideration it can be concluded that the proposed enterprise is technically feasible.

### **6.4 Social and institutional feasibility**

The assessment of the social and institutional feasibility of the proposed enterprise reveals that the Zambian population is predominantly a poor rural population characterized, by amongst others, poor socio-economic characteristics (life expectancy, infant mortality and population distribution) rampant malnutrition and marked prevalence of HIV/Aids

The social and institutional feasibility assessment of the products in question reveals that the processing group would benefit in a number of ways from the commercialization of the proposed products. The direct benefits include the creation of employment opportunities as well as the creation of a “market” for currently under-utilized resources in fruits, especially indigenous fruits. The indirect benefits of the proposed enterprise include an anticipated decrease in the number of households living under the poverty and ultra poverty line, a decrease in malnutrition, a decrease in the severity of the impact of HIV/Aids and an increase in incomes for communities, especially for women in communities. Taking the net social benefit of the proposed products into consideration it can be concluded that the two proposed products are anticipated to be socially and institutionally feasible.

## **6.5 Overall feasibility**

Based on the framework set out in this feasibility study where feasibility is assessed in four core areas it can be concluded that the production of fruit wine and jams by the Jerusalem Women’s Processing Group is feasible though some shortcomings can be found in the resource and environmental feasibility as a result of a lack of information. This positive result of the feasibility analysis is, however, heavily dependant upon the assumptions made during the study and on conditions (political, environmental, economical etc.) remaining relatively stable within the enterprise’s operating environment. If either the assumptions or the operating environment were to differ substantially from actual circumstances the actual feasibility of the two products could differ from the current result.

## 7 References

Lecup, I. & Nicholson, K., 2000, *Community – based tree and forest product enterprises: Market Analysis and Development* – The FAO Publication and Multimedia Service, Rome, Italy

Adam, H. & Doyer, O.T., 2000, *Exploring new opportunities in the Agribusiness industry: An approach framework for feasibility studies and business plans*. Unpublished, University of Pretoria, Pretoria

[www.cia.gov/publications/factbook](http://www.cia.gov/publications/factbook)

<http://www.mbendi.co.za/>

[http://www.nationmaster.com/graph-B/eco\\_gro\\_nat\\_inc\\_cap](http://www.nationmaster.com/graph-B/eco_gro_nat_inc_cap)

<http://www.xist.org>

<http://www.zamstats.gov.zm>

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