



CITRUS JUICE EXTRACTION Feasibility Study



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PREPARED FOR:



**Lepelle-Nkumpi Local
Municipality**



PREPARED BY:



Development Services (Pty) Ltd

**P.O. Box 13359
Hatfield
0028**

**Tel: 012 430 2888
Fax: 012 430 2979**



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1. INTRODUCTION

Agro-processing and more specifically value addition to citrus has the potential to create jobs and economic growth of rural places. This study, undertaken by Kayamandi Development Services (Pty) LTD, explores the feasibility of citrus juice making in the Lepelle-Nkumpi Local Municipality.

Citrus has been cultivated for thousands of years and in terms of volume it is the second largest fruit crop (second to grapes). In South Africa the Citrus industry is a large contributor to the economy and is the second largest earner of foreign exchange in terms of agricultural exports. South Africa is also the third largest exporter of citrus and fruit is exported to more than 50 different markets.

This project is recommended, based on the following aspects:

- Local value-adding
- Final product manufacturing
- Bulk sales minimises transport costs
- Vast local employment opportunities
- Income generation for local small-scale farmers
- Increase in local revenue base.
- Skills development of local community
- Direct local employment

The remainder of this feasibility is comprised of the following Sections:

- Development Description
- Market analysis
- Risks, strengths and impact
- Management team
- Financial Plan
- Implementation Plan

2. DEVELOPMENT DESCRIPTION

2.1 Overview of the Juice Making Process and Project description

A step-by-step description of the juice making process is described hereunder.

Step 1: Harvesting

All citrus, including oranges, must ripen on the tree as the deterioration process begins as soon as they are separated from the tree. Once a block is determined ready for harvest, a crew of harvesters is sent to pick the entire block of fruit by hand; using wooden ladders and canvas pick sacks or in commercial farms mechanically.

Oranges are hand-picked in the field, loaded into trailers and delivered to the processing plant. The fruit is dumped from trailers onto conveyers (see below Photograph) where it is carried through a washing process. This is also the process where chlorine and sulphur are added to the water for the killing of fungus and other bacteria.

Step 2: Grading of oranges

After the washing process the fruit is waxed and graded into three different classes (see below Photograph), class one, two, three, and other.

Photograph 2.1: Trailers and conveyors



The difference between the various classes is the outside appearance, which is made up of size, blemishes and colour of the fruit. The fruit is then diverted to conveyor belts according to the class specifications. Class one and two are the best fruit in terms of outside appearance, and these classes (1 and 2) are usually for the export market. Class three is for the local market. The class other (lowest grade) of the whole batch is stored in the 'juice bin' and sent to juice makers (see below Photographs).

Photograph 2.2: Grading process



Photograph 2.3: Juice 'bin' and conveyor



Currently approximately **2000 tons** of the lowest grade oranges are sent to juice processing companies per season. It is however relevant to note that Zebediela Citrus estate have indicated that the farm is planning to double its production within the next 2/3 years, as the current production is substantially less than the potential due to the lengthy land claim process which halted some farming activity. Essentially, a minimum of **4000 tons of the lowest grade oranges** will be available per season for processing.

Step 3: Grading and Juice extraction

At the juice plant oranges go through another washing process and there after they are diverted to another bin for being used as by-products and livestock feed. After being selected the oranges are sent to storage bins were after they are sent to the juice extractors. Prior to juice extraction the fruit

After juice extraction, the stream of pulpy juice goes through a finisher (screen) where the pulp and seeds are removed, and along with the peel, diverted to be used for by-products and used for cattle feed. At this stage, the juice is made into one of two product forms: bulk frozen concentrated orange juice (FCOJ) or not-from-concentrate (NFC). These are as follows:

- **Bulk Frozen Concentrate Orange Juice (FCOJ):** Juice made into bulk FCOJ is sent to an evaporator where vacuum and heat are used to remove excess water in order to obtain a base concentrate of 65° brix, which is a seven-to-one strength ratio to normal single-strength juice. The bulk FCOJ is then stored at 20°F or lower in a tank farm or in 55-gallon drums until it is sold or packaged for sale.
- **Not Frozen Concentrate (NFC):** Juice made into NFC is de-oiled to .02%-.04% oil levels with a centrifuge, then either pasteurized, chilled and packaged or stored for future sale and/or packaging. NFC is stored a number of ways: frozen as blocks in warehouses; frozen in drums; pasteurized and chilled in large stainless steel aseptic tanks; or, pasteurized and chilled in 4'x4' wooden boxes containing a plastic bag.

Fruit juice comes from squeezed or pressed fruit. Once the fruit is pressed the juice can be concentrated. The concentration process involves heating the juice to evaporate some of the water contained in the juice, while still maintaining the taste. This removal of water makes the concentrate a lot easier and cheaper to transport.

The concentrates may be blended with other fruit such as guava, mango or orange, depending on the juice variety being produced. The essences or flavours that were recovered during the juice concentration process are added back at this stage to ensure the distinct aroma of the juice is maintained. Ascorbic acid (Vitamin C) is also added here to replace what has been lost during processing. These natural flavours should be declared on the ingredients panel, in line with the requirements of food standards.

The blended concentrates are then diluted with water to create a single strength juice, the same strength as the juice was when it was pressed from the fruit. The juice is then ready to be filled into bottles, cans or cartons.

2.2 Project Details

This project will be focused on both concentrate and pure juice production, although the primary focus will be on orange juice because of its market and popularity in the surrounding communities.

Primary reasons for citrus juice production are:

- Large supply of oranges (the largest farm in South Africa)
- Large amount of low-grade oranges currently supplied to juice processing companies outside of the area
- Vast supply of suitable land
- The absence of local juice processing and citrus value adding in Lepelle-Nkumpi.

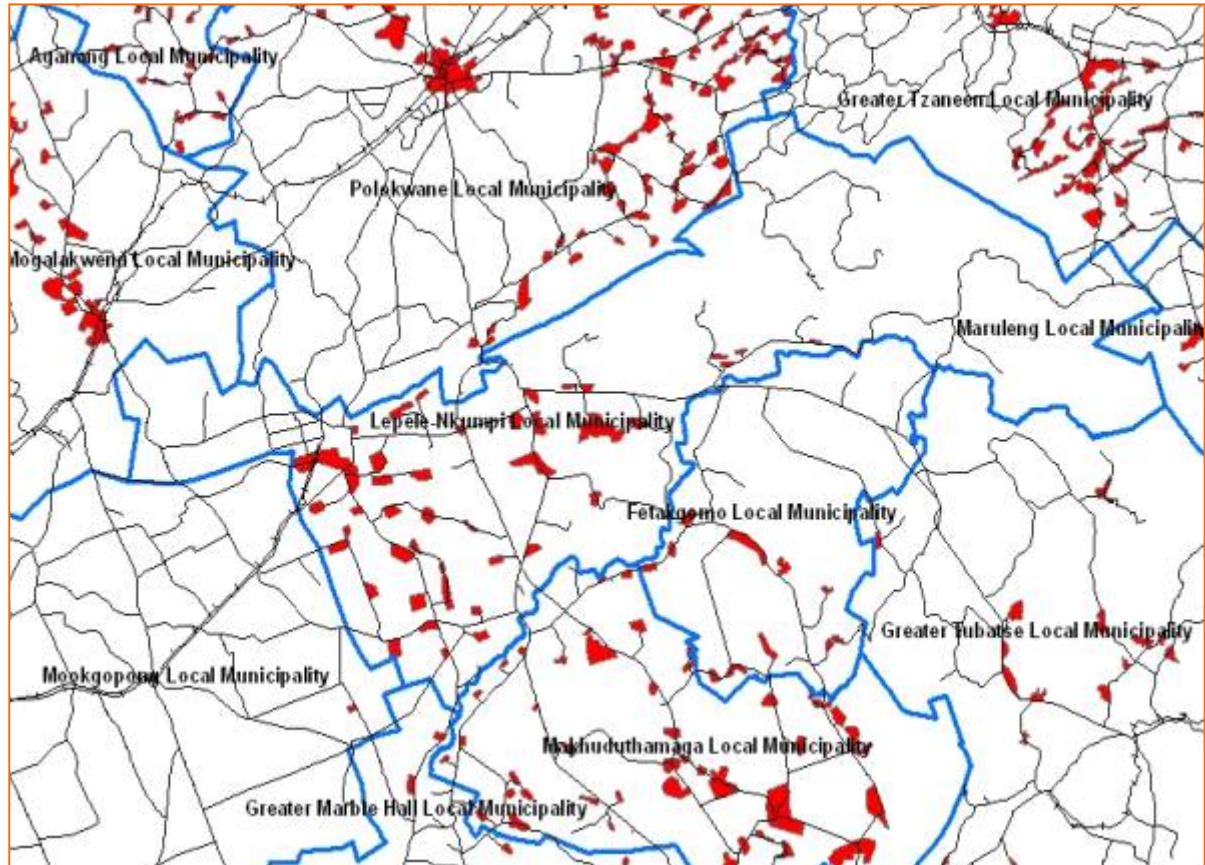
The development of juice from the juice processing plant will be guided by the following:

- The supply of good quality and competitively priced juice.
- To encourage existing and emerging farmers to participate in value adding of agricultural products
- Enable the creation of employment opportunities through the establishment of small agricultural enterprises in both upstream and downstream activities, e.g. transportation of produce and transporting of juice

2.3 Project Location

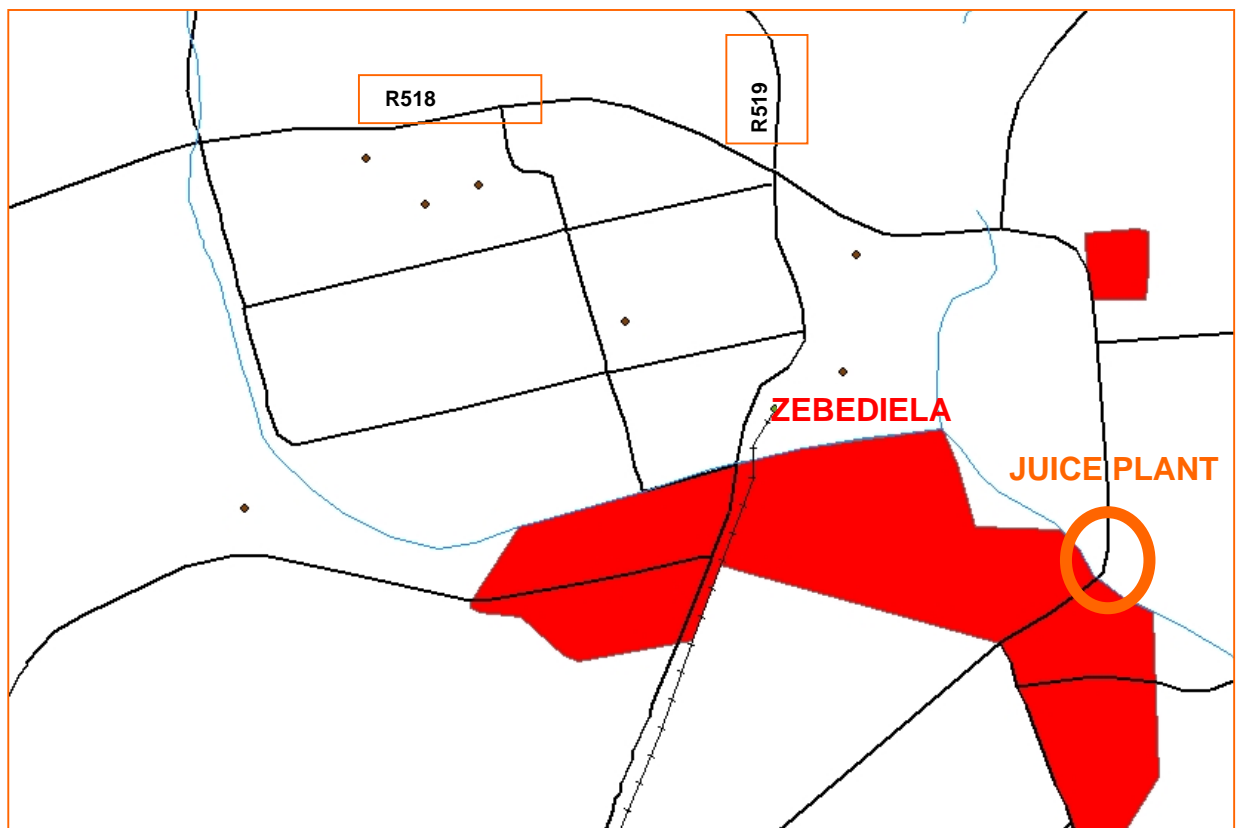
The location for the juice-making project is proposed to be located on the Zebediela Citrus estate at the junction of the Zebediela Citrus Estate and the main road to Lebowakgomo (see below Maps).

Map 2.4: Location of Lepelle-Nkumpi



Source: Kayamandi based on Survey and Mapping, 2006

Map 2.5: Location of Zebediela and proposed location of juice processing plant



Source: Kayamandi based on Survey and Mapping, 2006

Zebediela Citrus Estate (see below Photograph) is one of the biggest citrus estates in South Africa and in the Limpopo Province. It is 5973, 25 ha in size, of which 3,073 ha is used for livestock farming and the remainder for the production of citrus. Zebediela produces:

- Navel oranges,
- Valencia oranges, and
- Eureka lemons.

Zebediela's production is mostly export driven where approximately 75% of the production is exported and the remainder goes to the local market for consumption and to other juice processing companies outside the area.

The proposed location for the juice-making project is based on the following deciding factors:

- Current supply of citrus fruit to juice processors (approximately 2 000 tons of citrus from Zebediela citrus estate goes to juice processors per season)
- Proximity to small-scale farmers in Lepelle-Nkumpi
- Accessibility from existing road networks
- Availability of vacant land
- Availability of factory space

Photograph 2.6: Zebediela Citrus Estate



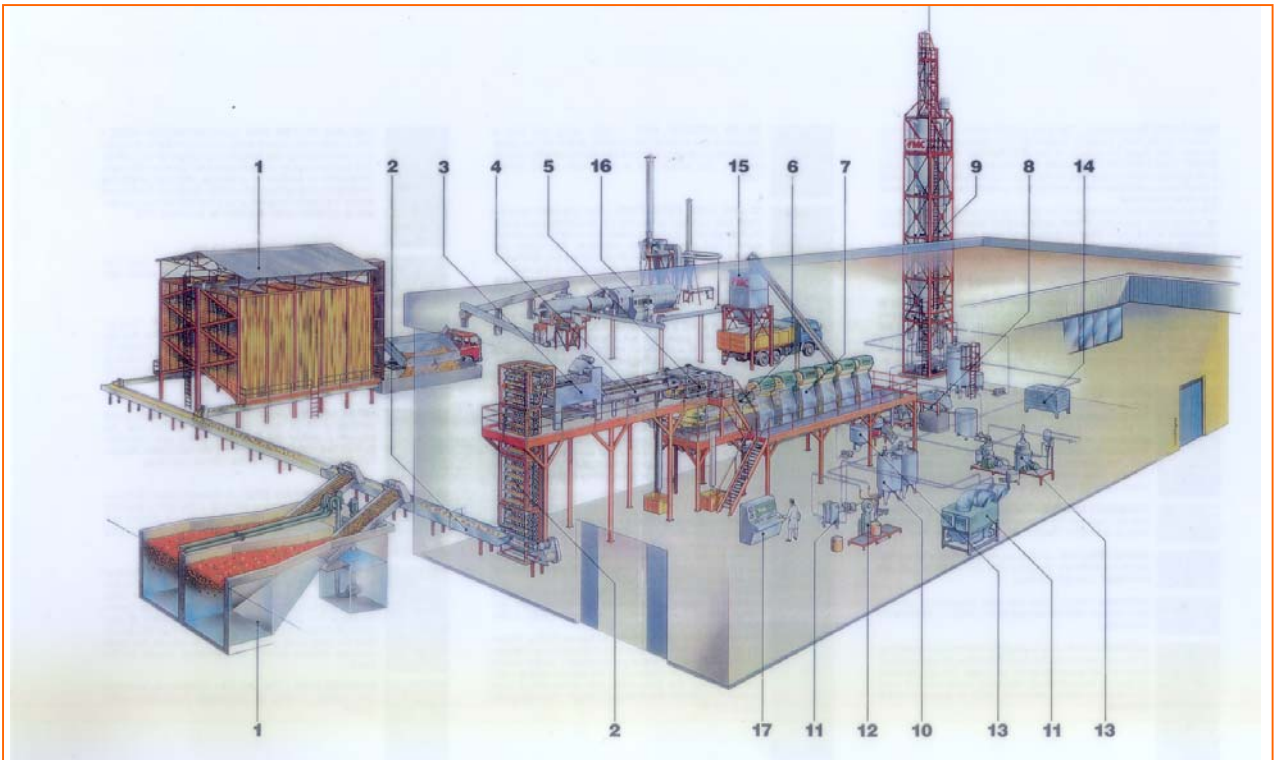
It is important to note that the Community Property Association (CPA) has recently been awarded full ownership of a part of the farm, through a successful land claim. The Zebediela Citrus Estate itself has the following ownership profile: 50% Boyes group, 35% CPA, 15% farm workers. Within the next 15 years, the Boyes group will ensure successful and sustainable handover of the Zebediela Citrus Estate to the community, in which event the community will have full ownership of the Estate.

Taking the above aspects into consideration it is therefore proposed that the juice making project be situated on the Zebediela Citrus farm. This will ensure that the project is situated within the vicinity of the supply of citrus and thus reducing transportation costs. It will also be situated in close proximity to the existing road network infrastructure in order to promote easy accessibility. Furthermore if the processing plant is situated on the boarder of the farm it can be in direct access to the local community from the Zebedeila Township who then has easier access to the processing plant.

2.4 Layout Plan and infrastructure needs

The Diagrams below provides a conceptual indication of the a juice processing plant a well as the proposed production unit (which is described in detail hereunder).

Diagram 2.7: Concept of Juice Processing Plant



High Quality Concentrate - The juice concentration up to 65 BRIX is obtained in the FMC T.A.S.T.E. Evaporator in a total cycle time of 2 1/2 minutes. The basic advantage of the «THERMALLY ACCELERATED SHORT TIME EVAPORATION» is that at each evaporation stage the juice is introduced into the tube nest in the form of a turbulent fog, enabling a much faster and higher heat transfer than it would be expected under any other conditions.

The juice flows from one stage to the other without recycling. The first juice evaporation occurring before pasteurization ensures a better juice deaeration and a more efficient stripping of fresh aromas.

The best quality of the product is preserved only when Deaeration Aroma Recovery - Pasteurization - Stabilization - Concentration - Cooling are provided in an extremely short time.

This is what FMC proposes with its most advanced Evaporation Technology.

Worldwide sales and service operations - FMC provides vital help at every stage in the process with people, advice, technology, products and systems that flow from unmatched FMC experience. Our specialists are found at strategic locations around the world planning and implementing FMC systems. FMC's commitment to citrus and its extensive experience enables FMC to make a unique contribution to the world wide citrus industry.

1 STORAGE - Citrus may be stored either with the Dry System or with the Water System. The Dry System includes aerated silos with sloping planes on which the product is placed in layers that ensure the soundness of the fruit. The Water System involves large concrete tanks on ground level, the product is discharged directly into these tanks from the truck, and extracted by means of water circulation which conveys the product to a special Elevator.

2 TRANSFER SYSTEM - This system consists of Conveyor Belt that transfers the product from one of the storage systems to a Vertical Elevator feeding the Brush Washer.

3 BRUSH WASHER - In this stage, all foreign matters that would contaminate the juice and the essential oils, are eliminated from the product.

4 SORTING TABLE - This has been designed in order to allow a more efficient removal of fruit that is unsuitable for extracting.

5 MASTER SIZER - In this stage the fruit is sized according to the cups of the In Line Juice Extractors, so as to achieve the best quality and maximum juice yield. Sizing is obtained by rotating the fruit along tilted belts and a series of rotating horizontal rollers, which can easily be adjusted during operation.

6 TILTED FEEDING BELT - After sizing the fruit is separately conveyed to the hoppers of the In Line Juice Extractors by means of a tilted belt equipped with suitable diverters. Any excess fruit is re-delivered to the Sorting Table.

7 IN LINE JUICE EXTRACTOR - Fruit delivered from the Tilted Belt conveyor is fed into the extracting cups singly. Fruit drops into a stationary lower cup which automatically centers and positions it for extraction. The upper cup descends, and as the metal fingers of the two intermesh, pressure is applied evenly to all surfaces of the fruit. The bottom of the lower cup contains a stainless steel cutter tube leading to the finishing tube and manifold. The cutter tube cuts a small circular plug in the bottom of the fruit, and as pressure is applied by the cups, the complete inside of the fruit is pressed into the finishing tube where the juice and juice cells are instantaneously separated from the seeds and section membrane. Only pure juice and juice cells are discharged into the juice manifold.

8 FINISHING - The juice coming from the Extractors is then collected by a stainless steel Juice Header and conveyed by gravity to the Finisher. This unit has been developed to extract juice from products having a low fiber and pulp content. The close screw tolerances in the Finisher and the continuous forward movement of product through the machine will keep the screens clean and free flowing. Further pulp reduction can be obtained by means of Centrifugal Separator.

9 EVAPORATOR (T.A.S.T.E.) - The juice is pumped into the Evaporator where, after the pre-heating cycle and the first evaporation stage, it is pasteurized and stabilized. During the evaporation, the juice is nebulized inside the Tube Nest at a very high speed (Thermo Acceleration) expanding in the separator very quickly.

Juice evaporation occurs in a single passage through a number of stages, consequently the limited juice residence time in the Evaporator guarantees a high quality product. The machine can also be equipped with an Aroma Recovery System: aromas are extracted from the juice and concentrated 150 times before pasteurization, which avoids any alteration to the freshness of the aromas due to heat. Before leaving the Evaporator, the concentrated juice passes through the «Flash Cooler», which drops temperature to 10°C.

10 COOLING SYSTEM FOR CONCENTRATED JUICE - The concentrated juice leaving the Evaporator is delivered to a standardizing and refrigerating system prior to filling. This system consists of 2 stainless steel tanks for Brix standardization in addition to a storage unit from which the product is pumped through a Plate - type Heat Exchanger where it is cooled down at a very low temperature by means of glycolate water supplied by a Chilling Unit.

12 DRUM FILLER - The concentrated juice is filled into drums by means of an accurately controlled system with preset weight scales.

13 FINISHING SYSTEM FOR ESSENTIAL OILS - This system consists of a Vibrating Screen to separate the oily emulsion from peel fragments, a Centrifugal Clarifier to concentrate the oily emulsion and a Centrifugal Polisher to completely separate the essential peel oil from other liquid phases.

14 CIP (CLEAN IN PLACE) - This system allows washing and sanitization of all parts coming into contact with the product. A special system of tanks, piping and high pressure pumps allows dissolution and semiautomatic distribution of sanitizing agents to the various machines.

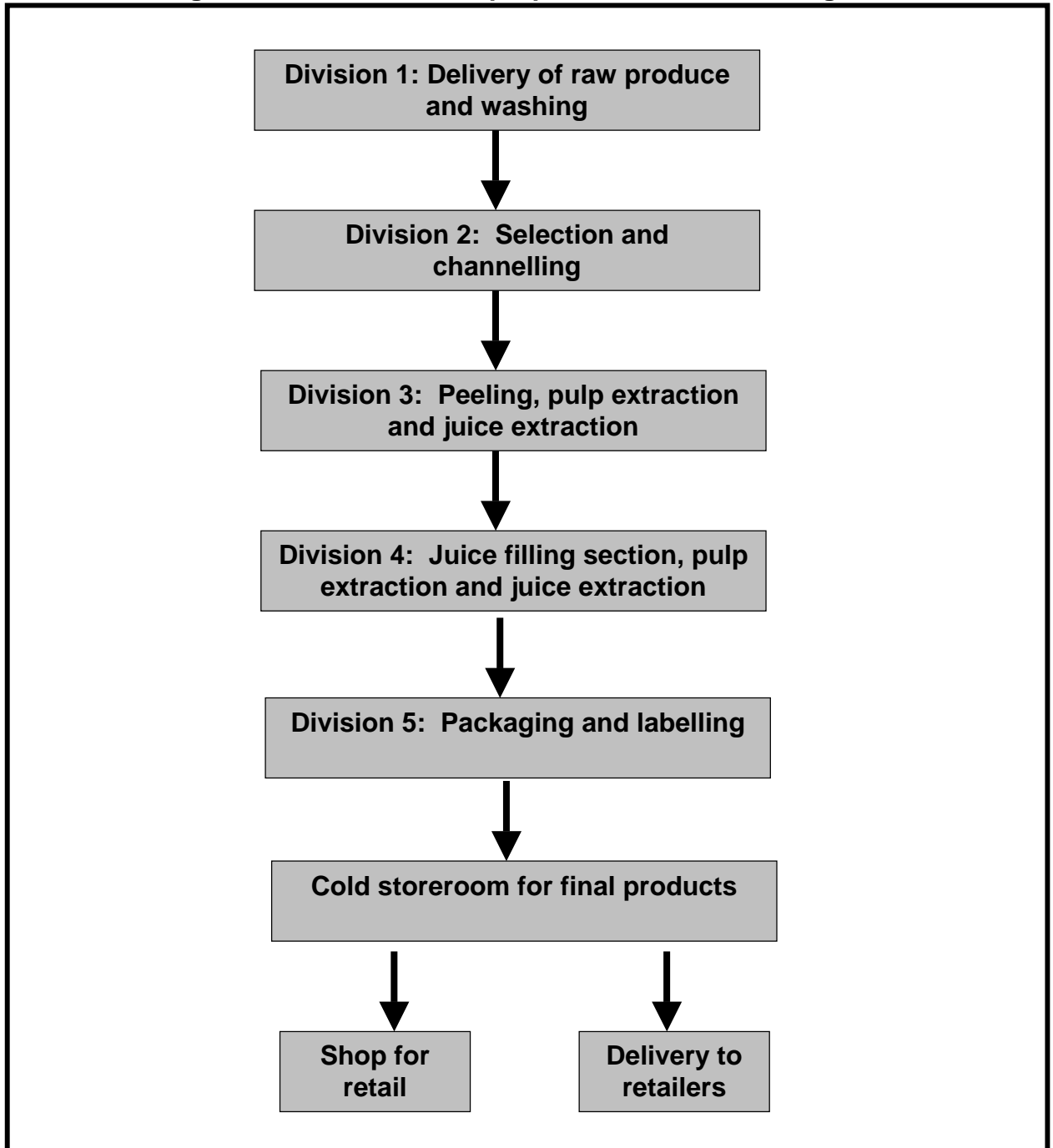
15 PEEL COLLECTING SILO - A special system of Screw Conveyors takes the citrus peels to a Silo with a capacity of approx. 12 cub. mt. The peels can be directly discharged onto a truck or conveyed to the Peel Drying system.

16 PEEL DRYING SYSTEM - This system includes: Hammer Mill, Neutralizing Tank with Lime Doser, Pressing unit, Drier complete with combustion chamber, Cooler for dried peels, Centrifugal Dust Separator, Product Filling System for Bags. The plant is designed for a reduction of peel moisture content from the initial 82% to a final 8%; this allows the peel to be preserved after its volume has been reduced without altering its nourishing feature as Pet Food.

17 CONTROL UNIT - This unit is so designed as to enable the operator to keep all operational parameters under control.

Source: FMC, 2006

Diagram 2.8: Flow chart of proposed Juice Processing Plant



As shown above, the juice making plant needs the following divisions:

1. Delivery of raw produce and washing
2. Selection and channelling
3. Peeling, pulp extraction and juice extraction
4. Juice filling section
5. Packaging and labelling

These are briefly described hereunder (as detailed description has been provided in terms of the process involved).

Division 1: Reception and washing

At the reception, the trailer load of oranges are weighed on scales in order to determine the weight of fruit received, which will be used to base the payment to the grower.

The trailer of oranges is then unloaded onto a conveyor belt. From this belt a sample is taken to test it for juice content and maturity. The fruit is then diverted to storage bins labelled according to the juice specifications.

This is where the surge bin (see below Photograph) and wash plant will be situated.

Diagram 2.9: Surge bin



The Surge Bin regulates the flow of citrus fruit to processing equipment. The surge bin serves as a buffer to control and maintain an adequate fruit flow for the extraction line. The fruit first passes through a series of internal baffles, allowing it to evenly distribute and gently descend to the base of the bin. An adjustable discharge gate controls the amount of fruit pulled out of the bin onto an attached withdrawal belt. Level sensors, located at high and low points within the surge bin, provide feedback to the control loop monitoring fruit flow rates. The bin frame is constructed of stainless steel and the surge bin has a volume of approximately 380 ft³ (10.75m³). The surge bin can hold approximately **5,000 kg (5 tons)** of fruit.

Division 2: Selection and channeling

Oranges are then selected from the bins to enable blending of optimal quality. The fruit is conveyed by belt through a washing process. The fruit is dumped from trailers onto conveyers where it is carried through a washing process. The elevator and conveyor serve the duty of channeling the fruit to the peeling machine.

Division 3: Peel, pulp and juice extraction

This is where the peel, pulp and juice extraction will take place. This is done by a peel, pulp and juice-extracting machine (see below Photograph). Two of these machines will be needed by the juice-extracting plant proposed.

Diagram 2.10: Juice extracting machine

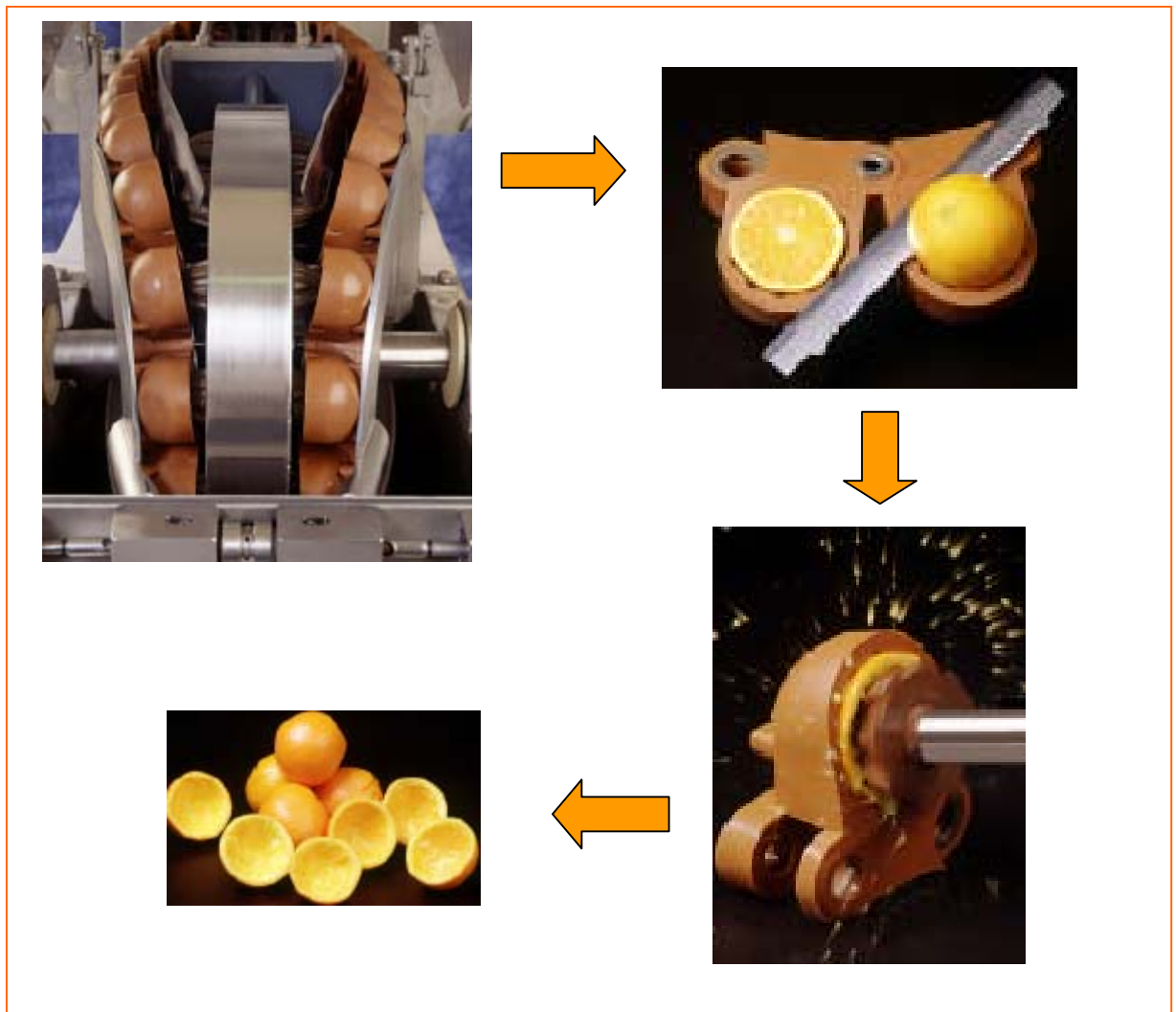


These extractors can be equipped with components to accommodate oranges, grapefruit, lemons, limes, and tangerines in several size ranges. They are manufactured using stainless steel construction and FDA approved rubber and plastic parts. The specifications of the juice extractor is as follows

- Overall length 82-1/4"
- Overall width 39-1/16"
- Overall height 79-3/8"
- Weight approx. 1600 lb
- Horse power std. drive 6
- Height of fruit inlet 57-15/16"
- Height of peel outlet 11-5/16".
- Height of juice outlet 8" Volume crated for export 206 cu. ft.
- Wash system requirements 66 gpm @ 100 psi
- **Processing speed: 2 to 7 tons of whole fruit per hour per machine**

The following Diagram provides an indication of the operation of the juice extracting machine.

Diagram 2.11: Juice extraction



This section also includes machinery such as the sizer, juice, receiving tanks, evaporator/pasteuriser, finisher, etc.

The Extractor separates the juice from those constituents, which, if allowed to remain in contact with the juice for any period of time, will have an adverse effect on the end product. The juice extractor also uses components specifically designed to reduce oil levels and bitterness in juice. Quality is also assured through maximum sanitation. This sanitation is made possible through the use of stainless steel constructions on the Juice Extractor, the Citrus Finisher and the use of an enclosed stainless steel piping system to transport the juice to the Citrus Juice Finishers.

In addition to juice extraction, the extractor is also able to recover the following by-products:

- Animal Feed - Peel, core, membrane and other by-products discharged from the extractor are available for livestock feed production

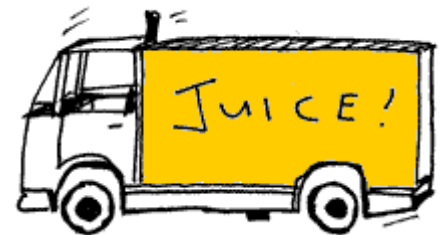
- Pulp Recovery - The Juice Extractors offer various methods of pulp recovery. The juice cell sac sizes can be custom tailored to the needs of the processor and its customers. In one configuration the Juice Extractor can produce pure juice sacs of nominal size for use in concentrated juices and other products. The Juice Extractor can also be configured to produce high quality premium pulp cells as part of the pulp recovery system. Juice sacs from this system are primarily used in the manufacture of not-from-concentrate juices. The juice cell sacs produced by this system range in size from 4mm to 10mm, are virtually free of peel and seed particles and embryonic seeds and up to 90% of the juice sacs retain their floating character.

Specialised machinery could also be obtained to extract oil from the peel.

This section also contains the evaporator/pasteuriser. It is important to note here that the pasteuriser needs to operate 24 hours. It will thus be necessary to employ 3 persons involved with this process (each with 8 hour shifts). It will thus also be necessary to take this into consideration for security personnel.

Division 4 and 5: Juice filling section, packaging and labeling

The juice is then transferred from the juicer into tanks and then into a drum filling station. From the drum filling station the juice needs to be filled or tapped into 5 litre plastic containers. Where after the containers need to get labeled with a Zebediela juice branding and then the juice gets stored in cold storage facilities. From the cold storage facilities the juice gets transported to stores ready for sale.



In addition to the above-described components, a storage facility is required for the empty containers. An ablution block with change room facilities is also needed for the staff.

A small shop is also required for the sale of juice to the local community.

3. MARKET ANALYSIS

This Section provides an indication of the supply and demand for citrus and for juice.

3.1 Citrus Supply

The South African citrus industry is the 3rd largest exporter of citrus in the world, despite being placed 13th in the world citrus production rankings. The estimated value of the annual crop is R2.8 billion of which exports account for R2.5 billion, or approximately 90%. The volumes purchased for processing in 2003/2004 amounted to 174 458, 13% of production. (National Department of Agriculture, 2003. Abstract of Agricultural Statistics).

The total area planted to citrus fruits in South Africa is 64, 685, with the Limpopo Province, Eastern Cape, Mpumalanga and the Western Cape representing the largest areas. The different citrus production regions are presented in the below Table.

The Limpopo province contributes approximately 33% (20 374ha) to the South African orange production (see below Table).

Table 3.1: Citrus Production in South Africa (2002)

Province	Area (Ha)	Metric Tons	% Contribution
Eastern Cape	14 263	300 069	20.3
Free State	114	1 619	0.1
Gauteng	62	936	0.06
Kwa-Zulu Natal	3 412	72 368	4.9
Limpopo	20 374	487 839	33.1
Mpumalanga	13 139	317 225	21.5
North West	1 707	27 661	1.9
Northern Cape	721	11 843	0.8
Western Cape	10 893	257 679	17.4
South Africa	64 685	1 477 239	100

Source: Census Commercial agriculture, 2002

It is evident from the above Table that 33% of the country's Citrus fruit are produced in the Limpopo Province. Major fruit produced in these regions are valencias, navels, grapefruits, mandarins, lemons and limes. The Limpopo Province has approximately 20,000 ha of land on which a third of the country's citrus production takes place and more than 75% of the citrus production in the Province is comprised of the production of oranges. However, the Limpopo Province does not have much citrus processing taking place, as almost 70% of its citrus produced is exported in its raw state.

The following Table indicates the amount of oranges produced from 1993/1994 to 2003/2004 as well as the amount sold on local markets, exported or sold for further processing.

Table 3.2: South African Orange production from 1993/1994 – 2003/2004

Year February to January	Total Production	Sales at major fresh produce markets	Exports	Purchases for processing
	Ton	Ton	Ton	Ton
1993/94	782 429	135 291	343 680	169 000
1994/95	875 662	124 496	423 145	203 733
1995/96	745 051	98 652	404 080	142 379
1996/97	919 068	118 543	462 000	219 845
1997/98	978 416	145 519	460 500	228 303
1998/99	963 589	115 602	522 000	210 078
1999/2000	1 156 359	137 056	607 500	275 681
2000/2001	1 117 964	145 354	573 000	255 671
2001/2002	1 262 527	136 980	750 926	238 570
2002/2003	1 266 634	117 782	758 414	272 474
2003/2004	1 330 187	114 978	937 619	162 269

Source: NDA abstract, 2004

Production of oranges in South Africa increased by approximately 70% from 1993/94 to 2003/2004 (from 782,429 tons in 1993/94 to 1,330,187 tons in 2003/2004). The volume of exports increased by 173% from 1993/94 to 2003/2004 (from 343 680 tons in 1993/94 to 937 619 tons in 2003/2004). Whereas the volumes purchased for processing decreased slightly from 169 000 tons purchased for processed in 1993/94 to 162,269 tons processed in 2003/2004.

In 2003/2004 purchases for processing amounted to 12% of orange production.

The primary focus of the Zebediela citrus estate is the production of citrus, which consists of lemons, navel and valencia oranges. The Table below shows the total citrus production of this estate.

Table 3.3: Zebediela Citrus Estate citrus production, 2006

March-October (kg)	Lemons	Navels	Valencia	Total
Production	2 196 330 kg	2 819 550	2 492 100	7 507 980
Percentage production	30%	38%	32%	100%
Citrus for Juice making	1 995 000 kg	250 000kg	780 000kg	3 025 000kg
Percentage for juice making	90%	9%	31%	n.a
Total	4 191 330 kg	3 069 550	3 272 100	10 532 980

Source: Zebediela Citrus Estate

As can be seen from the above Table approximately 10 500 tons of citrus is produced per season in Zebediela which is about 13% of citrus production in South Africa and 50% of citrus production in the Limpopo Province. The major contributor to the citrus production on this farm are lemons contributing approximately 30% to the total

production of citrus and approximately 90% of lemons are meant for lemon juice making. The total production meant for processing or juice making in Zebediela Estate contributes about 2% to the processing production in South Africa. The total production of navels and Valencia's meant for juice making is 9% and 31% respectively.

3.2 Citrus Demand

The Table below represents the local consumption of oranges from 1993/94 to 2003/2004.

Table 3.4: South African Orange consumption from 1993/1994 – 2003/2004

Year February to January	Total Domestic Consumption	Per Capita consumption
	Kg	kg
1993/94	269,748,683	7.14
1994/95	248,783,502	6.44
1995/96	198,592,530	5.03
1996/97	237,223,256	5.85
1997/98	289,612,808	7.02
1998/99	231,511,600	5.50
1999/2000	273,177,898	6.35
2000/2001	289,293,040	6.62
2001/2002	273,030,298	6.13
2002/2003	235,745,308	5.19
2003/2004	229,532,683	4.94
Total average	252,386,510	6.00

Source: NDA abstract, 2004

The total average domestic consumption was 252,387 tons for this period and the average per capita consumption was 6 kg. The per capita consumption has shown a decreasing trend since 1993/94 by approximately 1kg.

A survey on ready to drink (RTD) fruit juice consumption was undertaken based on a sample of more than 650 000 people in the Limpopo Province. The survey revealed that approximately **40% of the Limpopo population consume fruit juice**, of which 23% consume light amounts (1 to 2 drinks per week), 10% consume medium amounts (3 to 4 drinks per week) and 7% consume heavy amounts (more than 5 drinks per week). This then amounts to an average monthly consumption of **5 drinks per person per month (or 1.25 litres of fruit juice per month per person)**.

Discussions with relevant roleplayers and stakeholders have also revealed a high local demand for orange juice consumption by the local community. Numerous community functions such as weddings, funerals, birthday parties, etc will make use of bulk juice from the juice processing plant.

The Table below also indicates the juice market as noted from the aforementioned survey in the Limpopo Province. This survey conducted included most of the fruit juices available thus gives an indication of the juice market as a whole.

Table 3.5: Percentage distribution of consumption of fruit juice, in Limpopo

Types of Fruit Juices	Past 7 days	Mostly	Consider
All Gold	0.7	0.7	0.7
Appletiser	4.1	3.4	4.5
Bibo	13.2	11.7	11.8
Bonnita Cabana	1.3	0.9	1.2
Bonnita All Juice	4.1	2.3	3.1
Campbell's	-	-	-
Capri-Sonne	-	-	-
Ceres	3.1	1.8	2.5
Clover Krush	1.0	0.9	1.3
Dairy Belle	0.4	0.3	0.8
Fortris	0.2	-	0.2
Fruitopia	0.7	0.2	0.3
Fruittree	5.5	3.7	5.4
Genfen	-	-	-
Gibson's	-	-	0.2
Grapetiser	0.4	0.2	0.5
Hall's	5.3	3.3	4.7
Liquifruit	6.3	4.8	5.7
Just Juice	0.0	0.0	0.1
Minute Maid	2.7	1.9	3.3
Polar Ice	0.5	0.1	0.3
Pure Joy	1.0	0.7	0.8
Sunblast	-	-	0.1
Vitingo	0.1	0.1	0.1
Winnie the Pooh	0.4	-	0.4
House brands	0.5	0.5	0.6
Other Brands	2.6	2.2	2.6
No Brand	-	1.2	-
Total	100%	100%	100%

Source: RTD Survey, Stats South Africa

The above Table clearly reveals that the most popular fruit juice brands in the Limpopo Province are Bibo, Liquifruit, Fruittree, Appletiser, Bonnita, and Minute Maid.

On a world front it is also relevant to note that the supply of orange juice is set to fall after a poor harvest which has led to shortage of fruit used to make fruit juice. Brazil, alone which accounts for 48% of the worlds orange juice sales has absorbed nearly all its own fruit harvest and South Africa's total supply of oranges have almost been halved in 2006. It is thus clear that a substantial demand for orange juice exists.

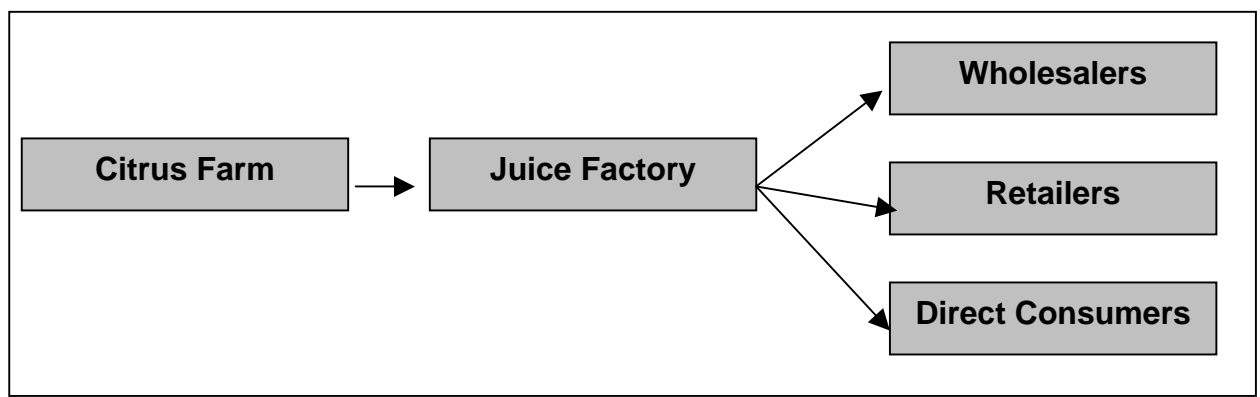
Furthermore, one of the measures to calculate the competitiveness of a product is by using the Revealed Trade Advantage (RTA). According to the Department of Agricultural Economics at the University of Pretoria the current Revealed Trade Advantage (RTA) index of orange juice is South Africa is 1.01. As compared to the orange juice RTA in 1980, the competitiveness of orange juice has increased by 37%.

3.3 Target Market and distribution channel

The target market is that section of the market or set of people that a business aims to supply its product to. Approximately 40% percent of Limpopo's population are fruit juice consumers, and by extension Lepelle-Nkumpi. The target market for orange juice processed in Lepelle-Nkumpi is the local community and local businesses as well as the Gauteng Market.

The distribution channel demonstrates how the juice products will be distributed or delivered to the end-users or customers. The project aims to distribute directly to the market, thus minimising the use of 'middlemen' as much as possible. The following Diagram is an indication of the juice product distribution channel envisioned.

Diagram 3.1: Distribution Channel



As can be seen from the above figure, the project also aims to supply directly to the community. One of the key advantages of supplying directly to the community in bulk is that it lowers the costs of delivery as transport costs and packaging costs can be minimized substantially. The juice will also be supplied to informal traders, grocers, restaurants, etc.

4. RISKS, STRENGTHS & IMPACT

4.1 Risks

The following factors that could prove to be detrimental to the running of the juice-making project if they are not addressed successfully as well as the physical attributes of the juice making project that do not appeal to the target market that need to be taken into account are as follows:

- Quality of produce not being up to standard as required by buyers
- Navels and Valencia's only produced for 6 to 8 months of the year, thus requires investigation into lemon juice for the remainder of the time
- Navels and Valencia's are produced at different times, which will affect the taste of the juice. These either need to be stored and mixed or otherwise market as Navel juice and Valencia juice
- Lack of proper infrastructure, building needs to be erected and infrastructure needs to be purchased which will be very costly
- Not being able to meet demands of buyers during low production season.
- Poor management.
- Competition from existing juice processors
- Lack of buy-in from commercial, small-scale and emerging farmers to participate in the juice-making project.
- Location and ownership of project
- Inclusion of small-scale and/or emerging farmers may cause uncertainties with regards to the quality and regular supply of fruit.
- Raw material constraints. Seasonality of raw material is the main supply constraints,
- Seasonality of production influence prices and turnover of the juice making project and may cause financial losses.
- Running of the juice making plant is mechanized and thus reduces possible job opportunities
- Lack of financial resources
- Lack of technical market information
- Limited managerial technical and administrative skills especially at the micro and small-scale level.
- Water is currently obtained from boreholes on the farm. A threat exists that the quality might not be up to standard for the required use for juice making
- Waste water needs to be dealt with in an environmental manner

4.2 Strengths and potential impact

The existing or possible market demand for the juice making project, as well as the physical attributes of the juice making project that appeal to the target market for the juice processing plant, are as follows:

- Existing agricultural production of citrus fruits on commercial and small scale

- The availability of locally produced fruit from commercial and small scale farmers who currently have limited access to the market
- There are only a few juice processors (and no local juice processors), thus little competition exists
- A large market for fruit juice exists
- Zebediela is well distinguished for good quality citrus production
- Agro-processing has been identified as one of the important agricultural activities in terms of value adding.
- The existing Zebediela name which is an advantage for marketing purposes
- Job creation from spin-offs including business, utilities, transport, etc.
- Growth of small farmers and community projects in the agricultural sectors.
- Development of small-scale and emerging farmers
- Value chain expansion
- Local value-adding
- Final product manufacturing
- Vast local employment opportunities
- Income generation for local small-scale farmers
- Increase in local revenue base
- Skills development of local community
- Direct local employment

In addition to the above-indicated opportunities and strengths which reveal some of the key potential impacts of the project, it is also important to note that the implementation of the proposed juice processing plant is assessable in terms of the socio-economic and economic effect it will have on a local and even District level. Socio economic effects can be determined by the following elements of a project:

- Business ownership
- Community ownership
- Black Economic Empowerment
- Labour intensiveness
- Permanent job placement (approximately 31 positions)
- Skills transfer
- Sustainability, etc

The juice-processing plant addresses all of the above-indicated aspects. The significance of the project lies within the large number of labourers, which needs to be employed in order to make the juice. The labour intensive processes involved in juice making include:

- Sorting of oranges
- Washing of oranges
- Peeling of oranges
- Juice extraction
- Juice storage and packaging
- Managing of by-products

Labour intensiveness leads to increased employment opportunities created through spin-off opportunities (see above) in the local community. The project will create job opportunities, promote entrepreneurship and curb poverty through income generation

Zebediela Juice Extraction Plant

and skills training of the labourers of the project. These in turn leads to the bettering of the lives of project labourers, their households and those of the community at large.

Due to the sheer magnitude of the juice processing plant, the project will also create spin-off employment opportunities, for a locally owned trucking company.

5. MANAGEMENT TEAM

5.1 Ownership and Management

The community property association, which holds ownership of the Zebediela farm, has already benefited substantially from the Zebediela Citrus estate (through the successful land claim and part ownership of the Citrus Estate). It is thus suggested that the rural community (i.e. tribal authority) in which the juice-making project is to be located hold ownership of the project, including the structures to be erected. Rental (and income) will thus accrue to the community property association at Zebediela farm. This therefore implies that all persons involved in the project will share profit and liabilities. The ownership of the juice-making project is thus proposed to be 100% community owned.

The juice processing plant's legal entity will be in the form of an agricultural co-operative. In general, a co-operative is a form of business undertaking, which has manifested itself throughout the world – from third world countries to the highly developed industrialised countries. It is therefore a worldwide phenomenon, which does not conform to any particular political system. Co-operatives usually originate from an economic need, which arises from the hardship or suffering of people – hence the adage “co-operatives are born out of necessity”.

Co-operation may be regarded as the working together of a group of people, on a voluntary basis, in order to achieve a common purpose. A co-operative is defined as: “A business undertaking whereby a group of individuals strive on a voluntary basis to meet their mutual economic and social needs in such a way that the economic advantages derived there from are greater than that which the individual could achieve on his/her own”.

The following universal principles for co-operatives apply:

- Democratic control: the highest authority in a co-operative is vested in the members in a general meeting.
- Distribution of profits based on patronage: The patronage or the value of business done by a member with his co-operative is the basis on which the co-operative distributes its profits and not by way of dividends on shares.
- Financing the co-operatives: The primary aim of taking up shares in a co-operative is to obtain membership and to participate in the rights and privileges of membership.
- Open and voluntary membership: by open membership is meant that everyone who fulfils the requirements for membership (e.g. only farmers may become members of a primary agricultural co-operative) and who can contribute and can obtain an advantage from the activities undertaken by the co-operatives should be entitled to become members of the co-operative on a voluntary basis. Discrimination on whatever basis therefore has no place in a co-operative.
- Business with members only: A co-operative is established by its members to service the mutual needs of its members.
- Autonomy: Co-operatives are autonomous undertakings, which are controlled and owned by their members.

The Internal Co-operatives Alliance, which is an international organisation which propagates co-operatives on a world wide basis and which regards itself as the final definer of co-operatives, determined the following additional principles:

- Education: In terms of this principle co-operatives have the responsibility to present education and training programmes to their members leaders and employees on a continuous basis in which they can, inter alia, learn more about their respective roles.
- Co-operative among co-operatives: In order to best serve the interests of their members and their communities, co-operatives should actively co-operative in every practical way with other co-operatives locally, regionally and internationally.
- Communities: Co-operatives are concerned about the communities in which they exist. While focusing on member needs, they strive for the sustainable development of these communities through policies that are respectful of the environment.

The affairs of the co-operative shall be managed and controlled by a board consisting of directors. The directors shall, subject to the provisions of the Act, exercise the powers and duties of the co-operative. The number of directors shall subject to the approval of members at the next general meeting, be determined by the board from time to time. The board may appoint non-members to the board in order to obtain expertise on the board: Provided that the total number of directors appointed by the board from non-members shall not exceed the number of directors elected from members.

The objectives of the juice processing agricultural co-operative are:

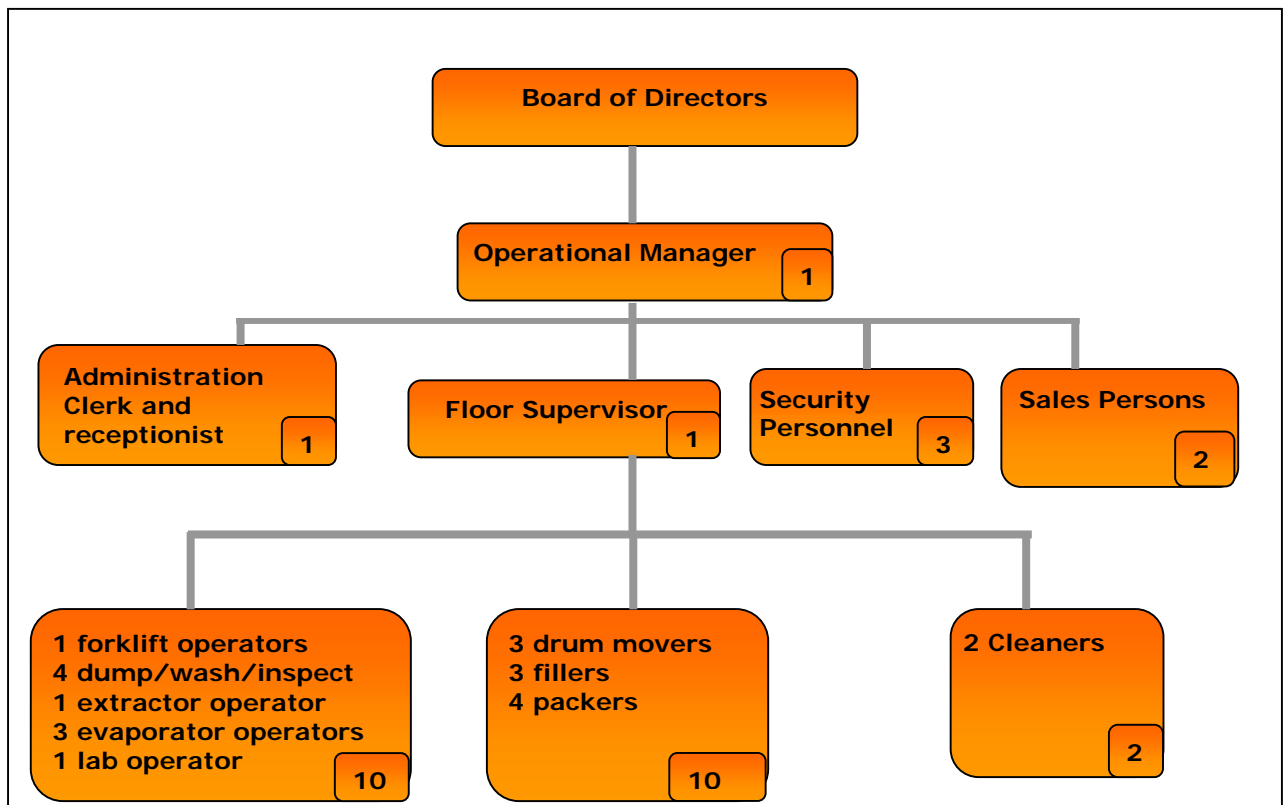
- To process such products and to dispose of the products into which they were converted
- To better the lives of members and their families and those of the community at large through generation of income for household management
- To render services to members jointly in order to reduce costs, such as the buying of the surrounding farmers citrus surplus
- To obtain professional assistance and/or advice for members, e.g. modern farming methods and systems
- To obtain or arrange credit facilities for the production needs of its members
- To take any other measures to promote the interest and standards of living of its members as may be agreed upon and as may be approved by the Registrar of Co-operatives
- To create jobs and entrepreneurship
- To combat poverty and hunger
- To provide a skills training base
- To propagate other co-operatives for the benefit of the community.

5.2 Organisational Structure

The juice processing plant will create a number of employment opportunities. The positions to be filled include among others managers, secretaries, supervisors, packers, cleaners, etc.

The following organogram illustrates the proposed organizational structure of the Zebediela juice processing plant.

Diagram 5.1 Organisational structure of the juice processing plant



From the Diagram above it is evident that it is envisioned that a total of 31 persons will be employed by the implementation of a juice extraction plant. The structure can be described as follows:

- Board of 6 Directors, including: 2 Managers: 1 Overall Manager and 1 Deputy Manager, and 4 Supervisors: 1 Treasurer, 1 Deputy Treasurer, 1 Secretary and 1 Deputy Secretary. The board of directors are elected from the labourers
- A manager and a floor supervisor
- A administration clerk and a receptionist
- 3 security personnel
- 2 sales persons
- 2 cleaners
- 20 labourers

Board of directors are elected to executive positions during the organisation's Annual General Meeting and all members have the right to vote. Six persons are elected into executive leadership of the organisation who fulfil the following responsibilities:

- The Chairperson
- Deputy Chairperson
- The Secretary
- Deputy Secretary
- The Treasurer
- Deputy Treasurer

The role of the **Chairperson** is to chair meetings and act as the public leader of the organisation. In most organisations, the Chairperson performs the following tasks:

- Convenes and chairs meetings of the Executive Committee
- Chairs the general meetings of the membership.
- Speaks at other meetings and events on behalf of the organisation.
- Represents the organisation on other structures and with other organisations, authorities, founders and the public.
- Deals with the media in liaison with officer for media or publicity
- Deals with disciplinary issues and problems members may have with the organisation.
- Spends time on strategising and planning as well as monitoring progress of the organisation.

The **Deputy Chairperson** has the same role and plays it when the chair is not available. The Deputy Chairperson could for example be responsible for sub-committees on projects, or could represent the organisation on the development forum.

The role of the **Secretary** is to act as an administrator. The **Deputy Secretary** will assist the Secretary and take over any functions as needed. In terms of administering an organisation the Secretary is usually responsible for the following tasks:

- Letting people know about meetings
- Drawing up agendas for meetings.
- Taking minutes of the Executive meetings and of the general meetings.
- Following up all tasks and decisions that come out of meetings to make sure they are implemented
- Receiving and responding to correspondence
- Keeping all records and a good filing system
- Dealing with incoming calls (telephones) and placing advertisements in newspapers.
- Managing the office.

The **Treasurer** and the **Deputy Treasurer** is responsible for managing the money of the organisation. S/he has to account for all funds raised and spent on a monthly and annual basis. The tasks of the Treasurer(s) include:

- Opening bank accounts
- Keeping the cheque book
- Drawing up a budget
- Keeping record of incoming and outgoing finances.
- Paying all the bills for the organisation within the budget
- Keeping both the Executive and membership up to date about the financial status of the organisation.
- Making sure that the organisation is audited and the annual financial reports are done and presented to the AGM.

Set out below are the main roles, responsibilities and duties for each of the posts indicated in the Diagram above:

- **Operational Manager**
 - Developing long term and annual objectives and strategies for the plant;
 - Monitoring, evaluation and review of implemented strategies, objectives and plans for the plant;

- General management in terms of planning, organising, leading and controlling the business and the resources of the plant;
- Management of the overall operation of the plant, including packaging, sales, grading, etc.;
- Allocation and dictation of roles and responsibilities to the various employees;
- Maintenance of equipment and infrastructure;
- Handle problems and queries from supervisors;
- Maintenance of a database on clients, amounts bought and sold and produce losses;
- Management of all financial requirements, sales, bookkeeping, taxes and duties etc.;
- Management of financial resources of the plant;
- Decision-making on the financial structure of the plant, personnel management and marketing;
- Management of day to day marketing of the plant;
- Development of a marketing plan, campaigns and funding for the plant.
- Liasing with the public, businesses, retailers, commercial and emerging farmers, and clients and ensuring that the product complies with their needs;
- Identification and implementation of technology advancements for business development; and
- Reporting to CEO and Board of Directors on management of the plant.
- **Administration Clerk**
 - Manages all financial activities and transactions
 - Assists and supports Operational Manager in bookkeeping and preparation of operational and capital budgets
 - Management of personnel and staff administration
 - Management of logistics and administration of inventory listings, attendance registers and leave forms
 - Assists Manager in logistical matters
 - Responsible for filing and administration
- **Receptionist**
 - Front sales
 - Receptionist and switchboard operator
 - Handling of petty cash
- **Floor supervisor**
 - Registering of deliveries of citrus to the plant
 - Ensuring deliveries to plant go through the market system
 - Supervising the unloading of citrus
 - Supervising the selection and weighing of citrus
 - Supervising sales of juice
 - Supervising loading and transport of juice
 - Render client service to buyers and relevant role players; and
 - Reports to Operational manager
- **Security personnel**
 - Access control and administration of right of admission
 - Traffic control
 - Alarm response
 - Recording and reporting of suspicious activities

- Patrol duties and checking of premise for break-ins and damages
- Protection of personnel and assets; and
- Emergency services.
- Three shifts of eight hours each are needed, hence 3 positions
- **Sales persons/cashiers**
 - Sales and customer service on the floor;
 - Regulation of produce sales;
 - Act as cashier;
 - Receiving cash, balancing and paying over of cash; and
 - Reports to Floor Supervisor and Operational Manager.
- **Cleaners**
 - Sweeping of floors, offices, ablutions;
 - Refuse removal; and
 - General cleaning of area and office equipment.
- **Forklift operator**
 - Loading and off loading of packaged juice
- **Dumper, washer, inspector**
 - Reports to manager for stock control
 - Receive citrus delivered to plant
 - Ensure fruit get dumped/washed
 - Channels the fruit to the right machinery
 - Inspection of fruit and quality control of final product
- **Extractor operators**
 - Overseas operation of the juice extractors
 - Monitors the efficient functioning of equipment
- **Evaporator and lab operators**
 - Oversees pasteurisation process
 - Temperature control
 - Quality control
 - Monitors the efficient functioning of equipment.
- **Drum movers and fillers**
 - Move the large drums from the drum filling station to the filling section
 - Fill the 5 litre containers with juice from the drums
- **Packers**
 - Packaging and labelling of finalised products
 - Operate citrus finisher

6. FINANCIAL PLAN

The Financial Plan sets out the expected financial requirements to set up the juice extraction plant and gives an indication of the estimated operational expenditures and likely incomes that could be generated by plant.

6.1 Capital Expenditure

The capital expenditure refers to the estimated expenditure or costs incurred during the acquisition of assets needed to establish a juice processing plant. These assets will be vital to the operation of the juice processing plant.

The following Table list the machinery items that will need to be purchased.

Table 6.1 Machinery costs

Machinery	Cost (in Rand)
Surge bins and washers	R 200,000
Bin tipper	R 9,412
Hopper/conveyor	R 10,588
Inspection Conveyor	R 10,588
Brush washer	R 38,824
Elavator	R 29,412
Spreader Conveyor	R 16,471
Sizer	R 47,059
Angled Conveyor	R 38,854
Return Conveyor	R 8,235
Return Elavator	R 20,000
Extractor stand for 3 Extractors	R 88,235
Peel Anger	R 47,059
Stainless Steel Pipe work	R 52,941
Juice Tanks (2)	R 58,824
Stainless Steel receiving tank	R 7,059
Finisher	R 232,470
Pasteuriser/Evaporator	R 1,117,647
CIP Tank	R 8,235
Blending Tank	R 94,118
Stainless Steel Pumps	R 112,941
Drum Filling Station	R 41,176
Electrical Panel Cables	R 98,823
Transformer	R 52,941
Compressor	R 17,647
3 Ton Boiler	R 147,059

Machinery	Cost (in Rand)
Deep Freeze	R 1,529,412
Chiller Plant	R 76,470
1 Forklift	R 160,000
Total Machinery Costs	R 5,150,147.00

The above machinery costs do not include the costs of two extractors, as these are to be rented.

The following Table provides an indication of the costs involved with the construction of the plant.

Table 6.2: Construction of processing plant

Expenditure	Size	Price (R)	Total (R)
Construction of warehouse space	1000m ²	R2,500 per m ²	R2,5000,000
Office space	80m ²	R3.500 per m ²	R280,000
Kitchen, bathroom, lockers	50m ²	R4,000 per m ²	R200,000
Professional fees (Quantity surveyor, architect, etc)	n.a	15% of above	R450,000
Total construction costs	n.a	n.a	R 3,430,0000

The Zebediela Citrus Estate could also be enticed to construct the warehouse space needed for the operation. In which event, the rental which they could obtain per month would be far higher than the above indicated estimates. This will lead to substantially lower capital requirements for the operation, although higher operational costs.

The expected capital expenditure for the project during the total project period is indicated in the Table below.

Table 6.3: Capital Expenditure

Expenditure	Amount	Price (R)	Total (R)
Machinery Costs		R 5,150,147.00	R 5,150,147
Installation of Machinery	1	R 327,320.00	R 327,320
Office Desks	5	R 1,000.00	R 5,000
Chairs	30	R 250.00	R 7,500
Kitchen equipment			R 15,000
Filing cabinets	8	R 300.00	R 2,400
Computer	5	R 6,000.00	R 30,000
Fax/copier/printer	1	R 3,000.00	R 3,000
Construction of processing plant	1	R 3,430,000.00	R 3,430,000
Total	n.a	n.a	R 8,970,367

The above calculations are based on the following:

- Machinery costs include all the costs incurred in the purchasing of machinery for the production of orange juice, except for the 2 extractors which are to be rented

- The installation of machinery includes all the costs involved in installing the machinery, drawing up a maintenance plan and training of staff on the operations of the machinery. It includes the hiring of 2 experienced technicians for 7 weeks full-time, including their accommodation costs.
- The construction of the processing plant (as shown in the previous Table)
- Office desks, chairs, filing cabinets, computers and fax/copier/printer to be used by the managers and the staff
- Kitchen equipment such as microwave, kettle, toaster, etc

It is thus evident from the above Tables that capital expenditure amounts to **R8,970,367**.

A loan amount of R9 million (which includes miscellaneous costs) will thus be needed. It is suggested that the loan be repaid within 5 years, which will amount to an annual loan repayment of R2,621,552 (at 14% interest).

6.2. Operational Expenditure

The operational expenditure is the projected running costs of the project. These are the day-to-day costs including administration costs, material costs, salaries and wages, etc.

The following Table indicates the expenditure on production costs of juice-extraction. These are the costs incurred during the production of the citrus or fruit juice such as the purchasing of citrus produce and other consumables.

Table 6.4: Raw material costs per annum

Produce	R/ton	Tons purchased	Cost
Navel Oranges	280	7,000.00	R 1,960,000
Valencia Oranges	420	7,000.00	R 2,940,000
Total		14,000	R 4,900,000

It has been estimated that a total of **14 000 tons** of citrus is required to sustain the two juice extractors per season. It is relevant to note here that both oranges and lemons can be processed (this will assist in ensuring a more constant supply of citrus as the orange season is only from April to October, while lemon season is from during November and December, and February to August). Zebediela Citrus estate has indicated that they would sell their Navel oranges at R280 per ton and their Valencia oranges at R420 per ton. The raw inputs costs (citrus in this instance) will amount to an annual cost of R4.9 million. It should also be noted that navels are more abundant in May, June and July, whereas Valencia's are more abundant in August, September and October and will thus have to be purchased accordingly.

The following Table indicates the salaries and wages for the proposed staff.

Table 6.5: Personnel expenditure

Personnel	Amount	Monthly Salary (R)	Total (R)
Manager	1	R 20,000	R 20,000
Supervisors	1	R 10,000	R 10,000
Sales persons	2	R 8,000	R 16,000
Lab operator	1	R 6,000	R 6,000
Administration clerk	1	R 4,000	R 4,000
Receptionist	1	R 3,000	R 3,000
Extractor, forklift, evaporator operators	5	R 2,500	R 12,500
Labourers	14	R 2,000	R 28,000
Security	3	R 1,500	R 4,500
Cleaner	2	R 1,000	R 2,000
Monthly Total			R 106,000
Yearly Total	31		R 1,378,000

Taking all of the above into account, the Table below sets out the overall expected operational expenditure per annum. This includes all produce purchases, salaries and wages, utilities and services, general maintenance, etc.

Table 6.6: Operational expenditure

Expenses	Annual Costs
Loan repayment	R 2,621,552
Rent	R 60,000
Purchase produce	R 4,900,000
Consumables	R 250,000
Salary and wages	R 1,378,000
Rent machinery and LDV	R 359,400
Bulk container costs	R 3,326,400
Transport of containers and RTD juice	R 2,541,000
Water and electricity	R 360,000
Marketing and promotion	R 50,000
Labelling	R 554,400
Repairs and maintenance	R 200,000
Stationary, printing, consumables	R 60,000
Telephone, fax, e-mail	R 100,000
Contingencies	R 120,000
Total	R 16,880,752

The above is based on the following:

- The juice making plant will have to take out a loan for R9 million to cover the start up capital expenditure. The loan needs to be paid back over a five-year period at 14% interest.
- Consumables refer to the chemicals and lubricants needed for the operation of the plant.

- Marketing, promotions and includes all the costs incurred in introducing the product to the market and making it known to the target market.
- Repairs and Maintenance figure includes all the costs incurred in maintaining and repairing the equipment, machinery and buildings
- Rent of Machinery includes the lease payment of the two juice extractor machines and a Light Delivery Vehicle (LDV)
- Stationary, Printing and consumables includes all the costs related to the day to day administration of the juice plant including fuel for the LDV and forklift
- Bulk and Retail containers these are the packaging costs of the final product. This is based on 5 litre containers which if bought in bulk amount to approximately R3 per container. A variety of container sizes could however be considered.
- Transportation costs include the costs for transporting the empty containers to the plant and for transporting the ready to drink (RTD) juice to the Gauteng market. This is based on R11 per kilometre (including toll gates).
- Water and lights are based on intensive plant operation of R30000 per month
- Labels at 50 cents per label per 5 litre container
- Rental based on a property size of 5000m² and a monthly rental of R5000.
- Contingencies to the value of R10000 per annum for unforeseeable happenings such as spillage, freezers not working and hampering development, spoilage of juice, etc

6.3 Projected Income

The projected income is the expected income from the sale of all the juice products (See below Table). It should be noted here that this income stream is only based on sale of pure juice, although both juice and concentrate can be made and sold by the juice processing plant. The selling of concentrate will provide even a higher income stream.

Table 6.7: Income expected from the juice products

Per Season	Citrus produce Used (kg)	Litres	Price	Income (R)
Sales of citrus juice	14,000,000	5,544,000	R3 per litre	16,800,000
Pulp and peel sales for animal feed	8,140,000	n.a	R75 per ton	610,500
TOTAL				R17,242,500

A total of 14,000 tons of fruit are required in order to sustain the two juice extractors. The 14,000 tons will be used to manufacture the fruit juice. Approximately 1% of the citrus purchased is estimated to be of extremely poor quality and is directly to be used for animal feed. The selling price for the juice needs to be no more than R3 per litre. This will allow retailers to double their mark-up and retail the juice at R6 per litre (which is very competitively priced in relation to juice sold in the market place). Furthermore, nearly two-thirds of the citrus purchased will remain (after the juice has been extracted) to be used as pulp for animal feed. This can be sold relatively cheap at R75 per ton. This will assist in the plant not having to pay additional for the removal of this 'waste' and at the same time Zebediela Citrus estate can benefit by using the mulch and peels as feed for their cattle.

It is however, relevant to note that the operation could also consider the sale of fruit concentrate, which would be cheaper to transport, but requires a more intricate process. This however, depends on the contracts, which are to be established, and the demand from retailers for either purchasing ready to drink juice or juice concentrate.

6.4 Projected Profit and loss statement

The Table below indicates the total income and expenditure expected in the juice processing plant.

It should be noted that the juice processing plant will only be fully operational in year 2, as the construction and infrastructure will initially have to be obtained, machinery training undertaken, etc. As a result the undertaking will not be fully operational in year 1. As such, it is expected that the plant is likely to operate at a loss for the first year, until such time as all structures and networks are in place. It should, therefore, be noted that the estimated operational expenditures, potential incomes and expected profits provided are based on operations in Year 2.

Table 6.8: Net profit and loss

Profit and Loss	Income
Income	R 17,242,500
Expenditure	R 16,880,752
Expected Net Profit per year (income – expenditure)	R 361,748

The estimated net profit amounts to R 361,748 for the production of approximately 5.5 million litres of citrus juice per year (from year 2 onwards). It should be noted that after the loan repayment for the capital expenditure has been repaid, slightly higher expenditures could be expected (due to maintenance of by then older machinery), although substantially higher net profit can be expected (due to the initial loan being settle).

7. IMPLEMENTATION PLAN

A breakdown of tasks, milestones, project initiation and co-ordination of the development process, which needs to be achieved for the realisation of the project, are as follows:

- **Appoint implementer:**
- In order to implement the project successfully, a dedicated person needs to take responsibility for the implementation. This can either be done in-house if sufficient capacity and know-how exists, or can be put out on tender for development facilitators. In order to ensure that the implementation and management of the project is driven successfully, the implementer must ensure that the project produces the required deliverables to the required standard of quality and facilitate handover of successfully implemented project. Consequently, the implementer must be appropriately empowered and provided with sufficient decision-making authority to fulfill his or her responsibilities.
- The project implementer needs to meet regularly with the community/potential owners (whom are to become the owners) of the project as well as with the LED manager on a weekly basis to ensure that the learning process is shared with all members and to effectively evaluate the progress of the project.
- The implementer must take responsibility for the following: liaison with the municipality, project programming and execution, monitor overall performance of members, undertake accounting administration of project, time frame management, setting up implementing user agreements, monitor and manage risks, establish and enhance reporting mechanism, conduct regular team meetings, monitor quality assurance and deliverable acceptance, monitoring construction phase and skills training phase, monthly progress reports and status reports in order to ensure that the study is in line with the required outputs, timeframe and budget.
- **Finalise ownership:**
- Identify local people interested in becoming involved in the juice processing plant
- Identify local communities and roleplayers/stakeholders (such as relevant Tribal authority, Department of Agriculture, Zebediela Citrus Estate, Community Property Association, etc) that need to be involved in planning and decision making process
- Undertake strategic workshops to engage with relevant project stakeholders. This includes obtaining local business interests with regards to the projects and to obtain community-based interests. It is essential that this participation be fostered, as the acceptance of the outputs of the projects needs to be in line with business and community desires. The purpose of these workshops will also be to ascertain stakeholder visions for the project, so that key issues not previously attained can be taken into consideration. It is essential to attain such input from the start of the study.
- Undertake negotiations with the community, Zebediela Citrus Estate, the Community Property Association (CPA), the relevant tribal authority, etc to finalise ownership and rental. The negotiations should include determining whether the owning body of the juice processing plant should construct warehouse space and pay rental to the Community Property Association, or whether Community Property Association wants to construct the warehouse and charge higher monthly rentals (thereby creating an additional income stream).

- Hold introductory meetings with existing (or proposed beneficiaries) of the proposed project. The purpose of this introductory meeting will be to explain the purpose of the project to the beneficiaries, so that they are able to make informed decisions regarding the projects at a later stage in the study.
- **Tender:**
- The project needs to be put out to tender. The advertising and the presentation of the project is of vital importance and will clearly indicate what customer needs will be met, the product or service being sold, the innovative qualities, the uniqueness of the project, etc. The tender will also indicate exactly what is required from interested parties, as well as: definitions, project information, short and long term goals, strategies to achieve goals, procedural aspects, scope of study, conditions of contract, ability to perform, empowerment, declaration of interest, legal jurisdiction, information to be submitted by tenderers and the format, timeframes, requirements and selection criteria.
- When the projects/businesses have aroused interested parties and parties have been short listed, the next step is to launch initial discussions and negotiations.
- A separate tender process is also required to entice constructors to construct the warehouse. Due to the type of construction required, it is suggested that local contractors be utilised.
- A tender also needs to be put out for the machinery, which is needed at the processing plant, and for the implementation of the machinery.
- After initial review of the tenders, a preliminary contract, known as a term sheets need to be concluded. This sets out the form of the business/project and regulates other important points, such as: monitoring, information and decision-making rights, possible limitations on liability of the parties to the contract, confidentiality declaration, type, extent, timeframe, ongoing management support, etc.
- **Obtain funding (ongoing):**
- There are numerous funding sources through which the Municipality can secure financial assistance or loans to support the implementation of the juice extraction plant. These sources include both private sector establishments and public sector resources. The following potential funding sources that could be approached for the implementation of the project include: Municipal and Special Municipal Infrastructure Grants, BP South Africa, Development Bank of South Africa, National Development Agency, European Union, and W.K. Kellogg Foundation Grants. Consult **Annexure A** for a complete list of potential funding institutions and contact details.
- Find ways to obtain and secure capital
- Determine how much money the owner has, how much the owner is willing to risk, how much they are going to invest, etc.
- Determine whether or not the owner is going to obtain a loan, make use of investors or all of the aforementioned?
- Contact all funding sources and programmes and obtain buy-in and support
- Utilise feasibility study to market the business to potential funders
- Submit applications for funding, such as to the Department of Provincial and Local Government' s LED Fund. Funding of development is often one of the most constraining issues faced during the implementation of projects. Development funds is a scarce resource and all sources should be mobilised with due care.
- Alignment with council policies is essential in order to get funding.
- Government support mechanism for the SMMEs also need to be obtained, as well as other support mechanisms. These programs aim to assist people to apply for new

projects (e.g. close corporation), expansion of an existing project and skills support programmes.

- **Develop detailed business plan:**

- Look at other products to fill the gap between planting and harvesting season
- Once the body responsible for implementation has been identified, such a person needs to develop a detailed action plan (as part of the business plan), which consists of: project scope and work breakdown structure, programme and milestones, agenda's and minutes of meetings, correspondence, progress reports, communication schedule, coordination of parties involved, time frame management, working capital, liaison with end users, ongoing monitoring plan, facilitation and final handover, etc
- Determine income and expenditure flows over a three-year period providing an indication of the monthly profit/loss, when the project will break even and the sustainability of the project
- The business plan should contain the following guidelines and actions to facilitate the implementation: project description, vital issues that need to be addressed before the business can be started, economic impact, key roleplayers that need to take responsibility for the development, nature and possible sources of additional financing for the business, facilitation plan (what needs to be done to ensure successful implementation), implementation timeframe and phasing, institutional arrangements (Legal form of company and registration details, shareholding and responsibilities, strategic partners, organisational structure, internal monitoring mechanisms), Operating plan, actuals, forecasts and timeframes, financial requirements, income creation, final capital costs, operating costs, outputs and outcomes, resource requirements, budget, cash flow, funding sources, investment opportunities, returns, income/expenditure and revenue stream, balance sheet, etc
- Business plan assessment and refinement is also needed. This entails: ensuring attainable vision, goals, strategies and objectives; detailed outcomes and project indicators exist, ensuring alignment to policy frameworks; obtain detailed understanding of risks and identifying risk ameliorations; verify timeframe for implementation; revise financial plans and resource requirements; ensure effectiveness – to ensure it contains all investors need to know, etc

- **Location and facilities:**

- Finalise position and location of processing plant on farm as well as shop for sale to community
- Determine requirements in terms of location such as identifying local authority regulations and permits needed for business in the area
- Insure acceptance of location by those involved
- Appointment architect for design of floor plan which ensures easy dispatch and delivery
- Determine detailed costs of the building required in terms of size, parameters, and rental requirements.
- Appoint specialists as and when needed such as quantity surveyor, architect, construction company, etc
- Fast track approval of building plans, the provision of bulk services, the facilitation of community involvement, etc.
- Provide assistance with regards to preparations of the sites, buildings to accommodate the project, and the purchase of equipment, tools and furniture that are needed for the projects.

- The construction processes also needs to be monitored to ensure that all the aspects of the final product are implemented successfully.
- Finalise immediate furniture and equipment requirements and set-up complete list of requirements in association with co-operative
- Obtain quotes for costs and discuss with owners
- **Management team:**
- Finalise exact legal requirements for community cooperative
- Determine membership fee
- Finalise involvement of community
- Contact institute involved and obtain required and updated membership forms, stamps, etc for the registration of the company.
- Assist in setting up the co-operative, selection of most appropriate candidates, selection of board members, registration of co-operative, etc
- The personality, professional and social competence, and motivation of the team also need to be evaluated so as to ensure successful implementation. Someone who cannot quickly get a group of people enthusiastic about working may have problems in getting customers enthusiastic about the product.
- **Staffing:**
- Assist with the appointment of a manager: this position is extremely important, as the manager will drive the project.
- Ensure that adequately skilled people are appointed
- Developed detailed Job descriptions with roles and responsibilities in association with the community
- **Human resource development:**
- Identify needs through research, meetings, seminars and workshops with the members', in order to put idea in working
- Undertake this identification of training and technical needs of members in collaboration with relevant and interested organizations
- Identify cost of training required. The training required should include providing access to technical training in order to operate the machinery
- Identify sources of training
- Assist (financially and technically) those interested to become involved in obtaining the required skills and training
- To initiate and provide access to training for the relevant candidates necessary to run the business in the long term
- Contact and rope in relevant SETA's and submit applications to obtain learnerships
- Monitor the training programmes to meet these needs
- Ensure team have: complementary skills and strengths, shared vision, flexible approach to problems, sticks together – especially in difficult situations, relevant experience, etc
- **Marketing plan:**
- Draw up a detailed marketing plan that identifies the nature of the product, the price, the place and promotions
- Determine the customers that make up the target segment and determine how large the market is, how it can be developed, who the competitors are, what substitutes exist for the product, how the market share and sales volume will develop, what distribution channels will be used, how much will advertising cost, etc

- Interpret the information for the stakeholder or investor in terms of potential for market penetration in order to undertake targeted marketing thus selling the product as a viable investment
- Assist in marketing of the establishment to mine houses, government departments, local farmers, tourists, local schools,
- Assist in negotiating contracts with Gauteng based retailers, restaurants, etc
- It is important here to note that the processing plant can produce both concentrate and pure juice. Either both or one of the aforementioned needs to be done. This however depends on the contracts finalised and the demand from retailers.
- In other words active marketing of the end products needs to be undertaken to ensure that the business starts earning an operating budget.
- **Financial and accounting system**
- Profitable small businesses often face cash crises and even bankruptcy. Managing this at the onset is critical.
- Efficient management of working capital includes the following: reducing the duration of the working capital shortage (and hence reducing the cost of the product due to lower interest expense), selecting the best option available for financing any working capital shortfall, ensuring that the time required to bring the product to the market is not underestimated, ensuring that market acceptance is not overestimate – realistic goals are required, the need for increased working capital must be taken into consideration as turnover rises, not to use short-term finance for long-term requirements, make allowance for peak cash requirements just prior to month end, make allowance for monthly salary deductions, determining how large the companies' capital requirements will be until break-even, etc. How much cash will be needed in the worst case? Determining where the capital will come from, what returns investors can expect, determining how profits can be realized, etc
- The financial and accounting system needs to be implemented.
- **Monitoring and evaluation and final handover**
- The final step in the implementation process of the project includes the progress and performance monitoring of the project and the final handover.
- Establish indicators/proxies for monitoring the development by the new business partners. An indicator can be defined as a generally acceptable expression that is seen as being representative (quantitatively and qualitatively) of the aspects that need to be addressed.
- Once the requirements are met with, the projects will be handed over. However, ongoing support needs to be provided in terms of: providing key focus areas for future intervention, intervention priorities that will require implementation in the event of pre-identified risks transpiring, sustainability guidelines, likely future growth forecasts, the priority future needs of the business, realistic general performance indicators, etc, important milestones will be identified as well as timeframes
- Furthermore mentoring needs to be continuously provided after handover. This implies that continuous monitoring needs to occur and as soon as any problems are noted, key specialists need to be appointed to attend to the specific problem within their field of specialisation. This will ensure that problems are identified and rectified as soon as possible before serious problems are encountered.
- Norm the process by providing constant support for the new entrepreneurs in order to ensure the success of the establishment
- Ensure long-term viability of the business by revisiting the initial concept

Bibliography:

Brown Machinery South Africa. Brown Machinery supply the machinery needed and have a branch in the Mpumalanga Province in Nelspruit. Contact details: 013 744 3188

Charles Schlesinger: Marble Hall Juice Making Plant. Contact detail (013) 261 1308

Containers from Multipak. Contact Details: 012 327 1531

FoodTech (FMC) produces citrus processing equipment for the global market. They are recognized around the world as the leading supplier of the best juicers for the food service industry. FMC have a local branch in Cape Town. Contact details: 021 982 1130.

www.nda.gov.za/publications: Abstract of Agricultural Statistics

Zebediela Citrus Estate: Mr Frans Ledwaba and Pack house manager. Contact details: (015) 642 3101

ANNEXURE A: FUNDING INSTITUTIONS

Name of the Institution	Physical Address	Tel	Fax
Absa foundation	2nd floor, Absa towers East, 170 Main str	011 350 6207	011 350 4964
Africa Project development	Ground floor, Victoria Gate West, Hyde park	011 325 0720	011 325 0729
Amb private equity partners limited	Forum Building, Cnr 5th & Maude Street, Sandton	011 215 2100/011 215 2023	011 215 2023
Aquilla Growth limited	13 Sloan Road, Epsom Downs Office Park	011 706 6318	011 706 8928
ARTPAC	35 Rissik str, Surrey hse, 2nd floor	011 838 3730	011 838 7220
Ashoka innovators for the public	5th Floor, 23 Jorrison str, Braamfontein, 2017	011 880 5592	011 880 8950
Australian High commission-AUSAID	4th Floor, Fedsure Towers, 13 Friedman Drive	012 342 3740	012 342 8442
Belgium Consul General	Leyds 625, Muckleneuk. Pretoria, 0002	012 460 7555	012 346 8063
Billiton	6 Hollard str, JHB Central	011 376 3360	011 376 3362
BKS Pty Ltd	Oakhurst 11 State andrews road, Parktown	011 481 0300/ 012 430 9965	011 481 0301
BMW (SA)	1 Bavaria ave, Randjes Park Ext 7, Midrand	012 522 3167	012 522 2689
BOE Equity partners	187 Rivonia Road, Morningside. JHB	011 302 1302	011 302 1303
BOE investment partners	90 Ordance Road, Durban, 4001	031 364 1567	031 364 2936
BP South Africa	Forsdick, Rooderkop	011 488 5111	011 488 5288
Brait Private Equity Limited	9 Fricke Road, Illovo Boulevard, Sandton, 2196, JHB	011 507 1000	011 507 1001
British Consulate General	275 Jan Smuts, Denkeld West, JHB, 2196	011 537 7206	011 537 7238
British development division of SA		011 718 4300	086 010 3525
Business Bank	5 Bellingham str, 1 highveld, Centurion	012 665 9083	
Business partners: venture managers (pty) ltd	5 Wellington Road, parktown, 2193	011 480 8700/012 664 3397	011 484 2035
Caltex oil	21 keys ave, Rosebank,	011 280 2000	011 880 1945
Canadian consular and diplomatic missions abroad	1104 arcadia, Hatfield,	012 422 3000	012 422 3054
Cape gateway	142 Long street, Cape Town	086 014 2142	
Catholic religious orders	140 visagie street, Pretoria	012 323 6458	012 326 6218
CDC Capital Partners	Cradock Heights, 1st floor cnr Cradock and tyrwhitt ave, Rosebank	011 778 5900	011 327 7407
Charles Stewart mott foundation in south Africa		011 403 6934	011 403 7566
Development Bank of Southern Africa		011 313 3004	011 313 3629
DTI	not available	086 184 3384/012 394 9500	086 184 3888
Edward L Bateman		011 899 9111	not in use t

Zebediela Juice Extraction Plant

Name of the Institution	Physical Address	Tel	Fax
Equal opportunity foundation	1 Wynderower Rd, Claremont, 7735	021 671 9055	021 671 9225
Eskom	Megawattpark,Maxwell, Sunninghill X3, Sandton	011 800 8111/0118003312	011 800 4299
Estee Lauder Group	6 kylami blvd, kylami business park, kylami, 1685	011 516 3000	011 516 3200
Ethos private equity ltd	35 Fricker Road, Illovo, Sandton, 2196	011 328 7400	011 328 7410
European Union	2 Greenbock Street, 27 GeorgeStorrar Road, Groenkliff, Pretoria	012 460 4319	012 460 4923
Finish fund for industrial cooperation	628 Leyds str,Muckleneuk, Pretoria	012 343 0275	012 343 3095
Ford Foundation		011 403 5912/011 2761200	011 276 1248
Franklin electric SA	not available	011 796 5800	011 792 6698
Get ahead financial services	101 du toit str, Tomkor South Building	012 323 1459	012 323 1511
Greenwich venture partners (pty) Ltd	not available	011 883 6996	011 884 0225
HBD Venture Capital	not available	021 970 1000	021 970 1001
Horizon Equity Partners	52 Wierda Road West, West Valley , Sandton	011 269 4040	011 269 4098
I Capital Fund Managers	Ground Floor, Block F , Rochester Place, 173 Rivonia road Morningside	011 784 2230	011 784 7013
IBM	70 Rivonia Road, Sandhurst, 2146	011 302 9111	011 302 6141
International Finance Corporation	14 Fricker Road, Illovo, JHB	011 731 3000	011 325 0729
Irish Aid	1st floor,Southern life plaza, 1059 Schoeman street, CNr Festival, Arcadia 0083, Pretoria	012 342 5062	012 342 4752
Japan International Cooperation Agency:Embassy	1st Floor Bank Forum Building, Fehrsen and Veale str, New Muckleneuk, Pretoria	012 346 4493	012 316 4966
Joint Education Trust	23 Jorrison Road, 3rd Floor Braamfontein	011 403 6401	011 339 7844
Kagiso Trust	8th Floor , Braamfontein centre, 23 Jorissen str, JHB,2001	011 403 6319	011 403 1884
Khula Enterprise Finance Limited: Business Loans for Retail	use postal adress	012 394 5560	012 394 6560
LED Fund	87 Hamilton stree, Arcadia, Pretoria,	012 334 0600/012 334 0705	012 334 0603
National Development Agency	5th Floor Jorissen place,Jorissen Street, Braamfontein	011 403 6650	011 403 2514/5
Special Municipal Infrastructure Fund (SMIF)	John Vorster Drive, SITA Building,	012 672 2867/ 012 672 2855	012 672 1321
W.K. Kellogg Foundation Grants		012 431 0900	012 342 3612

