



EMFULENI COMMUNITY SANITATION INITIATIVE

COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW

Rotary 
Club of Vanderbijlpark
“A ROTARY SUPPORTED COMMUNITY INITIATIVE”

BUSINESS PLAN STUDY 4

October 2016

COMMUNITY FORUM	 <p>National African Federated Chamber of Commerce & Industries Gauteng Province Sedibeng Region</p>	 <p>NORTH-WEST UNIVERSITY YUNIBESITHI YA BOKONE-BOPHIRAMA NOROONWES-UNIBESITHI</p>	 <p>Vaal University of Technology</p>
	 <p>RAND WATER</p>	 <p>TRINAMICS CONSULTING ENGINEERS (PTY) LTD</p>	 <p>SAVE Save the Vaal Environment</p>
	 <p>EMFULENI LOCAL MUNICIPALITY</p>	 <p>ilifa Ilifa Africa Engineers</p>	 <p>Emfuleni Tourism Association</p>
	 <p>VAAL LED WARRIORS</p>	<p>SUBF Sedibeng United Business Forum</p>	 <p>SEDIBENG</p>
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BUSINESS PLAN
STUDY NO. 4
OCTOBER 2016

INDEX

	PAGE
1 INTRODUCTION	4
1.1 Agricultural Economy.....	4
2 CONVENTIONAL FARMING	5
3 GREENHOUSE FARMING	11
3.1 What is Greenhouse Production?	11
3.2 Advantages of Greenhouse Vegetable Production	11
3.3 Disadvantages of Greenhouse Vegetable Production	12
3.4 Greenhouse water management	12
3.5 Proposal	12
3.6 Technical Specifications of the Greenhouse Structure	12
3.7 Income Projections	16
4 CATFISH FARMING	20
4.1 Fish farming spreads through Africa.....	20
4.2 Nutritional benefit of fish.....	21
4.3 Aquaculture in South Africa.....	21
4.4 Catfish	22
4.5 Proposal	22
4.6 Project objectives	23
4.7 Market and trading of fish products	23
4.8 Sub-Saharan Africa	24
4.9 Environmental sustainability	25
4.10 Improved productivity.....	25
4.11 Potential of Africa's Inland Fisheries.....	25
4.12 Food Security	26

**EMFULENI COMMUNITY SANITATION INITIATIVE
COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW
BUSINESS PLAN STUDY 4 – OCTOBER 2016**

4.13	Fish Species	27
4.14	NEPAD	27
4.15	Fishing capacity	29
4.16	Inland Fisheries	30
4.17	Utilization of the catch	31
4.18	State of the Industry	31
4.19	Project development cost per phase	33

Emfuleni Commercial Agriculture Potential

Utilising Treated Waste Water for Agriculture Development,
Food Security and Job Creation



Unlocking Emfuleni Agricultural Potential

Agriculture Development

Climate

Emfuleni Local Municipality has its summer season from December to February; this coincides with its rainfall season. During summer the hottest months occur in January/February with its mean maximum day temperature 27 °C and the minimum 16 °C. The winter season is from June to August. The mean maximum diurnal temperature in winter for ELM is 16 °C and the minimum is 3 °C.

1 INTRODUCTION

The agricultural sector, is defined as all activities relating to agricultural input provision, farming and the processing and distribution activities that add value to farm products, remains an important sector in the South African economy despite its small direct share of the total gross domestic product (GDP). It is a backbone of growth and development in South Africa because it provides a strong foundation and support to other sectors of the economy. Its influence on the economy has been demonstrated by the recent floods that destroyed parts of the Northern Province and Mpumalanga in February 2000, when the GDP growth rate dropped by about 1 %.

Primary agriculture, which consists of production within the boundaries of the farm gate, accounts for less than 5 % of the GDP of South Africa. The agro-food complex, which consists of primary production plus the input and agro-processing sectors, accounts for about 14 % of the GDP. There are approximately 50 000 large-scale commercial farmers who are predominantly, but not exclusively, drawn from the white population. In 2000 they exported about R16 billion worth of products, or nearly 10 % of South Africa's total exports. They employ about 1 million workers, which is 11 % of total formal sector employment in the country. Many of these workers live on commercial farms and their children receive education in farm schools. Thus commercial farms provide livelihoods and housing to about 6 million family members of these 1 million employees and provided for their education needs.

1.1 Agricultural Economy

The spending focus is on increasing food production by providing agricultural support to smallholder farmers through the comprehensive agricultural support programme. Economic freedom refers to a condition which enables people to utilize their innovative and creative capacities in the development process; protects individual economic rights to have access to productive assets, including land right; provides a right to control one's labour in terms of decisions to engage in economic activity of one's choice; and conveys a right to control the fruit of one's labour. It also implies a right to gainful employment. In ideal conditions, therefore women, like men, need political stability which guarantees protection of their basic human rights, social security to be able to engage in productive activities, the right to develop and utilize their talents, fair pay for work performed, and the right to participate in the management of their societies as intellectuals, policy makers, producers and consumers.

Agriculture in South Africa has a central role to play in building a strong economy and, in the process, reducing inequalities by increasing incomes and employment opportunities for the poor, while nurturing the inheritance

of natural resources. Agriculture is often viewed solely as the technical advance, in this century particularly, of large-scale commercial farming specializing in crop and animal production according to the prevailing natural resources and climatic conditions, and taking advantage of both abundant low-cost labour and opportunities for mechanization. Therefore, it is a crucial sector and an important engine of growth for the rest of the economy.

As part of Agriculture Sector stimulation to contribute substantially to economy growth, the following farming activities are proposed for the initiative. The activities will be conducted on a 2000 - 4000ha land within the Municipality through utilisation of three (3) Waste Water Treatment Facilities for agricultural irrigation to establish small farms, job creation and food production, namely: (1) Leeuwkuil 1000ha with capacity 32Ml/day; (2) Rietspruit 1100ha with capacity \pm 32Ml/day; (3) Sebokeng 1500ha with capacity 100Ml per day.

The farming activities will be conducted in three (3) phases, namely:

- i. Primary Farming comprising community and commercial farming
- ii. Greenhouse Structures with supporting facilities (cold rooms, packing and cutting area, admin and ablution blocks with showers, on-site training facilities)
- iii. African Cat fish farming

2 PRIMARY FARMING

Primary farming systems share many characteristics: rapid technological innovation; large capital investments in order to apply production and management technology; large-scale farms; single crops/row crops grown continuously over many seasons; uniform high-yield hybrid crops; extensive use of pesticides, fertilizers, and external energy inputs; high labor efficiency; and dependency on agribusiness. In the case of livestock, most production comes from confined, concentrated systems.

Primary farming proposal on a seven hundred (700) ha land for planting of the following key commodities:

- (a). Cabbage – three hundred (300) ha land
- (b). Butternut – two hundred (200) ha land
- (c). Spinach – one hundred (100) ha land
- (d). Beetroot – one hundred (100) ha land

General Conventional Vegetable Production Yield Capacity Per ha

No:	Product	No: of Plants per/ha	Expected Yields in tons/ha	Days of Maturity	Growing Time in Nursery	Distance in-rows & in-between plants
1.	Butternut	5 000 – 10 000	20 – 30 tons/ha	85 – 90 days	5 – 6 weeks	50 – 70 cm in-rows 150 - 200 cm in-between rows
2.	Cabbage	30 000 – 40 000	60 – 80 tons/ha	70 – 160 days	6 weeks in summer 7 weeks in winter	40 – 70 cm in-rows 60 – 90 cm in-between rows
3.	Onion	500 000 – 800 000	30 – 70 tons/ha	180 – 240 days	7 weeks in summer 8 weeks in winter	5 – 8 cm in-rows 20 -30 cm in-between rows
4.	Lettuce	55 000 – 100 000	25 – 30 tons/ha	65 – 90 days	4 weeks in summer 5 weeks in winter	20 – 30 cm in rows 30 – 60 cm in-between rows
5.	Spinach	150 000 – 340 000	15 – 20 tons/ha	20 – 30 days	3- 4 weeks	7 - 51 cm in rows 30 – 45 cm in-between rows
6.	Beetroot	170 000 – 350 000	25 – 40 tons/ha	55 – 60 days	6 weeks in summer 7 weeks in winter	5 – 10 cm in-rows 30 – 40 cm in-between rows
7.	Chilli	30 000 - 55 000	4 – 7 tons/ha (dry)	65 – 95 days	6 weeks in summer 8 weeks in winter	40 – 45 cm in-rows 45 – 75 cm in-between rows
8.	Tomato	16 000 – 22 000	60 – 100 tons/ha	80 – 120 days	6 weeks in summer 7 weeks in winter	20 – 40 cm in-rows 150 cm in-between
9.	Sweet Pepper	20 000 – 55 000	25 – 30 tons/ha	65 – 95 days	6 – 7 weeks in summer 7 – 8 weeks in winter	40 – 45 cm in-rows 45 – 75 cm in-between rows

2.1 Job Creation:

Two hundred and seventy (270) permanent, eighty (80) seasonal and twenty (20) temporal employments will be created from the 700 ha land development @ R3 300.00 per month per person during the first year and 10% escalation on an annual basis as per the following criteria:

Product	No: of ha	Permanent Employment	Seasonal Employment	Temporal Employment
Cabbage	300 ha	100	40	10
Butternut	200 ha	70	20	4
Spinach	100 ha	50	10	3
Beetroot	100 ha	50	10	3
Total	700 ha	270	80	20
Overall Total				370

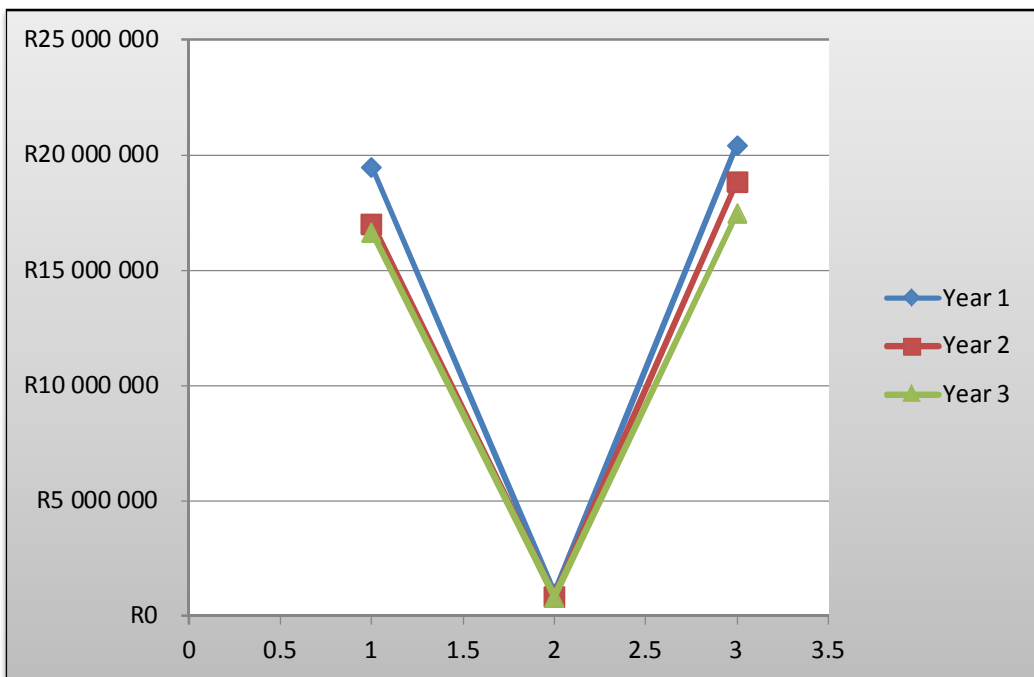
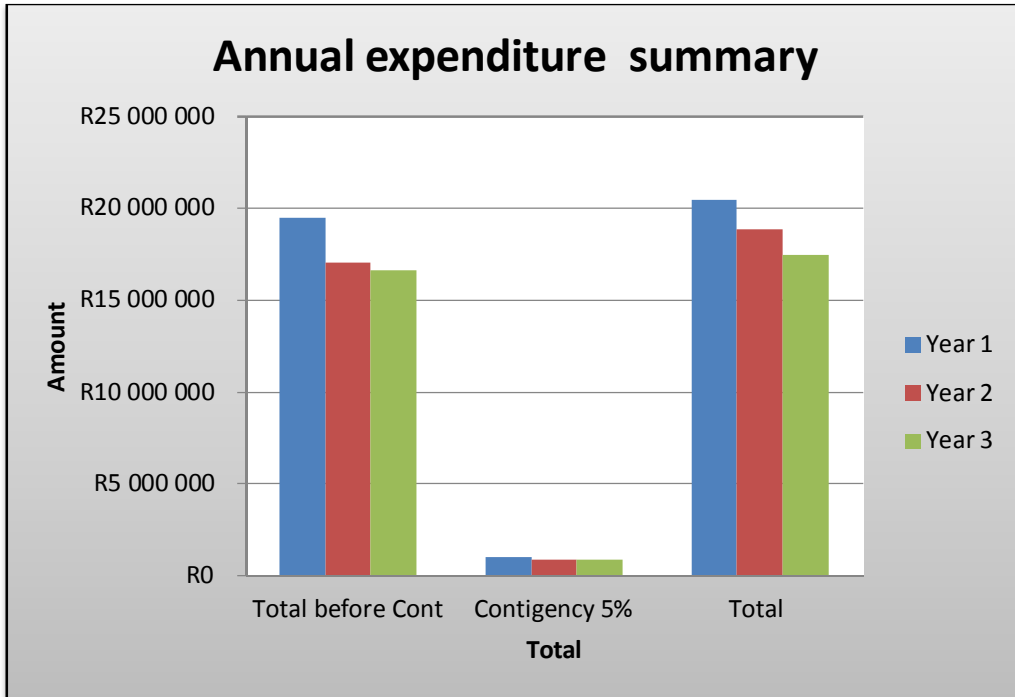
Seasonal and temporal employment will be paid at a rate of R110.00 per day per person.

Expenditure Analysis Estimates

Expenditure	Year 1	Year 2	Year 3
Soil Preparation	R50 000.00	-	-
4 x Borehole installation and testing	R280 000.00	-	-
Fencing	R1 200 000	R200 000.00	R180 000.00
Electricity installation	R40 000.00	-	-
Production Inputs (seeds, fertilizer, packaging material, and hail nets)	980 000.00	R1 180 000.00	R1 350 000.00
Tools and equipments	R380 000.00	R220 000.00	R200 000.00
Tractors x 3	R500 000.00	R250 000.00	-
1,3 ton and 8 ton Bakkies	R980 000.00	-	-
10 x 10 000 liters JoJo tanks	R120 000.00	-	-
Irrigation system	R2 800 000.00	R1 800 000.00	R1 200 000.00
Labour x 270 people	R10 692 000.00	R11 761 200.00	R12 937 320.00
Management and Technical support fees	R 1 200 000.00	R1 320 000.00	R1 452 000.00
Accounting fees	R40 000.00	R44 000.00	R48 400.00
Water and electricity	R40 000.00	R48 000.00	R56 000.00
Fuel, insurance and maintenance	R42 000.00	R54 000.00	R62 000.00
Provision for temporal work	R 120 000.00	R132 000.00	R145 000.00
Total	R19 464 000.00	R17 009 200.00	R17 630 720.00
Contingency fee 5%	R973 200.00	R850 460.00	R881 536.00
Total	R20 437 200.00	R17 859 660.00	R18 512 256.00

Note: For community high labour content farming profits will also be utilized for remuneration thereby increasing labour force.

The overall total over a period of three (3) years: R56 809 116.00



**EMFULENI COMMUNITY SANITATION INITIATIVE
COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW
BUSINESS PLAN STUDY 4 – OCTOBER 2016**

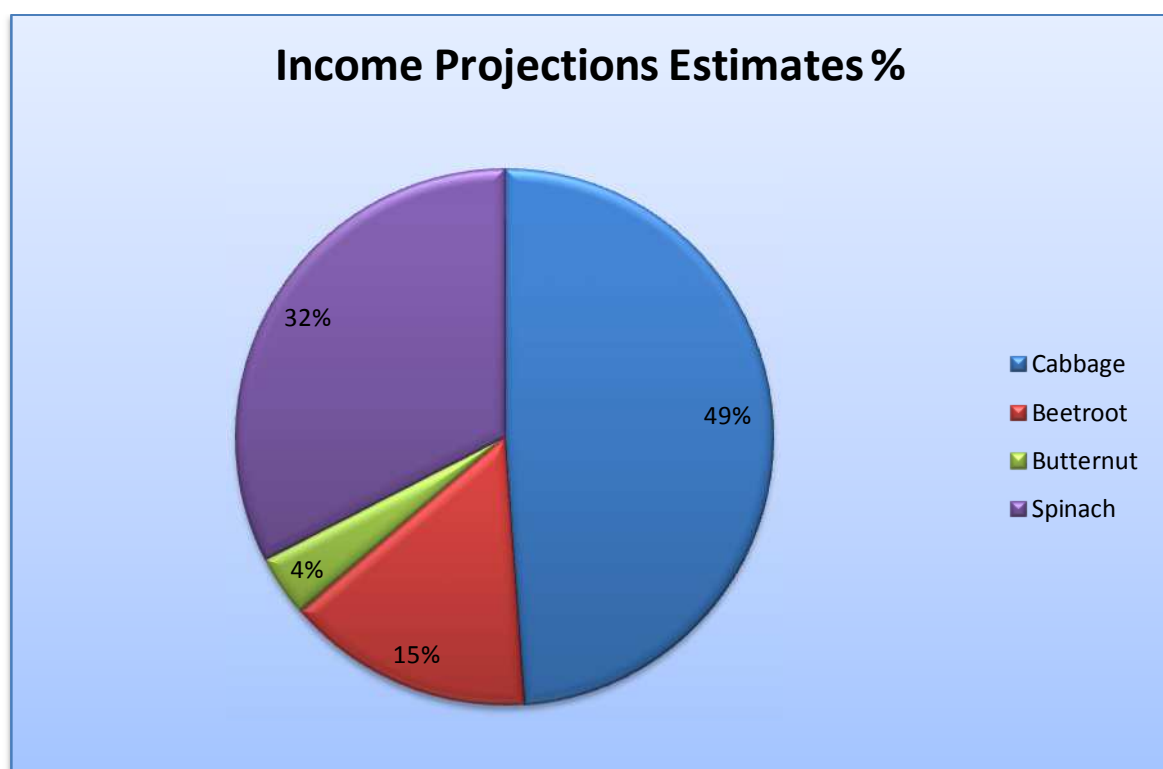
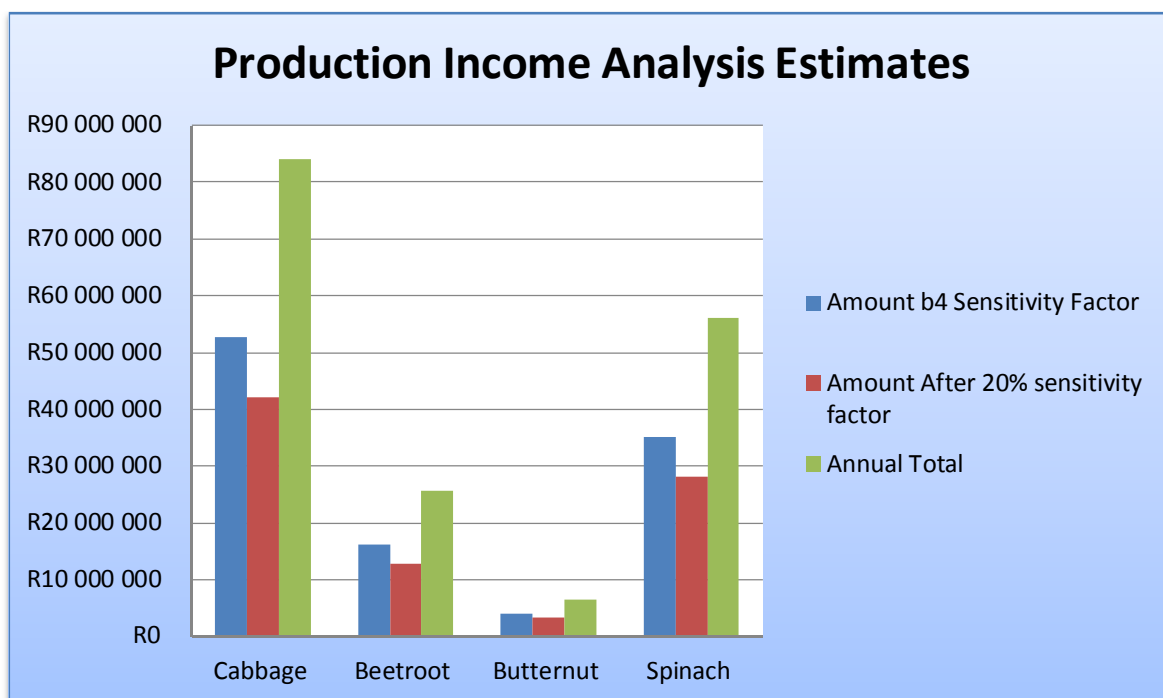
Estimated Income Projections

No	Suggested Product	Average Plants/ha	No. of ha to be planted	Total Plants Per season	Unit Price	No of seasons	Income per season with 20% sensitivity factor	Income per season after 20% sensitivity factor	Income per Annum
1	Cabbage	35 000	300ha	10 500 000	R5.00	2	R52 500 000	R42 000 000	R84 000 000
2	Beetroot	200 000	100ha	20 000 000 x 5 fruits per packet	R4.00	2	R16 000 000	R12 800 000	R25 600 000
3	Butternut	8 000	200ha	1 600 000 x 4 fruits per plant	R2.50 p/kg	2	R4 000 000	R3 200 000	R6 400 000
4	Spinach	150 000- 340 000	100ha	20 000 000	R5.00	2	R35 000 000	R28 000 000	R56 000 000
	Total		700 ha				R107 500 000	R86 000 000	R172 000 000

Projections notes

- i. Cabbage: an average of 35 000 plants will be produced from one ha land at R5.00 per head. 2 production seasons are expected per annum.
- ii. Beetroot: an average of 200 000 plants will be produced from one ha land at R4.00 per packet of 5 beetroots. 2 productions seasons are expected per annum
- iii. Spinach: an average of 200 000 plants will be produced in one ha land at R3.50 per bundle in which two plants are expected to give one bundle. 2 production seasons are expected per annum
- iv. Butternut: an average of 8 000 plants will be produced per ha and each plant will produce approximately 5 butternuts in which each butternut is estimated to weigh a kg at R2.50 per kg.

Target Markets: African Dynamics, National Fresh Produce Markets, Department of Social Development, Schools with Feeding scheme, Hospitals, Dep't of Correctional Services, Street vendors, homestead resellers, Parastatals and etc



Income versus Expenditure Analysis

Year	Project Income	Estimated Expenditure	Profit/Loss
1	R172 000 000	R20 437 200.00	R151 562 800
2	R175 440 000	R17 859 660.00	R157 580 340
3	R178 948 800	R18 512 256.00	R160 436 544

3 GREENHOUSE FARMING



3.1 What is Greenhouse Production?

Greenhouse is a commercial method for growing plants or crops. In a greenhouse system, roots grow and develop either in humid air, well-aerated water, or in a moist solid non-soil medium. The water supplied to the roots comprises of a carefully balanced solution with all the nutrients a plant needs for optimal growth.

Greenhouse offers the promise of feeding the millions of starving people around the world. Greenhouse yields are commonly 5 times the field yield for a two crop per year field harvest and 10 times field yield for a one crop per year field harvest. The crops are enclosed and protected from insects and the harsh climatic conditions.

3.2 Advantages of Greenhouse Vegetable Production

- i. Does not rely on the quality of soil, enabling crops to be grown almost everywhere.
- ii. Develop up to three times faster than in conventional farming and it requires no crop rotation.
- iii. Allows crops to be grown closer together, requiring less space.
- iv. Have yields which are greater and more consistent.
- v. Uses 40% less water compared to soil production.
- vi. Requires no expensive farming implements such as tractors.

3.3 Disadvantages of Greenhouse Vegetable Production

- i. Plant diseases can spread very easily in the greenhouse system because of the fact that the water can carry diseases from one plant to another. The mitigation of this threat is that water from one plant must be circumvented from entering other plants.
- ii. It is expensive to setup, as the water-soluble nutrients that are used in greenhouse are more expensive than the usual fertilizers.

3.4 Greenhouse water management

- i. Greenhouse and drip-feeding are considered more efficient-less wasteful than conventional farming.
- ii. The higher yields regularly achieved in intensive farming all over the world and in South Africa, are testimony to the efficiency of direct application of water born efficient.

3.5 Proposal

It is therefore proposed that fifteen (15) Commercial Greenhouse Structures measuring [34m (L) x 28m (W) x 4.5m (H)] be erected in Emfuleni Local Municipality as to address socio economic challenges which include unemployment and poverty. An area of two (2) ha land will be reserved for Greenhouse Vegetable Production structures.

3.6 Technical Specifications of the Greenhouse Structure

SIZE : 28m Wide x 34m Long x 4.5m Gutter height

AREA : 952 Sq/m

Quantity:

Cucumber plants : 7 Rows / 156 Plants =1092 Plants

Tomato plants : 7 Rows / 180 Plants = 1260 Plants

Spinach plants : 7 Rows / 152 Plants = 1064 Plants

The key commodities to be planted in the Greenhouse structures will be: English cucumber, tomato, spinach, green/red and yellow peppers as per the following criterion:

Product	Cucumber	Tomato	Spinach	Mixed Peppers	Total
No: of Structures	9	4	To be planted on the sides of each structure	2	15

Expected production capacity per each crop/commodity:

No:	English Cucumber	Tomato	Spinach	Green/Yellow and Red pepper
Size per double span	952 m ²	952 m ²	To be planted at sides of each double span structure	952m ²
Total plants per double span	1 092	1 400	+ -30000kg/double span in soil + -16000kg/8double span in soil	5-6 kg per plant 2.5 plants per m ² at 5 kg per plant =952 m ² x 2.5 x 5 =11 875 kg per tunnel
Minimum yield	20 cucumbers/plant	9 kg/plant		11 875 kg per tunnel
Price	R6.00 per cucumber	R8.00 per kg	R6 – R10 per kg	Green Pepper: R14 Yellow Pepper: R18 Red Pepper: R18 per kg

Climate

- i. Climatic conditions play a vital role with regards to vegetable growth.
- ii. In different cases, temperatures below 10 degrees will stunt the growth of vegetables; therefore, heating system will be required.

Job Creation

Twenty (20) permanent, ten (10) seasonal and six (6) temporary employments will be created from the Emfuleni Greenhouse Vegetable Production Enterprise @ R3 300.00 per month per person during the first year and 10% escalation on an annual basis as per the following criteria:

Product	No: of ha	Permanent Employment	Seasonal Employment	Temporal Employment
15 Greenhouse Structures	2ha	20	10	6
Total	2ha	20	10	6
Overall Total				36

Seasonal and temporal employment will be paid at a rate of R110.00 per day per person.

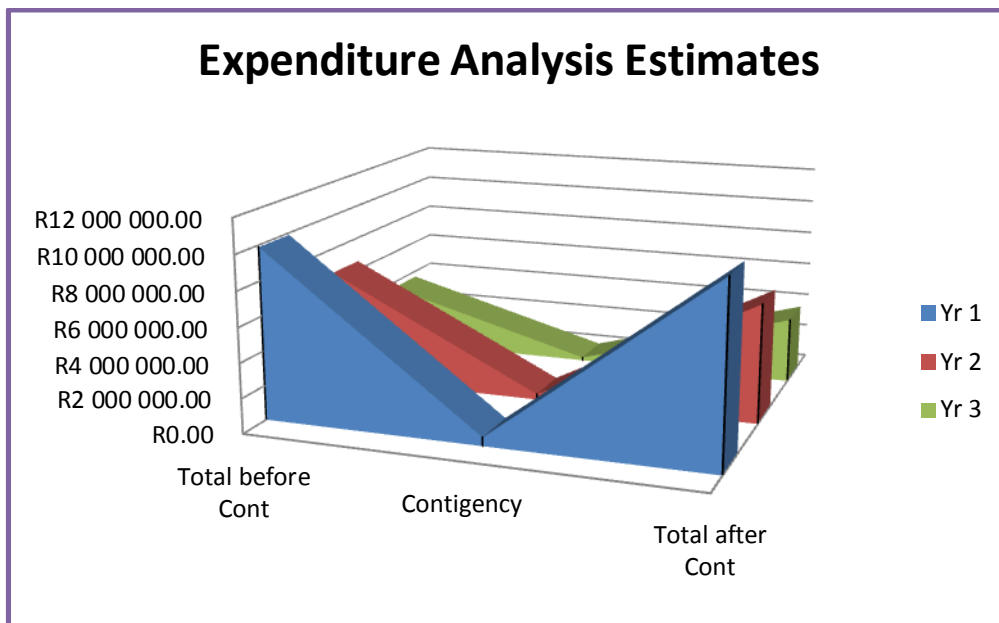
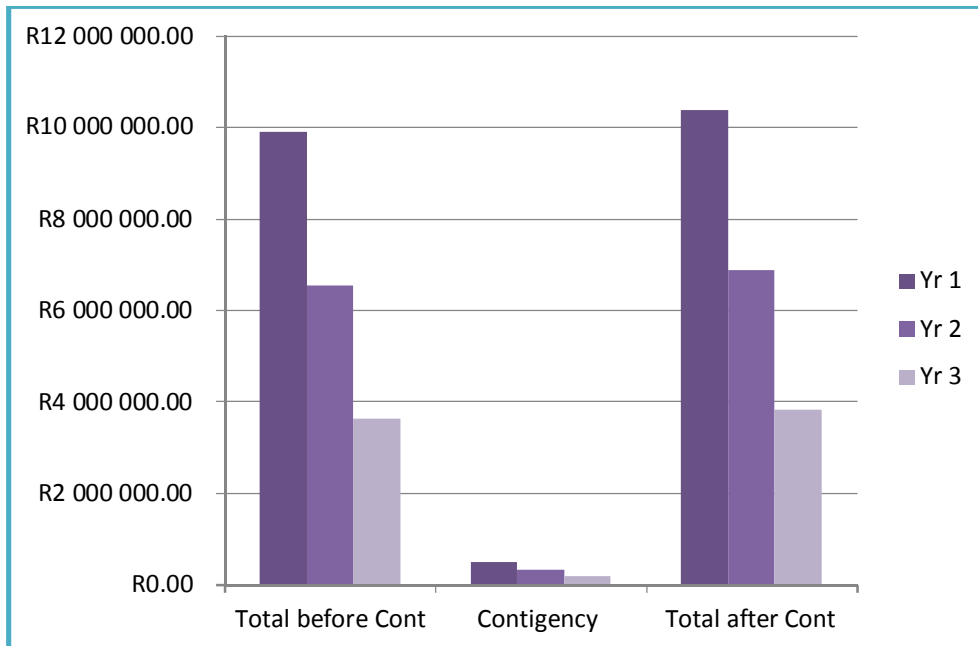
**EMFULENI COMMUNITY SANITATION INITIATIVE
COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW
BUSINESS PLAN STUDY 4 – OCTOBER 2016**

Expenditure Estimate Analysis

Expenditure	Year 1	Year 2	Year 3
15 x Greenhouse Structures (Yr 1: 10 & Yr 2: 5)	R5 743 453.60	R3 015 313.14	00.00
Production Inputs (seeds, fertilizer, packaging material, nutrients, grow bags and sawdust)	R50 000.00	R280 000.00	R350 000.00
2 x Borehole installation and testing	R140 000.00	-	-
Fencing	R400 000.00	-	-
Electricity installation	R40 000.00	-	-
Tools and equipments	R180 000.00	R120 000.00	R100 000.00
4 x 10 000litre x Jojo tanks	R36 000.00	R12 000.00	-
Labour X 20 people	R792 000.00	R871 200.00	R958 320.00
Management and Technical support fees	R1 200 000.00	R1 320 000.00	R1 452 000.00
Accounting fees	R40 000.00	R44 000.00	R48 400.00
Water and electricity	R70 000.00	R78 000.00	R86 000.00
4 x storage facilities (1 office and 3 storages)	R100 000.00	R110 000.00	R121 000.00
Provision for temporal work	R56 000.00	R68 000.00	R76 000.00
Movable Ablution facilities	R60 000.00	R20 000.00	R20 000.00
Capacity building and first aid trainings	R380 000.00	R350 000.00	R320 000.00
Heating/cooling system	R600 000.00	R250 000.00	R100 000.00
Total	R9 887 453.60	R6 538 513.14	R3 631 720.00
Contingency fee 5%	R494 372.68	R326 925.65	R181 586.00
Total	R10 381 826.28	R6 865 438.79	R3 813 306.00

Total costs for a period of three (3) years: R21 060 571.07

Expenditure Analysis Graphs



3.7 Income Projections

i) Cucumber

One double span can produce approximately 1092 plants at consecutive 20-25 cucumbers/plants thus 21840 and 87360 per four double span x by 9 double spans, thus 786 240 plants per 9 double spans anticipated to be planted cucumber during the first production year at a maximum rate of R8.00 per cucumber, thus R6 289 920.00 per season and R12 579 840.00 per annum to be obtained from the cucumber production. It is anticipated that 10% of the production might die/be damaged due to environmental and other related factors.

Product	No: of Tunnels	Quantity/Price	Price in Rand	Total per annum
Cucumber	9 x 4 double span structures (36 tunnels)	87 360 plants x 9 x 4 double span = 786 240 plants x R8.00 per plant = R6 289 920.00 per season And R12 579 840.00 per annum	Less 10% sensitivity factor R1 257 984.00	R11 321 856.00

ii) Tomato

One double span can produce approximately 1400 plants per double span, thus 5600 per four double spans and 22 400 plants per four x four double spans anticipated to be planted tomato during the first year. Each plant has capacity to produce the minimum of 9kg, thus 201 600kg per season at a minimum rate of R8.00 per kg. The total anticipated income per season will be R1 612 800.00 per season and R3 225 600.00 per annum. There is assumption that only 90% of the tomato will survive and 10% might not grow or die/damage due to the environmental and other related factors.

Product	No: of tunnels	Quantity/Price	Price in Rand	Total per annum
Tomato	4 x 4 double span (16 tunnels)	22 400 plants x 9kg per plant = 201 600kg x R8.00 per kg= R1 612 800.00 per season x 2 = R3 225 600.00 per annum	Less 10% sensitivity factor R322 560.00	R2 903 040.00

iii) Spinach

Spinach will be planted at the sides of every double span and it is expected that ±30 000kg will be obtained from all 15 x 4 double span, thus 30 tons at a minimum rate of R6.00 per kg which equals to R180, 000.00 expected from the spinach production per season. It should be noted that spinach production unlike tomato and cucumber it has three seasons per year. Therefore the total anticipated income per annum will be R540, 000.00. There is assumption that only 90% of the spinach will survive and 10% might not grow or die/damage due to the environmental factors and other related factors.

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COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW
BUSINESS PLAN STUDY 4 – OCTOBER 2016**

Product	No: of Tunnels	Quantity/Price	Price in Rand	Price in Rand
Spinach	15 x 4 double span structures (60 tunnels)	±30 000kg will be received from 15 x 4 double spans x by R6.00 per kg = R180,000.00 per season x by 3 seasons = R540,000.00 per annum	Less 10% sensitivity factor R54 000.00	R486 000.00

iv) Green/Red and Yellow Pepper

- Green pepper will be planted in one Greenhouse Structure in which 11 875kg is expected from each structure. Each plant produces 5 – 6 kg which is 2.5 plants per m² per plant. The structure comprise of 952 m². Green pepper minimum costs is R14.00 per kg multiply x 11 875 kg equals R166 250.00 per season multiply by 2 seasons equals to R332 500.00 per annum.
- Red and yellow pepper will be mixed in one Greenhouse Structure in which 11 875 kg is expected from each structure. Each plant produces 5 – 6 kg which is 2.5 plants per m² per plant. The structure comprise of 952m² hence Red and Yellow pepper will be produced at a minimum rate of R18.00 per kg multiply x 11 875 kg equal to R213 750.00 per season and R427 500.00 per annum.

There is assumption that only 90% of the green/yellow and red pepper will survive and 10% might not grow or die/damage due to the environmental factors and other related factors.

Product	No: of Tunnels	Quantity/Price	Price in Rand	Price in Rand
Green Pepper	1 x 4 double span structure (4 tunnels)	11 875kg will be received from 1 x 4 double span x by R14.00 per kg = R166 250.00 per season x by 2 seasons = R332 500.00 per annum	Less 10% sensitivity factor R33 250.00	R299 250.00
Red & Yellow Pepper	1 x double span structure (4 tunnels)	11 875 kg will be received from 1 x 4 double span x R18.00 per kg = R213 750.00 per season x 2 seasons = R427 500.00	Les 10% sensitivity factor R42 750.00	R384 750.00
Totals				R684 000.00

Total production income summary

Product	No: of Structures	Expected price per annum before sensitivity factor	Price in Rand Anticipated sensitivity factor	Expected price per annum
Cucumber	9	R12 579 840.00	R1 257 984.00	R11 321 856.00
Tomato	4	R3 225 600.00	R322 560.00	R2 903 040.00
Spinach	60 (<i>plant on-sides</i>)	R540 000.00	R54 000.00	R486 000.00
Green/	1	R332 500.00	R33 250.00	R299 250.00
Red and Yellow Pepper	1	R427 500.00	R42 750.00	R384 750.00
Total	15	R17 105 440.00	R1 710 544.00	R15 394 896.00

Financial Summary

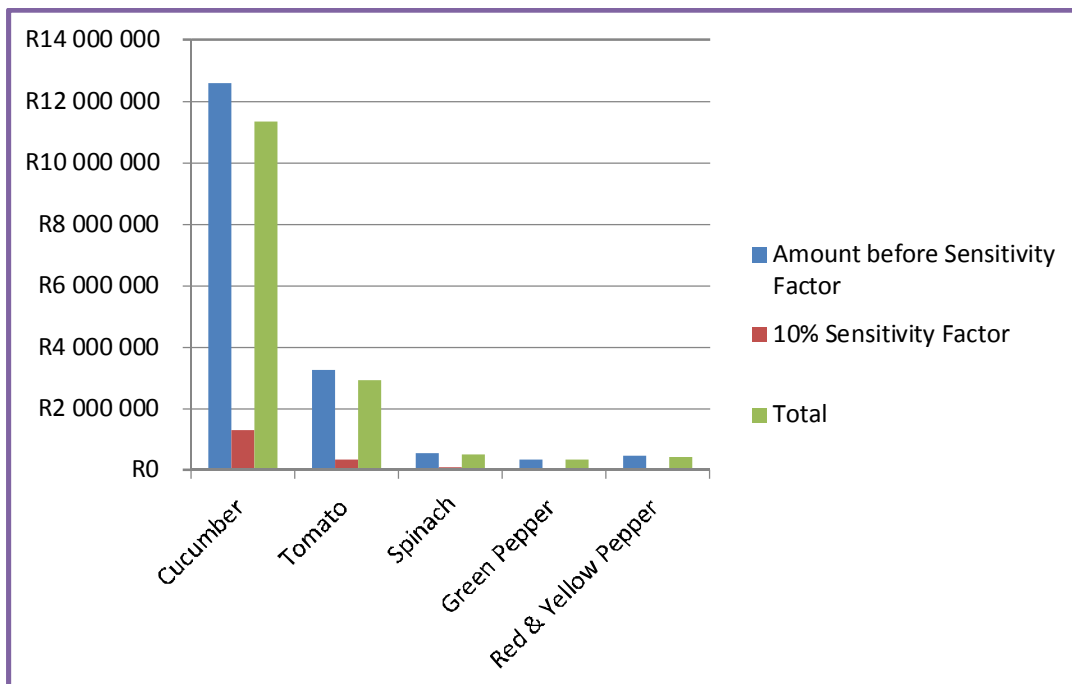
Total Project Costs: **R21 060 571.07**
 Projected Annual Income: **R15 394 896.00**
 Breakeven Year: **Year 2** of the Project Production

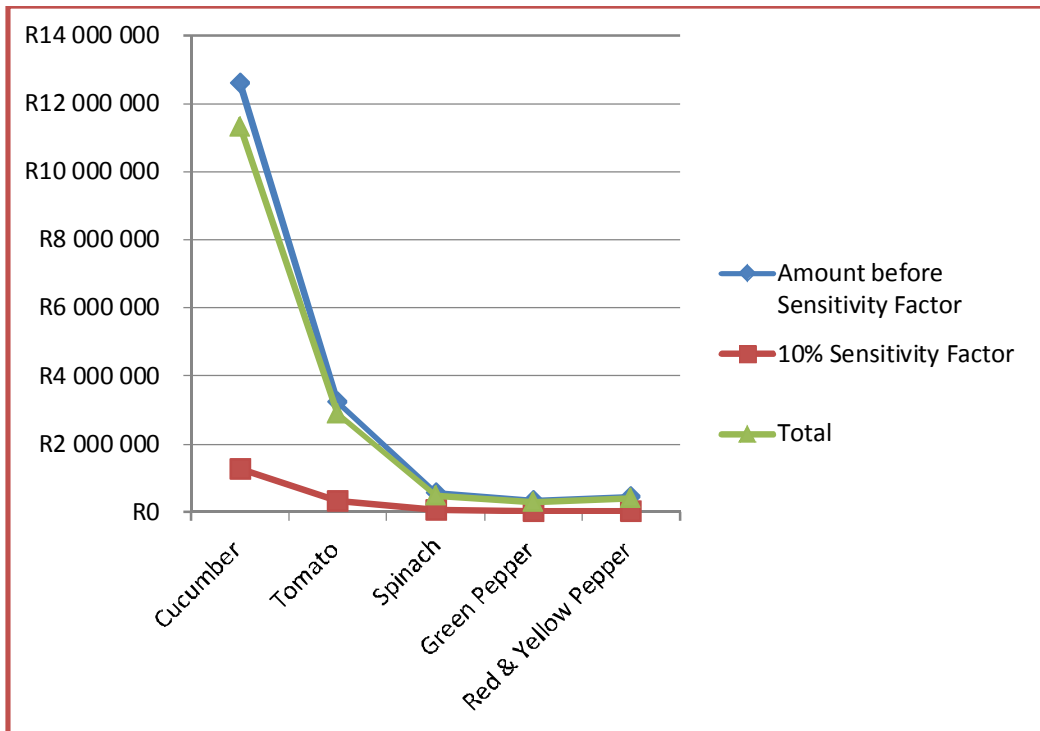
Note: It should be noted that the highest percentage (41%) of the budget is allocated for production infrastructure and the third highest (12%) goes for stipend of the workers.

Income versus Expenditure Analysis

Year	Project Income	Estimated Expenditure	Profit/Loss
1	R15 394 896.00	R10 381 826.28	R 5 013 069.72
2	R15 702 793.92	R 6 865 438.79	R 8 837 355.13
3	R16 016 849.79	R 3 813 306.00	R12 203 543.79

As for primary farming profits will be ploughed back in jobs.





Target Markets: National Fresh Produce Markets; Farmwise Marketing, African Dynamics, Government Institutions with Food schemes, Chains stores, Burial societies, homestead resellers and individuals

4 CATFISH FARMING

Fish Tanks



4.1 Fish farming spreads through Africa

Egypt has been the largest producer in African aquaculture since as far back as 1950. In 2004, Egypt accounted for almost 83 per cent of the total African production. Nile tilapia is the dominating species in Egypt. In 2004 Egyptian farmed tilapia production amounted to some 200,000 tones, accounting for over 42 per cent of the total aquaculture production of the country. But in recent year's aquaculture has been developed in other countries like Congo DR, Nigeria, Madagascar, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. In Nigeria it is particularly catfish farming that has contributed to this development. In 2004, production of catfishes accounted for about 63 per cent of the total Nigerian aquaculture production. By far the major part of African aquaculture is done in inland waters, - lakes, water reservoirs and rivers. In 2004, this accounted for 89 per cent of all African aquaculture. There is some marine aquaculture, mainly in the Mediterranean and the Indian Ocean, while activities on the Atlantic coast have been very limited until now. The largest species in African aquaculture in terms of volume include tilapias, gray mullet, carps and catfishes. There is also some production of shrimp, mainly black tiger shrimp (*Penaeus monodon*), and in 2004 African farmed production of this species amounted to 7,600 tones.

4.2 Nutritional benefit of fish

First and foremost, increasing the per capita consumption of fish in any country benefits health. Aquatic animals contain a high level of protein (17-20%) with an amino acid profile similar to that of the meat of land animals. The flesh of fish is also readily digestible and immediately utilizable by the human body which makes it suitable for complementing the high carbohydrate diets prevailing in almost all the countries of the region under survey. Compared with land animals (with some exceptions, such as shellfish), aquatic animals have a high percentage of edible flesh, and there is little wastage. Aquatic animals are a source of minerals such as calcium, iron and phosphorus as well as trace elements and vitamins. Marine species are particularly rich in iodine. The fatty-acid content is high in polyunsaturated and particularly those which are attributed to reduce blood cholesterol. There are also some indications that certain fatty acids in fish may provide protection against renal disease. On a unit weight basis, fish is relatively expensive compared with the local prices of vegetables and grains, but it is frequently less costly than alternative animal protein sources. Where and when fish and other aquatic products are available they are the major animal protein source for the rural poor.

4.3 Aquaculture in South Africa

Aquaculture in South Africa can be divided into freshwater culture and mari-culture. Freshwater fish culture is severely limited by the supply of suitable water. However, trout or salmon farming is practiced in the Western Cape and other highland areas of South Africa, and in 2003 approximately 250 t was exported. Other freshwater species cultivated on a small scale include catfish (*Clarias gariepinus*), freshwater crayfish (maron) and tilapia species. Mari culture is a fast developing sector, with a focus on mussels, oysters, abalone, seaweeds and prawns. Of these, mussel farming is the best established, producing most of the estimated 2 650 t of Mari-culture production in 2003. Abalone culture is now well established, centred in the Hermanus area on the Cape south coast.

For capture fisheries there is growing recognition that improved governance system for fisheries resources and better management of the resources base upon which they depend are needed for sustainable use, while carefully targeted investment in infrastructure and marketing are needed if the full value of these resources is to be realized by the local, national and regional economies. Although aquaculture development in South Africa is in its infancy many city municipalities have recognized the potential role of aquaculture as a livelihood option. Several cities, such as Durban, have formulated an urban agricultural policy that includes aquaculture as an economic activity. Ornamental fish rearing is considered a possibility and trout farms are being

established by disadvantaged groups in peri-urban zones. In view of its rich marine resources South Africa has a well-established formal and informal marketing structure. To encourage economic activity, improve sanitary conditions and encourage the distribution and sale of fish, many municipalities have constructed fish marketing sites.

Recent surveys indicated that these traders are receptive to aquaculture products provided quality and price expectations are met. A problem identified in most cities is the quality and suitability of available water for fish farming. In the case of Dares Salaam some water bodies may be contaminated with heavy metals such as lead and cadmium and therefore all sites may not be suitable. In addition, in most of these zones city bylaws are not conducive for both aquaculture and agriculture. Efforts will have to be focused on local institutions to create an enabling environment to encourage ordered expansion of aqua farming to meet the rising food prices.

4.4 Catfish

Catfish products include fresh and smoked fillets, and tinned catfish. The waste (gut, etc.) is used as an additional protein source for farmed catfish and the bones are used to produce bone meal to supplement their diets. In addition, the skins are used to produce leather for wrist watch straps, gloves, handbags, etc., and the pituitary gland (hypotheses) is used to induce spawning of various fish species. There was an 87% increase of catfish production from 1989 to 1990, followed by a 23% drop over the period 1990 to 1991 and it *can* be expected that there has been little development since the last Survey. Drought and marketing problems are responsible for the decrease in production. However, a potential increase to capacity of 5,600-6,000t per annum can be achieved (projection based on established production capacity of the present catfish farming community) and rapid progress can be anticipated because hatchery techniques have been improved for the past years, with an understanding that good rainfall has occurred since 1996, and market constraints have been improved.

4.5 Proposal

It is proposed that catfish farming be established in Emfuleni Local Municipality. This initiative will be a commercial export oriented project aiming at generating mostly needed foreign revenue. The project will have the following facilities:

- (1) 400 tones Fish Production Facility (20 permanent jobs)
- (2) 400 ton Live Fish Processing facility (108 permanent jobs) =128 jobs in Emfuleni.

The project will be an out-grower for CATFISH SUPREME (Pty) Ltd, which has catfish supply agreement with buyers in JAPAN and started delivering 1000tons of fresh processed catfish in June 2009. Emfuleni Local Municipality has significant potential for aquaculture / inland fish farming development given the fact that the area has access to water, land and human resources. The farming site has adequate power supply and the road is in excellent conditions. Majority of the people in the community are youth and a high number of them have completed grade twelve and are highly trainable.

The aquaculture development could be linked to existing agricultural development. With the current scarcity of employment in the area, this project will add to the number of job opportunities and assist to address poverty related, social and economic challenges. It is proposed that the fish farming project be implemented over a period of time depending on the availability of finance.

4.6 Project objectives

- i. To establish fish farming facility with 400ton production capacity and fresh fish processing facilities.
- ii. To establish commercial fish farming project focusing on export markets.
- iii. The project will use proven world-wide acceptable technologies for production, and processing and will provide training on fish farming, processing and marketing development.
- iv. Promote inland fish production and consumption as a source of cheap protein provision.

4.7 Market and trading of fish products

As mentioned, most of the commercial aquaculture operations in Africa are targeting the international export markets. That often puts the continent at a disadvantage because of inadequate transport options. However, even so, some projects have been successful in exporting to world markets, such as tilapia farming in Zimbabwe, shrimp farming in Mozambique and Madagascar.

The local markets, which until now have been mainly served by small scale, community based fish farming, are probably grossly under-estimated. There is a growing demand in the region for fish, and many markets are able and willing to pay good prices. In fact, for many operations the local, African markets represent a better option in terms of profitability. What is needed, though, is the development of distribution systems, and to some extent cold chains.

The full potential of Africa's inland fisheries will only be realized when artisanal fisheries and small – scale

traders have much improved access to market for their produce. In order to improve this, multiple investments are required to develop market information system at both regional and national levels and build capacity to understand and adapt to those market dynamics. Investments are also necessary to improve market infrastructures and communication and transport networks. These interventions need to be supported by increased promotion of fish and fisheries production in international, regional and local markets, and the development of policies and regulations that can help foster this trade, including the formalization of the currently significant informal regional traders. In addition, the reduction of transaction costs at all levels, including the removal of tariff barriers and elimination of all forms of illegal (informal) taxation systems, need to be implemented. Finally to ensure that the benefits of markets and trade are shared, more accountable and transparent institutions will need to be developed that allow size operators to benefit from their support services. If the economic opportunities offered by the African fish trade are to be realized fully, training for enterprise management, marketing strategies and organizational capacities will need to be provided to the fishers and the full range of operators along the marketing chain. In addition, a specific effort will have to be made to facilitate access to financial institutions, in particular for the small-scale operators and the local grass-root organizations that support these small-scale operators. As part of the improvement of access to credit and financial support, special attention needs to be given to addressing the remoteness of financial institutions that are often located hours or days away from the rural new fish farmers or fishing communities.

Finally provision of facilities such as electricity and water to remote fishing communities will bring direct health benefits but also indirect benefits through the improvement of the economic performance of micro and large – scale enterprises. Fish pricing traditionally is guided by bargaining. The final price depends on many factors, such as the quantity available, the season of the year (with respect to the intensity of capture fisheries activities), the size and type of fish, and the quality, but it often includes the economic status of the buyer in terms of appearance and dress. Within this milieu of factors prices of fish are highly variable, not only within a country but also between countries. In general, fish farmers have taken advantage of those factors which influence pricing, particularly the freshness of their products and/or the fact that they can sell live products which command fairly good prices.

4.8 Sub-Saharan Africa

Aquaculture has grown strongly in most regions of the world where the potential exist. This has not happened in sub-Saharan Africa, and Egypt is the only African country to have achieved the scale of change observed elsewhere. However, there is now growing recognition that aquaculture in Africa can develop under specific conditions and contexts, and that the prospect of marketing-led growth and broader regional integration,

together with more realistic understanding of the technical potential, provides substantial opportunities. This realization has promoted considerable development investment and sectoral promotion at both regional levels. The availability of natural resources and the opportunities for entering valuable export markets have also led to private investment initiatives, often with external capital, wholly owned enterprises or joint ventures. In many circumstances, local private investment has also been considerable, often by artisanal farmers, community development associations and local businesses, with expectations of meeting local demand and diversifying household income. The challenge being addresses now in countries is how best to foster this growth and that challenge is even bigger for most communities as aquaculture initiatives need to start from zero.

4.9 Environmental sustainability

The long-term productivity of fisheries is dependent on maintaining the ecosystems on which these fisheries depends. These are however, under widespread pressure from land and water management practices that are steadily reducing the availability and production of these systems. If inland fisheries are to be sustained over the coming decades, fisheries stakeholders will in particular need to engage with other water users at all levels of decision-making, particularly with regard to interactions with irrigation agriculture and hydro-power sector. Investment in land and water management that sustain aquatic resources including inland fisheries are urgently needed, together with water governance that provides for full integration of inland fisheries priorities in water resource management. The investments will need to be rooted in a better appreciation of the fisheries resources and their specific contribution to economic development in different river basins.

4.10 Improved productivity

The social and environmental sustainability of Africa's inland fisheries, and the realization of their full development value, will only be achieved through more effective and equitable and governance arrangements. Of particular concern is the general under-representation of fishing communities in the decision-making process in both local and national political arenas.

In order to address this requirement, governance mechanisms and processes need to be strengthened, in particular that of rural and urban new-comers fishing communities. Effective participatory planning processes involving all stakeholders' local communities, private sector and leading to sustainable co-management frameworks need to be put into place and support with appropriate legislation.

4.11 Potential of Africa's Inland Fisheries

The full potential of Africa's inland fisheries will only be realized when artisanal fisheries and small – scale

traders have much improved access to market for their produce. In order to improve this, multiple investments are required to develop market information system at both regional and national levels and build capacity to understand and adapt to those market dynamics. Investments are also necessary to improve market infrastructures and communication and transport networks. These interventions need to be supported by increased promotion of fish and fisheries production in international, regional and local markets, and the development of policies and regulations that can help foster this trade, including the formalization of the currently significant informal regional traders. In addition, the reduction of transaction costs at all levels, including the removal of tariff barriers and elimination of all forms of illegal informal systems, need to be implemented. Finally to ensure that the benefits of markets and trade are shared, more accountable and transparent institutions will need to be developed that allow size operators to benefit from their support services. If the economic opportunities offered by the African fish trade are to be realized fully, training for enterprise management, marketing strategies and organizational capacities will need to be provided to the fishers and the full range of operators along the marketing chain. In addition, a specific effort will have to be made to facilitate access to financial institutions, in particular for the small-scale operators and the local grass-root organizations that support these small-scale operators. As part of the improvement of access to credit and financial support, special attention needs to be given to addressing the remoteness of financial institutions that are often located hours or days away from the rural new fish farmers or fishing communities. Finally provision of facilities such as electricity and water to remote fishing communities will bring direct health benefits but also indirect benefits through the improvement of the economic performance of micro and large – scale enterprises. The current fish market focus is in Japan and the first 1000 tons of fish need to be delivered in June 2009.

4.12 Food Security

The role of fish as a major source of animal protein and micronutrients is now increasingly well document internationally. Yet this has so far not been reflected in the integration of fisheries into Africa's national food policy framework. To achieve this, the contribution of fish to food and nutritional security needs to be better appreciated by senior decision-makers and planners at national level and supported through more adequate and coherent policies at both national and regional levels. These need to address how Africa's fish resources can best contribute to food security through better processing and marketing of locally produced fish, while also seizing the opportunities to generate income through export of high value species to international markets. In addition, the role of imports of low-value fish needs to be considered at a local level. However, the following considerations will need to be made:

- i. Document and communicate the real contribution of inland fisheries to regional, national and local food

security.

- ii. Identify national and regional policies that promote better management of inland fisheries as a contribution to enhance local and national food security.
- iii. Promote fish consumption in areas where it can provide a source of affordable protein. Develop safety standards that recognize the different requirements of export and local markets.
- iv. Building capacity of planners and managers at local to integrate fisheries priorities into integrated water resource planning and management.
- v. Undertake assessments and valuations of major inland fisheries and contribute this information in the support of improved water management.
- vi. Strengthen the capacity of local institutions to provide science and training services required for better water resource planning and management.
- vii. Implement cost-effective and sustainable information monitoring systems that provide information to all stakeholders.
- viii. Raise awareness amongst planners and decision-makers at local level to integrate fisheries concerns into land and water management.

4.13 Fish Species

The people of Emfuleni Local Municipality are familiar with common fish species such as cat-fish, cab yellow fish and some, but not popular species. However, various non-local fish species could find their way in the ports of many families if promoted and marketed properly in highly urbanized and densely populated urban areas of Emfuleni Local Municipality.

4.14 NEPAD

According to the NEPAD action plan for the development of African Fisheries and Aquaculture, Africa currently produces 7.31 million tons of fish each year. Of these, 4.81 million come from marine fisheries and 2.5 million from inland fisheries. While capture fisheries rose steadily throughout the 1980's and 1990s, they have stagnated since then, reaching about 6.85 million t in 2002. Aquaculture on the other hand has risen, but slowly, and only Egypt has growth achieved rates of increase seen in other parts of the world, rising from 85 000 t in 1997 to over 400 000 t in 2004. These trends combined with population growth means that per capita consumption of fish in Africa is low and stagnating, and in sub-Saharan Africa specifically per capita consumption has fallen in the past 20 years. In a recent study by the International Food Policy Research Institute (IFPRI) and the World fish Centre analysis of future demand and supply of fish suggested if per capita

consumption is to be sustained and where possible enhanced and aquaculture develop rapidly, with an increase of over 260% in sub-Saharan Africa alone over the course of the next 15 years. While these trends underline the enormous internal demand for fish in Africa, they also highlight both the importance of managing capture fisheries more effectively so that their full development potential can be achieved and sustained, and the urgent need to foster more rapid development of aquaculture. For capture fisheries there is growing recognition that improved governance system for fisheries resources and better management of the resources base upon which they depend are needed for sustainable use, while carefully targeted investment in infrastructure and marketing are needed if the full value of these resources is to be realized by the local, national and regional economies. In addition, studies by the Food and Agriculture Organization of the United Nations (FAO) have shown that there is considerable physical potential to respond to the growing demand for fish by improving aquaculture production. For sub-Sahara Africa alone, it estimated that 9.2 million km², or 31% of the land area, is sustainable for smallholder fish farming. If yields from recent smallholder development projects can be replicated elsewhere, only 0.5% of this area would be required to produce 35% of the region's increased fish requirements up to the year 2010, at present however, this potential for aquaculture remains largely untapped: by 2002, total aquaculture production in sub-Saharan Africa was only 79 000 t (0.15% of world production), yields in most countries remain low, commercial operations have yet to develop in many areas, and fish farmers are relatively few in number. However, the main economic parameters are starting to change and opportunities for aquaculture are opening up. With growing urbanization, improved market integration and the concurrent supply crisis from capture fisheries, small and large- scale investors are gaining interest in aquaculture production. There is urgent need to develop guidelines and policies that create conducive aquaculture investment climate and at the same time provide safeguard against environmental and social risks.

The trade in fish products has increased substantially over the past two decades and African fish exports were valued at US\$2.7 billion in 2001, from a total global value of US\$56 billion. Much more can be done to foster markets for African fish products, both within the District, Regional and Global areas. In several countries, fish exports to European and other overseas markets are now contributing significantly to national economies. In relatively short time, the processing and exporting industry has acquired access to tightly regulated markets by meeting international Hazard Analysis and Critical Control Point (HACCP) and sanitary and Phytosanitary (SPS) standards. There is great potential to learn from these success stories and build the capacity of a wider spectrum of small and medium-sized enterprises to participate in these growth opportunities. At the same time, trade relations with importing countries need to develop further to stimulate the growth of value-adding industries in Africa. In marine fisheries, Arrangements that regulate the access of foreign fleets to African fish stocks need to be considered from a long term perspective on fish supply and economic activity for many

countries, marketing fish locally needs to be encouraged as this will contribute significantly towards the reduction of hunger and malnutrition as highlighted in the Millennium Development Goals. Clearly, the implications of accelerated fish trade for poverty and food security need to be fully understood so that the potential of trade as a stimulus to fisheries development can be effectively harnessed. Importantly, this will include increased attention to domestic and regional markets in addition to exports to industrialized countries. Trade of fish between African countries is an important if often unreported sector that provides affordable fish products to millions of consumers across the continent. It is estimated to absorb up to 50% of fish catches in some inland fisheries and it is widely acknowledged that better processing, improved transport and marketing, and more conducive regional trade relations could increase the contribution of this trade to the regional economy and food security. Gaining a wider and more balanced perspective on opportunities for trade at all levels will be an important step towards maximizing the development impact of fish exports to Local, National, Regional and Global markets.

The structure and characteristics of the industry

4.15 Fishing capacity

Vessels active in South Africa's fisheries are generally reaching the end of their working life (more than 30 years old) and many new vessels are being built (mostly locally). South Africa has introduced effort control, and rights holders have to justify new vessels within each sector. As a general rule, new effort can only replace existing effort in any sector, with replaced vessels not permitted back into the specific sector from which they came. In the hake trawl fishery, there are approximately 100 vessels active, of which 65 (35 wetfish and 30 freezer trawlers) fish in the offshore sector and a further 30 smaller trawlers catch hake and sole in the inshore trawl sector. In the hake longline sector, there are about 150 active vessels, although many of these also fish in other sectors, such as the tuna pole and rock lobster fisheries. In the pelagic (purse seine fishery) there is a mixture of small wooden vessels and larger steel boats, making up a fleet of about 60 vessels. Offshore vessels in other sectors include a small prawn trawl fishery (four boats), the south coast rock lobster (6–8 boats), shark longline (about six vessels active) and tuna longline (50 permits, of which 12 are foreign long liners and the rest local boats). In the inshore sectors there are a large number and diversity of vessels, including large deck boats used in the squid fishery (138 boats), many west coast rock lobster boats (>200) and >400 commercial boats in the handline fishery. These figures ignore the thousands of recreational fishing boats.

4.16 Inland Fisheries

Africa's inland fisheries play a critical role in supporting the livelihoods and food security of millions of people across the continent. They provide employment for households dependent on fishing and post-harvest activities, and provide the principal source of animal protein and essential micronutrients for millions of rural and urban-based poor. Yet catches from most inland fisheries have generally reached their maximum capacity, and many are now declining. Many of these fisheries are considered to be over fished, while the ecosystems that sustain them are threatened by eutrophication, deforestation, dams and other water management schemes. In the next three decades, increasing competition for water will be a major challenge for these fisheries. With the exception of semi-industrial fisheries in a few large lakes and reservoirs, the level of private and public investments directed to Africa's inland fisheries is remarkably low. Yet, in regions where inland fisheries and related activities are present, the potential contribution of these activities to the decentralized economic development process is substantial. There are no inland commercial fisheries of any significance in South Africa. Recreational exploitation of freshwater fish on inland rivers and impoundments is extensive, with small subsistence fisheries in places. However, most freshwater or inland fisheries are related to a limited number of aquaculture developments. To unleash this potential, an appropriate level of policy support and investments is required in different domains, including infrastructures and landing facilities, but above all, activities aiming at reducing the rate of post-harvest losses that severely hampers the development of the African inland fisheries. Aquaculture in South Africa can be divided into freshwater culture and mariculture. Freshwater fish culture is severely limited by the supply of suitable water. However, trout or salmon farming is practiced in the Western Cape and other highland areas of South Africa, and in 2003 approximately 250 t was exported. Other freshwater species cultivated on a small scale include catfish (*Clarias gariepinus*), freshwater crayfish (maron) and tilapia species. Mari-culture is a fast developing sector, with a focus on mussels, oysters, abalone, seaweeds and prawns. Of these, mussel farming is the best established, producing most of the estimated 2 650 t of mari-culture production in 2003. Abalone culture is now well established, centred in the Hermanus area on the Cape south coast. There is also an experimental offshore farm (cage culture) off Gansbaai for salmon. South African aquaculture production, though limited in its contribution to Africa's and global production, has shown a significant increase over the past decade. Total production and value has increased to the total value from 3 000 (R51million) tons in 1997 to 4 030 tons (R146million) in 2000. This reflects the increase of 31% in weight and 35% in value from 1997 to 2000.

4.17 Utilization of the catch

The total annual catch fluctuates depending on the catches of pelagic fish, (particularly of anchovy). The total commercial catch in 2000 was 674 117 t with a wholesale value of about R 3.1 billion (US\$ 4.8 million). South Africa's coastal communities have traditionally had diets high in fish. The per capita consumption of fish products in South Africa is relatively low compared with that of other fishing nations. The small pelagic fishery production, which is the largest by volume, forms the bulk of the fish production consumed locally. Pilchard in cans is a popular protein source and fishmeal production is utilized in the agricultural sector (and exported in good years). The South African fishery sector is, however, also characterized by its substantial level of international trade, resulting in a significant net contribution to foreign exchange (primarily hake exports to Spain). South African exports of fish products outweigh imports, contributing significantly to the international whitefish trade. Fresh lobster exports to the Far East are also a valuable export commodity. As part of the evaluation of all South African fisheries prior to the issuing of medium-term rights in 2003, a comprehensive economic assessment was undertaken of the industry (Rhodes University Economic Sectoral Study, 2003). The results of this study showed that, in 2003, some 16 854 people were directly employed in the fishing industry (fishers) and that secondary and associated industries employed a further 10 876 people. Of the fishing sectors, the line fish sector employed the most (about 3 000), followed by the squid and deep-sea hake sectors. There is also a significant "recreational" component, with associated service industries. Employment in the coastal communities, including subsistence and artisanal fisheries, is also significant in areas around the coastline, but has not been quantified.

4.18 State of the Industry

Fishing at the best of times can be described as a high risk industry. In South Africa, however, since independence and the transition to a new democracy, the fishing industry has had to deal with ongoing instability. This instability derives from the process of transformation, with the introduction of many new entrants (historically disadvantaged persons) and the loss or reduction in the rights of the established players in the industry.

The development of a new fisheries policy started shortly after independence in 1994, and culminated in a new fisheries policy. This was followed by the promulgation of a new Marine Living Resources Act in September 1998 (effectively replacing the old Sea Fisheries Act) and a new set of Fisheries Regulations. The subsequent

allocation of medium-term fishing rights from 2003 to 2005 created much needed stability in the main commercial sectors. The issuing of medium-term rights was, however, only a precursor to long-term rights. Transformation (transfer of rights to persons previously disadvantaged in the old political regime) remains a cornerstone of the new fisheries policy. There has been a noticeable improvement in compliance. A new system of land-based monitoring of landings has been introduced at all ports and fishing harbours, and a sea-based observer programme established for the collection of scientific data in all offshore fisheries. South Africa also has numerous Memoranda of Understanding (MOUs) with other countries and deploys observers in international waters. Another major development further illustrating commitment to fisheries monitoring and control has been the purchase of four new patrol vessels (all commissioned by September 2005). With regard to the status of fish stocks, poaching of abalone and rock lobster remain major concerns, although compliance and successful prosecutions in these fisheries have improved in recent years. Other sectors that in the past have been a concern, such as the hake longline fishery, have now stabilized and are fully integrated into the overall management of South Africa's marine resources. By way of example, the successful prosecution of a large company for the poaching of both South Coast Rock Lobster and West Coast Rock Lobster resulted in immediate improvements in catch rates. In the most valuable fishery, that for the Cape Hakes, the number of rights holders has increased sharply as the exploitation of these stocks has expanded from trawl to include longline and handline. Hake stocks are therefore under enormous pressure.

**EMFULENI COMMUNITY SANITATION INITIATIVE
COMMERCIAL AGRICULTURAL POTENTIAL OVERVIEW
BUSINESS PLAN STUDY 4 – OCTOBER 2016**

4.19 Project development cost per phase

	Cost Breakdown per Phase			
Phase 1	Unit	Amount	Price	Total
Building	450	1	R2,200,000.00	R 2,200,000.00
100-Ton system	100	1	R30,255	R 3,025,500
Settling dams	6000	1	R65	R 390,000
Dam liners	7632	1	R35	R 267,120
Filter material	100	1	R1,450	R 145,000
Wetland system	3000	1	R12	R 36,000
Pipeline	400	1	R171	R 68,400
Biological heater system	300	1	R157	R 47,100
Storage facility	72	1	R1,065	R 76,680
Office	32	1	R2,000	R 64,000
Borehole equipment and pipeline	600	1	R24	R 14,100
Fence	1000	12	R11	R 129,600
Reservoir	10	5	R860	R 43,000
Genset	200	1	R1,250	R 250,000
Training	5	1	R500,000.00	R 500,000.00
EIA	1	1	R60,000	R 60,000
Feasibility study & developing bankable business plan	2	2	R3,800,000.00	R 3,800,000.00
Total phase 1				R 11,116.500
Phase 2, 3 & 4				
System 2	100	1	R35,052	R 3,505,200
System 2	100	1	R35,052	R 3,505,200
System 2	100	1	R35,052	R 3,505,200
Training	123	1	R12,500	R 1,537,500
Biological heater system 2	300	1	R157	R 47,100
Biological heater system 2	300	1	R157	R 47,100
Biological heater system 2	300	1	R157	R 47,100
Pipeline 2	400	1	R171	R 68,400
Pipeline 2	400	1	R171	R 68,400
Pipeline 2	400	1	R171	R 68,400
Primary processing	1000	1	R6,500,000.00	R 6,500,000.00
Filter material	1000	1	R1,458	R 1,458,000
Total for project				R31, 474.100.00

See the attached Excel finance analysis

Production	Year One (1)		Three (3) Years	
	Expenditures Estimate	Income Projections	Expenditure Estimates	Income Projections
Conventional Farming	R20 437 200.00	R172 000 000.00	R55 799 116.00	R178 948 800.00
Greenhouse Production	R10 381 826.00	R15 394 896.00	R21 060 571.00	R16 016 849.00
Fish Farming	R11 116 500.00	R572 778.00	R10 491 333.00	R15 019 508.00
Total	R41 935 526.00	R187 967 674	R87 351 020.00	R209 985 157.00
Profit/Loss	R146 032 148.00		R122 034 137.00	

A further 3300 people can be employed utilizing the profit giving a total of ± 10 per ha.

Projects financial summary analysis

(a). Year One (1) Financial Summary Analysis

