Feasibility Study

for

Frozen Vegetables Shop

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Table of Contents :

Introduction

Freezing has been successfully employed for the long-term preservation of many foods, providing a significantly extended shelf life in order to supply them to the customers in the season off. The process involves lowering the product temperature generally to -18 °C or below. The physical state of food material is changed when energy is removed by cooling below freezing temperature. The extreme cold simply retards the growth of microorganisms and slows down the chemical changes that affect quality or cause food to spoil. The frozen food industry dates back to the early years of the twentieth century, when some foods were preserved by the so-called cold-pack method.

Purpose of the documents :

This report of the term project of Facility Planning Course aims to define the idea of frozen vegetables production possibility in Gaza Strip , Describing the project products and process , Preparing a feasibility study , and the layout of the production /factory facility, compensate the increased demand in Gaza strip, especially, with the absence of major facility of frozen vegetables production, law competitiveness in this field, utilization of big production of vegetables in Gaza strip.

Executive summery

- This particular feasibility study is for producing a “frozen vegetables business”. The important aspects that should be taken into account while making investment decisions are efficient marketing, induction of qualified freezing equipment and provision of quality services at reasonable prices.
- The total project cost is **3,200,000** , debt equal to **1.5 million** and self financing . The project NPV is **3,007,509.**
- with an IRR of **39% ,** and payback period of **2.28** years , discounted payback period **2.503** years.
- The production full capacity for pea is 70,000 , for corn is **88,000** , for haircut is **60,000** and for Okra is **55,000**.
- The Khanyounis city and surrounding area are the best available location .

Brief description of the project

- This section focus on selecting a definition , determine the opportunity to get a successful idea , determine which products to produce as a frozen vegetables , illustrating the production procedures and processes.

Definition of the project

- In Gaza, the drying and freezing are the oldest, preservation by freezing as a concept started by burying the covered vegetables in the sand, by The seventies the freezing process performed manually in the houses, some self and simple efforts made to develop this area but it stay simple & costly.
- Establishing a facility to utilize the fresh vegetables to be consumable in season off by construction of freezing factory with better resources (including good layout, low operating cost), and commitment of quality culture and its requirements.

Opportunity to success

- The chance of success is highly regarded, based on the low competitiveness in Gaza, the design, scientific procedures. Also, the governmental support is giving us hope and optimism.

Objectives of the project

- Filling in the local markets requirements , and reducing exports of frozen vegetables.
- Depending on local self production, To make a technical and feasibility study, then to recommend based on results.

Methodology:

- The methodology employed in this feasibility consists of published data such as , interview with frozen vegetables companies , multilateral agencies , freezing experts and ministry of health . And we make questioner to determine the acceptance of this project . Also , the data collected in this feasibility has been analyzed using quantitative and qualitative technique , where required necessary assumptions have been made which have been mentioned in this feasibility .

SWOT Analysis

Strength :

- A firm's strength are its resources and capabilities that can be used as a basis for a developing a competitive advantage . Example of such strength in include :

- Exclusive access to high grade natural resources.
- Favorable access to distribution network.

Weaknesses :

- The absence of certain strengths may be viewed as a weaknesses for example eash of the following in considered weaknesses :
- High cost structure .
- Lack of access to the best natural resources.
- Lack of access to key distribution channels.

Opportunities :

The external environmental analysis may reveal certain new opportunities for profit and growth. Some examples of such opportunities include :

- Arrival of new technologies
- Loosing of regulations
- Removal of international trade barriers

Threats :

Changes in the external environmental also may present threats to the firm. Some example of such threats includes :

- Shifts in consumer testes away from the firms products

- Emergence of substitute products
- New regulation
- Increase trade barriers
- The problem of electricity in Gaza strip
- Restriction imposed by Israel occupation on imports

Critical factors

- To establish frozen vegetables business successfully , you must considered the following critical factors :
  - location of business preferably in commercial markets or in area that have large population .
  - Background knowledge and experience of the entrepreneur in the frozen vegetables business.
  - Induction of trained human resource for production of requisite items.
  - Ensure good quality and customers services .
  - Business should be neat and clean with standard tools and equipment.
  - The sale of products must be according to the prevailing market price.

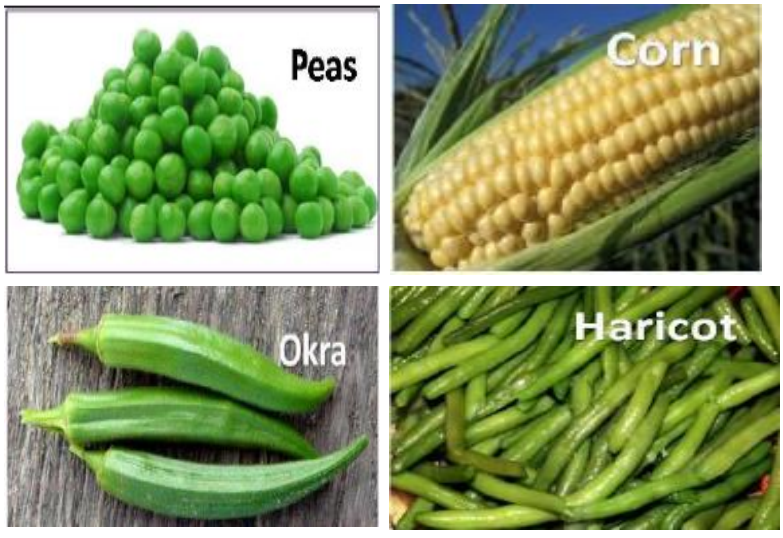
legally study

- This project is considered as a sole proprietorship .
- project products have permit from healthy authority based on product identification low and quality standards
- This project operates in perfect competition market.

Process description

: Products

- Due to the variation in cultivation time of each kind of vegetables, we choose the following products:



Processes description

The following are discussing the processes, identifying them, and its sequence.

Cultivating : The harvesting schedule needs to be agreed on by both the farmer and the producer. The producer may measure the tenderness of the crop, and will also evaluate how much volume the freezing plant can accommodate.

e.g. Peas need to be frozen within hours of picking, and if a backlog develops at the freezing plant, some of the peas may deteriorate.

- **Picking and washing :** the crop may be picked by hand or automatically. Then, a machine called a viner removes them from their shells. If truck transport is necessary, they are cooled with ice water and then packed in ice for transport. At the plant, the crops are dumped into beds and sprayed with water to remove dust and dirt.
- **Blanching** : the cleaned crop are next passed into a vat of boiling water for a few minutes. This kills enzymes that effect the taste of the crop, but it does not cook them. After blanching, the crops are cooled with water and then passed to a specific gravity sorter.
- **Sorting** : The crop are next sorted to remove any old, starchy pieces. They are immersed in water with a specified

salt content. Tender crop (e.g. peas) float to the top of the brine tank, while peas with a high starch content sink to the bottom. The tender peas are then sprayed with clean water to remove the salt, and they pass to an inspection area.

— **Inspection** : In the inspection area, workers glance over the sorted products as they move along a belt. Nimble workers pick out any discolored or otherwise off products, and also any rocks or other field detritus that may have made it this far.

— **Packaging and freezing :** Proper packaging of frozen food is important to protect the product from contamination and damage while in transit from the manufacturer to the consumer, as well as to preserve food value, flavour, colour, and texture. There are several factors considered in designing a suitable package for a frozen food. The package should be attractive to the consumer, protected from external contamination, and effective in terms of processing, handling, and cost (Rahman, 1999). Proper selection is based on the type of package and material. There are typically three types of packaging used for frozen foods: primary, secondary, and tertiary. The primary package is in direct contact with the food and the food is kept inside the package up to the time of use. Secondary packaging is a form of multiple packaging used to handle packages together for sale. Tertiary packaging is used for bulk transportation of products.

— Packaging materials should be moisture-vapor-proof to prevent evaporation, thus retaining the highest quality in frozen foods. Oxygen should also be completely evacuated from the package using a vacuum or gas-flush system to prevent migration of moisture and oxygen. Glass and rigid plastic are examples of moisture-vapor-proof packaging materials. Many packaging materials, however, are not moisture-vapor-proof, but are sufficiently moisture-vapor-resistant to retain satisfactory quality in foods. Most bags, wrapping materials, and waxed cartons used in freezing packaging are moisture-vapor-resistant .

— In general, the containers should be leakage free while easy to seal. Durability of the material is another important factor to consider, since the packaging material must not become brittle at low temperatures and crack.

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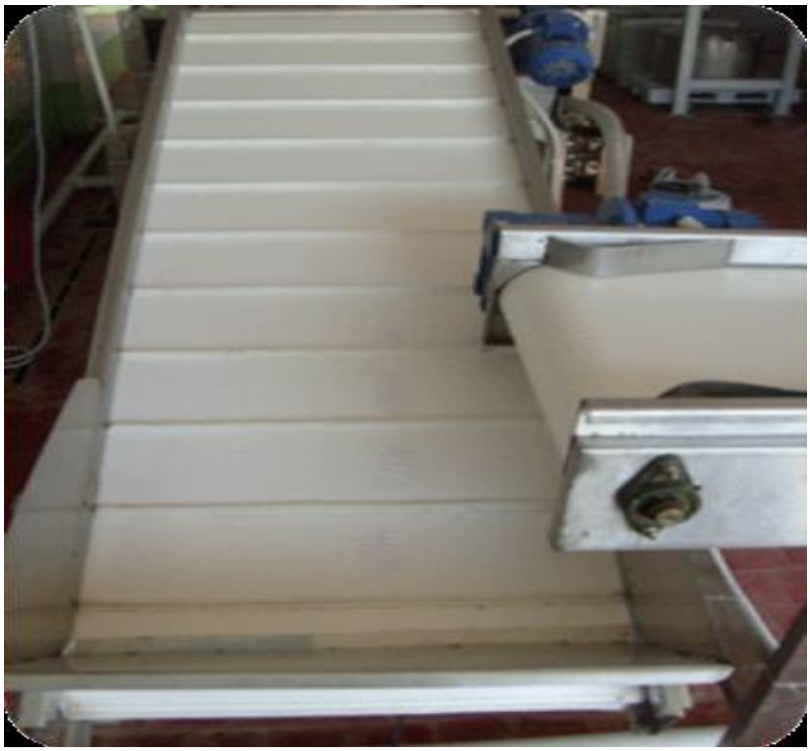
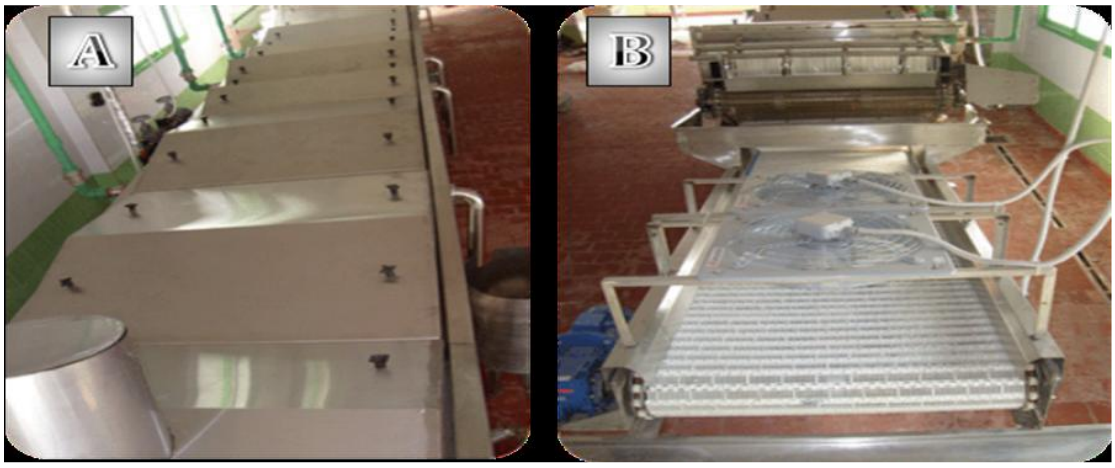
— **The common equipments (machines) require to work as a production line are:**

Handling belting



Parboiling line

Filling and Packaging line



Filling and Packaging line; A for filling , B and C for Packaging.

Marketing feasibility study

Market Study :

- Market study almost study demand and supply which are the two main factors to verify if the project feasible or not, many paths should be followed to satisfy this study. In our study we collect the following information which arranged in separate tables to support our study.
- We assume that our products are to be sold to warehouses, so the products will not exceed the 1 day on freezers and storage coolers.

- we identified our market share to be 50%, and this percentage is based on many things, like the governmental support, lower price than the imported frozen vegetable, also better quality because it is not a long time of freezing, and other causes related to supporting the national production etc..

General information about Palestinian economy

—Economic activity

- Real quarterly GDP was lower in Q1/2014 than in Q4/2013, although an expansion of the economy was observed compared to Q1/2013. In the Gaza Strip, which accounts for only 23% of GDP but 39% of the population, GDP has lower quarter-on quarter since Q2/2013. In this context, nominal GDP per capita is 2.6 times higher in the West Bank than in the Gaza Strip.

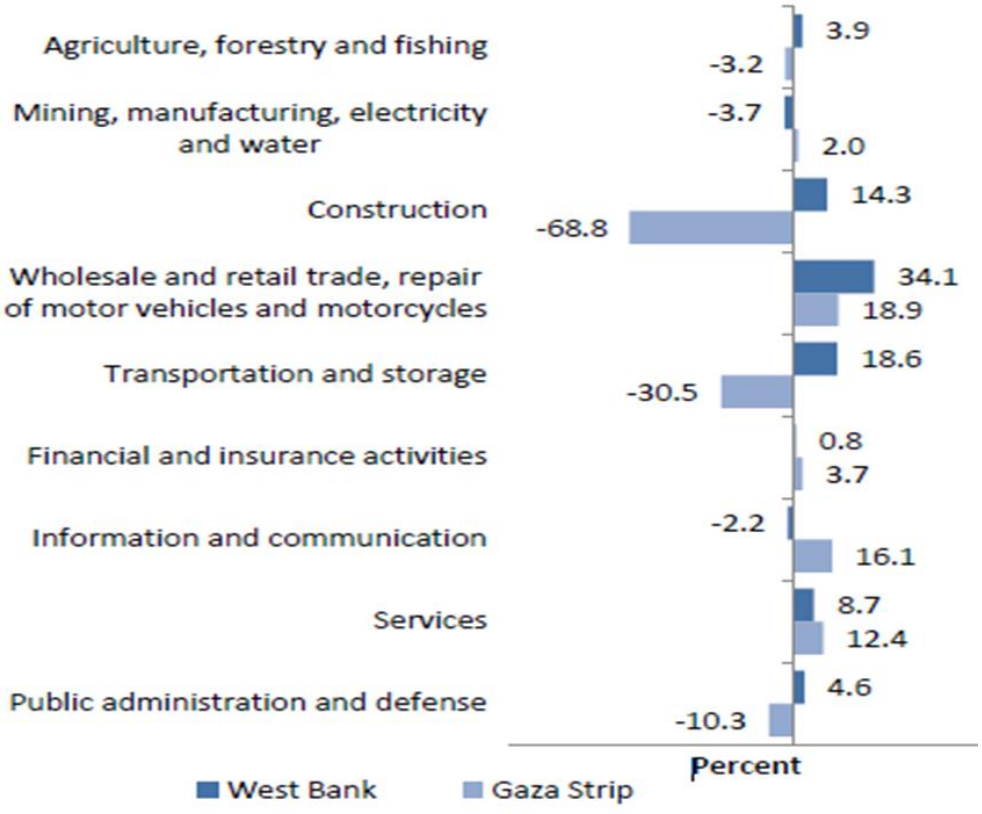
- Between Q1/2013 and Q1/2014 there was a significant expansion in the wholesale and retail trade sector in the West Bank (34.1%), followed by transportation and storage (18.6%), construction (14.3%) and services (8.7%). Small decreases in value added were registered in the mining, manufacturing, electricity and water sector, as well as the information and communication sector. Value added by sector underwent considerable changes in the Gaza Strip during the same period, with contractions of 68.8% in construction, 30.5% in transportation and storage, and 10.3% in public administration and defense. At the same time, in the Gaza Strip real value added in wholesale and retail trade grew by 18.9%, and it grew by 16.1% in information and communication and by 12.4% in services.

Key GDP indicators (Q1/2014)

	West Bank	Gaza Strip	oPt
Real GDP (million US$)	2,314.9	700.2	3,015.1
Rate of change in real GDP (quarter-on-quarter, %)	0.0	-2.7	-0.6
Rate of change in real GDP (year-on-year, %)	9.9	-1.0	7.1
Nominal GDP per capita (US$)	1,099.1	424.4	823.0

Note: Base year for real GDP is 2010. Data for Q1/2014 are flash estimates.

Rate of change of real value added by economic activity (year-on-year, Q1/2014)

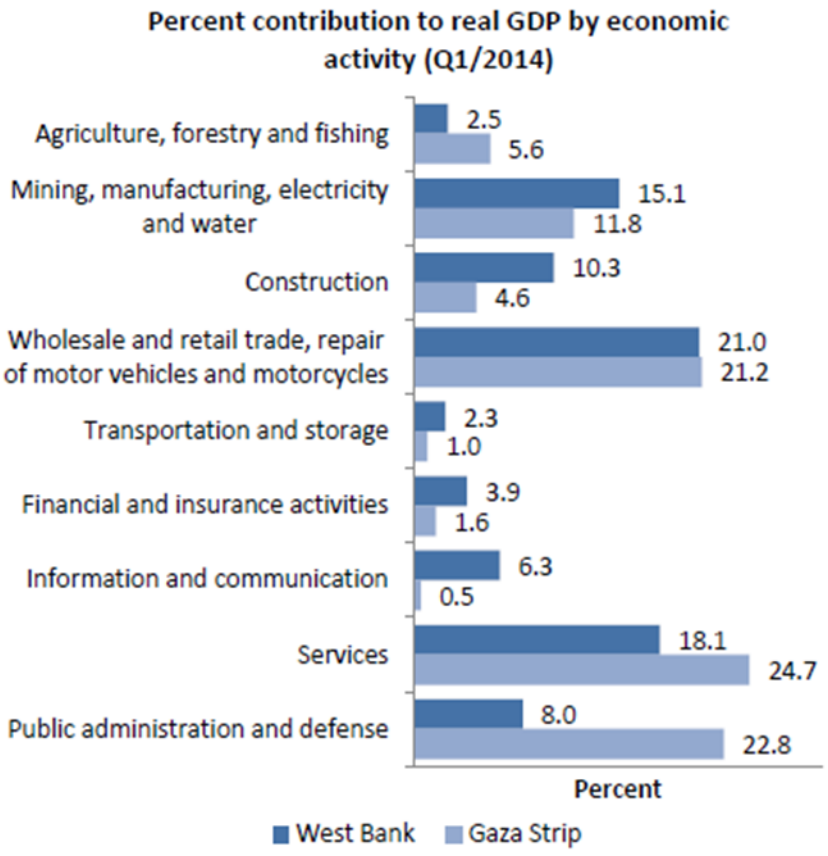


- As a result of these changes, the wholesale and retail trade sector was the largest in the West Bank economy in Q1/2014, accounting for 21.0% of GDP. This sector was followed by services (18.1%) and mining, manufacturing, electricity and water (15.1%). In the case of the Gaza Strip, services was the largest sector in Q1/2014, accounting for 24.7% of the total, followed by public administration and defense (22.8%) and wholesale and retail trade (21.2%). The construction sector, which accounted for 14.6% of GDP in Q1/2013, saw its share reduced to 4.6% by Q1/2014.

- Final consumption in the West Bank represented 108.8% of GDP in Q1/2014, and 80% of it was in the form of household final consumption, while 19% of the total was government final consumption. Gross capital formation in the West Bank grew by 15.3% between Q1/2013 and Q1/2014, and was equivalent to 27.1% of GDP in Q1/2014. Ninety-one percent of it was gross fixed capital formation. The value of exports of goods and services from the West Bank grew between Q1/2013 and Q1/2014 but not as much as the value of imports. The West Bank trade deficit represented 29.7% of GDP in the quarter.

- In the Gaza Strip, final consumption in Q1/2014 was equivalent to 151.6% of GDP, 63% of it household final consumption and 31% of it government final consumption. Gross capital formation decreased by 79% between Q1/2013 and Q1/2014, when it represented only 2.8% of GDP. Between the first quarters of 2013 and 2014 the value of

exports of goods and services from the Gaza Strip decreased, while that of imports increased, resulting in a trade deficit equivalent to 58.7% of GDP in Q1/2014.



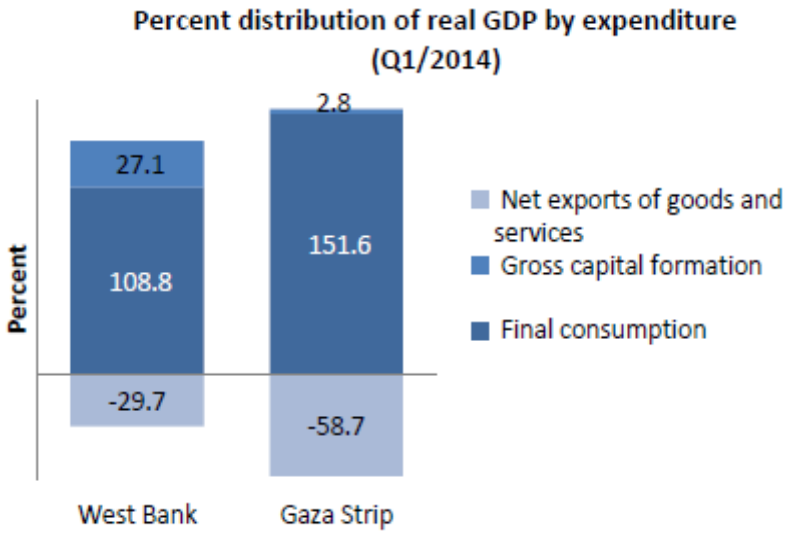


Table 1 : Past and current demand :

annual Demand				
	2011	***2012***	***2013***	***2014***
Pea	46,900	51,260	52,150	56,900
Corn	68,800	74,500	75,700	77,900
Hairocet	45,150	47,380	50,350	52,650
Okra	40,250	41,600	42,850	44,180

Table 2 : Past and current supply

annual production				
	2011	***2012***	***2013***	***2014***
Pea	50,200	52,360	54,250	55,630
corn	70,200	73,250	76,950	78,690
Hairocet	47,250	49,100	51,200	53,250
Okra	41,200	42,500	44,100	45,150

Table 3 : Annual Sales

	quantity sold during 2011	*quantity sold during 2012*	*quantity sold during 2013*	*quantity sold during 2014*	*sales Price*	*sales during 2011*	*sales during 2012*	*sales during 2013*	*sales during 2014*
Pea	4,700	51,000	52,250	55,800	10	47,000	510,000	522,500	558,000
Corn	68,600	73,680	74,650	77,500	10	686,000	736,800	746,500	775,000
Harocet	45,050	46,300	49,100	51,250	9	405,450	416,700	441,900	461,250
okra	39,350	40,500	42,850	43,852	11	432,850	445,500	471,350	482,372

Table 4 : Sales Forecasting

Sales Focasting					
	2015	***2016***	***2017***	***2018***	***2019***
Pea	542,110	597,676	658,938	726,479	800,943
Corn	710,000	782,775	863,009	951,468	1,048,993
Hairocet	433,800	478,265	527,287	581,333	640,920
Okra	467,500	515,419	568,249	626,495	690,710

Current and Future demand gap

We use regression to find forecasted Demand and forecasted production , we calculate regression by using SPSS :

- **Demand forecasting formula :**

- For pea : Y = 44080 + 3089X
- For corn : Y = 67100 + 2850X
- For Haricot : Y = 42515 + 2547X
- For Okra : Y = 38960+ 1304X

- **Budgeted production formulas** :

- For pea : Y = 48565 + 1818X
- For corn : Y = 67480 + 2917X
- For haricot : Y = 45175 + 2010X
- For okra : Y = 39875 + 1345X

- **Note : Demand Gap Table is attached in the Project Folder .**

Target Customers

- The business target customers ARE "anyone interested in my services , the medial income class homeowners, or stay-at-home moms. All of these targets are too general.
- To define the market even further, the company could choose to target only those interested in kitchen and bath remodeling and traditional styles .
- With a clearly defined target customers, it is much easier to determine where and how to market your company .

Competitors analysis

- The competitive analysis is a statement of the business strategy and how it relates to the competition. The purpose of the competitive analysis is to determine the strengths and weaknesses of the competitors within the market, strategies that will provide you with a distinct advantage, the barriers that can be developed in order to prevent competition from entering your market, and any weaknesses that can be exploited within the product development cycle

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- The first step in a competitor analysis is to identify the current and potential competition . There are essentially two ways you can identify competitors. The first is to look at the market from the customer's viewpoint and group all your competitors by the degree to which they contend for the buyer's dollar. The second method is to group competitors according to their various competitive strategies so you understand what motivates them.

Location Study

The success of any project depends on its strategic location. The Khanyounis city and surrounding area of it will be the best available location for this project according annual vegetarian production.

City	North Gaza	Gaza	Dier Al-Balah	Khanyonis	Rafah	total
Annual production 2011(ton).	53,288	9400	38,074	64,827	49,662	215,251

The forecasted values are to be used in all next studies. After determining the total volume of production of each type we produce as fresh vegetable, it is time now to determine the demand of frozen final product in each type, but before that, let's know the production cost and market price for the selected four products .

Technical Feasibility

Table 5 : areas of departments

	Department	Area M^2
A	Production Room	350
B	Freezing Room	250
C	Management	50
D	Labor	40
E	Storage	130
F	Masjid,WC, services	90
Total	**	**910**

Table 6 : equipment and accessories cost.

Equipment	Cost(NIS)
Production line + Installation. According to: Zhengzhou Jiangyuan Machinery And Equipment Co., Ltd	116,480
Freezing rooms (7 rooms, each capacity of 40 cubic meters). According to: Guangzhou Green & Health Refrigeration Equipment	83,500
Co., Ltd.	
Storage cooling rooms (3 rooms) + 2 small freezers. Guangzhou Green & Health Refrigeration Equipment	44,500
Co., Ltd.	
Water tanks, 50 cubic meters	5,200
Fork lifts. (2) according to: Flurfördergeräte GmbH & Co.	22,300
Test equipment	2,100
Technical assistance	2,650
Total	276,730

Table 7:

Item	Cost(NIS)
Building	120,000
Furniture	3,000
Equipment and supplies	276,730
Overhead	2500
Total	402,230

Table 8 : Salary

Job	NO.1st shift 12/12 (month/month), the other 8/12 (month/month)	Salary/month (1person)	Salary/year
Manager	1	3,000	3,000
Secretary	1	1,900	1,900
Accountant	1	1,500	1,500
Marketing	1	1,900	1,900
Engineer	2	2,000	4,000
Cooling technician	2	1,900	3,800
Labors	12	1,000	12,000
Drivers	2	1,300	2,600
Guard	2	1,000	2,000
Total	**24**	**15,500**	**372,000**

Table 9 : Operational Costs

Operation	Cost(NIS)
Land rent cost	1,950
850 tons of fresh vegetables	425,422
Salaries	372,000
Critic Acid	2,300
Maintenance	3,800
Advertising	5,000
Packaging materials	20,000
Additional costs	3,000
Depreciation	39,973
Total	**873,445**

Table 10 : Maximum capacity

	Maximum capacity
Pea	70,000
Corn	88,000
Hairocut	60,000
Okra	55,000

Financial Study

Table 11 : Future Gross benefits , future Operational cost , and future net return

		Future GB	Future OC	Future NR
Year	no.year			
2015	1	2,153,410	873,445	1,279,965
2016	2	2,374,135	917,117	1,457,018
2017	3	2,617,483	962,973	1,654,511
2018	4	2,885,775	1,011,121	1,874,654
2019	5	3,181,567	1,061,677	2,119,890

- Annual cash flow = $2,153,410.00 - $873,444.63 = $1,279,965.37
- The salvage value of the project is estimated to be 1,100,000 NIS.

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Testing the feasibility of the project according to the following :

Calculated by Excel

NPV	**3,007,509**
IRR	**39.0%**
PI	**1.94**
ARR	**0.52**
NARR	**$ 0.32**
Discounted ARR	**0.39**
Discounted NARR	**0.61**
Payback period	**2.280**
Discounted payback period	**2.503**
Benefit / Cost Ratio	**1.94**
Pay-off period Rate of return	**44%**

Sensitivity

—Sensitivity is attached in the project folders. It's calculated by using Excel.

WACC

—WACC is attached in the project folders. It's calculated by using Excel.

Breakeven Analysis

Year	Quantity	Average Price for all Products	TR	TC	TFC	TVC	AFC	MR
1	215,911	10	2,159,110	873,445	444,153	429,292	2.06	10
2	226,707	10	2,267,066	917,117	444,153	917,117	1.96	10
3	238,042	10	2,380,419	962,973	444,153	962,973	1.87	10
4	249,944	10	2,499,440	1,011,121	444,153	1,011,121	1.78	10
5	262,441	10	2,624,412	1,061,677	444,153	1,061,677	1.69	10

AVC	**2**
Breakeven quantity in term of physical units	**55,519**
Breakeven quantity in term of Sales revenue	**444,133**

Financial Statements :

1- Income Statement

Frozen vegetables Company
Income Statement
For the Year Ended Dec. 31, 2014

	2015	2014
Sales	2,153,410	2,015,800
Cost of Goods Sold	445,422	425,422
Gross Profit	1,707,988	1,590,378
operational costs	873,445	891,360
EBIT	834,543	699,018
Interest Expenses	1,500	1,300
Earnings Before Taxes	833,043	697,718
Taxes	333,217	279,087
Net Income	499,826	418,631

2- Balance sheet

Frozen vegetable company **Balance Sheet** **As of December 31, 2014**		
	2014	**2015**
Assets		
Cash	150,282	280,500
Accounts Receivable	4,850	8,000
Inventory	650,000	355,000
Total Current Assets	**805,132**	**643,500**
Fixed assets	1,181,271	1,150,000
Depreciation	39,973	79,946
Net Fixed Assets	**1,141,298**	**1,070,054**
Total Assets	***1,946,430***	***1,713,554***
Liabilities and Owner's Equity		
Accounts Payable	220,022	163,100
Notes Payable	436,808	314,454
Accruals	489,600	336,000
Total Current Liabilities	**1,146,430**	**813,554**
Long Term Debts	800,000	900,000
Total Liabilities	**1,946,430**	**1,713,554**
Total Liabilities and Owner's Equity	***1,946,430***	***1,713,554***

3- Cash Flow :

Frozen vegetables Company **Statement of Cash Flows** **For the Year Ended December 31, 2015**		
Cash Flows from Operations		
net income	**499,826**	-
increase in A/R	-3,150	
decrease in inventory	195,000	
decrease in A/P	-56,922	
decrease in accruals	-153,600	
Depreciation	39,973	
		521,127
Cash Flows from Investing Activites		
Decrease in fixed assets	31,271	
		31,271
Cash Flows from Financing		
decrease in N/P	-122,354	
increase In long-term debt	100,000	
Dividends	-431,097	
		-453,451
Net Change in Cash Balance		**130,218**

National feasibility study :

- **Added value**

Added Value is attached in the project folder. It's calculated by using Excel.

Conclusion

- Many problems were facing us when we studying the project , main of them are: Difficulties in statistical data collection , There is no ideal location with standard criteria's. , Limited skills and experience in our project , and governmental supporting weakness .
- We can add the following recommendations to make the project more efficient and successful they are :Encourage local and foreign investments in this field. Improve quality of vegetarian production. More opportunities for Industrial and agricultural engineers. And Governmental supports.

Recommendations

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