



PROJECT PROFILE ON MARGARINE PRODUCTION



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ADDIS ABEBA CITY ADMINISTRATION INVESTMENT COMMISSION

PROJECT PROFILE ON MARGARINE PRODUCTION

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I. Executive summary

This project profile is prepared to assess the viability of running Margarine production factory, in Addis Abeba city administration. Hence Market, Technical, Organizational and Financial study was made to investigate the viability of the envisaged project.

This project profile on Margarine factory has been developed to support the decision –making process based on a cost benefit analysis of the actual project viability. This profile includes marketing study, production and financial analysis, which are utilized to assist the decision-makers when determining if the business concept is viable. Ethiopia has a private sector driven Margarine industry. According to the latest data sourced from Ethiopian investment commission there are 70 registered companies to invest on margarine manufacturers. However out of them only 2 of them are on operational stage while others are on implementation and pre-implementation stage.

The location of the plant will be decided on the basis of access to raw materials, infrastructure namely power, water, transport and telecom to easy access to international market. The most locally available raw materials for margarine factory are hydrogenated oil and fat, skimmed milk, and additives, packing materials and etc.

The factory at full capacity operation can produce 592,236 kg of margarine per year based on 260 working days and their shifts of 24 hours per day.

The total investment capital including establishing the factory is Birr 184 million. Out of the total investment capital, the owners will cover Birr 55 million (30 %) while the remaining balances amounting to Birr 129 million (70 %) will be secured from bank in the form of term loan.

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As indicated in the financial study, the cash flow projection of the project shows surplus from the first year on. The net cash flows of the project range from Birr 46 Million in the first year to Birr 65 million at the end of the 10th year of operation. At the end of the 10th year of operation period the cumulative cash balance reaches Birr 655million. The Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 390.35 million Birr at 17%D.F. and the benefit-cost ratio of 1.54 at 17% D.F.

Therefore, from the aforementioned overall market technical and financial analysis we can conclude that the Margarine manufacturing factory business is a viable and worthwhile.

1. Background information

1.1. Introduction

This document was undertaken to show margarine production investment profile in Addis Ababa. In compiling the report, information from Addis Ababa investment commission, Addis Ababa trade and industry development, Ethiopian custom commission and published sources have been augmented.

Presently, in spite of high demand and its crucial importance, margarine products are in short supply and also significant amounts are imported from abroad. This causes freight transportation costs from the supplier to the Djibouti Port to the users to be high and in some cases inefficient and unreliable.

The provision of adequate margarine is fundamental importance to Ethiopia's present and future demand. In Ethiopia, the demand for poultry farming products is expected to increase considerably in the next few decades as a result of increased population growth, urbanization and increasing income levels. Thus, identifying potential of margarine production is crucial in a country like Ethiopia.

1.2. Product description

Margarine is used for flavoring, baking, and cooking. It is most often used as a substitute for butter. Although originally made from animal fats, most margarine consumed today is made from vegetable oil. Margarine consists of a water-in-fat emulsion, with tiny droplets of water dispersed uniformly throughout a fat phase in a stable solid form. While butter is made from the butterfat of milk, modern margarine is made through a more intensive processing of refined vegetable oil and water

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1.3. Project location and justification

1.3.1. Location of Addis Ababa

Addis Ababa is the seat of the Ethiopian federal government. It is located on the central highlands of Ethiopia in the middle of Oromia Region. The absolute location is around the intersection point of 9°1'48''N latitude and 38°44'24''E longitudes. This is very near to the geographical center of the country. It is, therefore, equidistant to the peripheral areas or is equally accessible to almost all parts of Ethiopia. Addis Ababa is located on a well-watered plateau surrounded by hills and mountains. The city is in the highlands on the edge of the Ethiopian rift valley or the eastern slopes of the Entoto Mountain ranges bordering the Great Rift Valley. The total area of Addis Ababa is about 540 km² of which 18.2 km² are rural. Addis Ababa's built-up urban area spans 474 km². It is also the largest city in the world located in a landlocked country.

1.3.2. Demography of Addis Ababa

According to the CSA (2013) population projection, Ethiopia's total population reaches about 105 million people in 2022. Of the total population 22.9% (24 million people) live in urban areas. Ethiopia's urban population is expected to triple by 2037 (World Bank, 2015). Addis Ababa hosts an estimated 3,859,638 people. Currently, Addis Ababa is experiencing an annual growth rate of 3.8% and is estimated to reach 4,696,629 inhabitants by 2032 (CSA, 2015).

1.3.3. Economic activity of Addis Ababa

The transformation of Addis Ababa has especially been rapid since 1991. According to the data from the city's Bureau of Finance and Economic Development (2006), per capital income of Addis Ababa has grown from USD 788.48 in 2010 to USD 1,359 in 2015. The city also achieved a decline in the poverty index from a high of 29.6 in 2012 to 22.0 in 2014. Moreover, the current poverty headcount

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index for Addis Ababa is estimated at 18.9 while the poverty severity account for 5 and 1.8 index points respectively. Even though, the poverty status of Addis Ababa has an improvement over previous years, there is still much work to be done to curb both the incidence and severity of poverty.

The major contributor to the economic growth of the city is the implementation of publicly financed mega urban projects like condominium housing, the Light Rail Transit, the international airport and industrial zone development (The state of Addis Ababa, 2017). The existence of international large and medium-size enterprises in and around Addis Ababa have also significant role in creating huge opportunity for employment and technology transfer. Furthermore, there are strong demand for goods and services following the existence of many embassies and inter-governmental organizations like the African Union, the United Nations Economic Commission for Africa.

The manufacturing sector's contribution to Addis Ababa's GDP is high. Despite the fact that 86% of the industries in the city are micro and small scale (cottage and handicrafts, and small-scale), the majority of the country's large and medium scale industries are found in the city. Noticeable increases are also registered currently in other aspects of industrial growth.

The service sector is both the largest contributor to the city's economy and the largest employer. It contributes to 76.4% of the city's GDP while industry's share makes up (almost all) the rest. This sector is dominated by three major sub-sectors: Transport and communication; Real estate, Renting and Business services; and Trade, Hotel and Restaurants. According to the state of Ethiopian Cities 2015 report, the service sector has also been responsible for more than 50% of the growth in the estimated annual growth of the city's GDP. Although 75% of employment in the city is also generated in the service sector, a large proportion of the employed work in low skill and low paying

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jobs as shop salespersons, petty and 'gullit' traders, sales workers in small shops, domestic helpers or doorkeepers and restaurant service workers.

Analysis of the economic structure of Addis Ababa reveals that the services sectors (63%) dominates with industry (36%) in second place indicating that these sectors account for almost all of the Addis Ababa's GDP (The State of Addis Ababa, 2017).

Addis Ababa has a great share in the economy of the country due to its attractiveness to businesses, companies, individuals and foreign direct investment. Overall primacy index of the city is 24.8 based on urban employment and unemployment survey (CSA 2015). According to the State of Addis Ababa 2017 report, the simultaneous high rates of economic growth and urbanization in Addis Ababa indicates a likely further rising dominance of the city in Ethiopia's economy as well as growing agglomeration of economic activities in and around the city.

1.4. Why is it beneficial to invest in Addis Ababa?

Addis Ababa is the largest and most economically significant city in the country. Ethiopia's urban population share is only 17 percent (as of 2012, World Bank 2015). The city is the only urban area in Ethiopia capable of delivering scale economies in terms of concentrated demand, specialization, diversity and depth of skills, innovation, and technology transfers. Thus, investors will be benefited in getting capable human power from the market.

The capital is the country's main industrial hub. The city dominates industrial capacity in almost all the braches of light manufacturing that Ethiopia prioritizes. As a result Addis Ababa completely dominates production in various subsectors. This can be taken as the political and social stability of the city.

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Overall, the city has a beautiful environment, favorable location, and strong industrial base. Its advantage as an economic powerhouse of the country and human resource center are the most attractive features for local and overseas investors.

Moreover, investors will be getting a comprehensive set of incentives for priority sectors. These include:

- Customs duty free privilege on capital goods and construction materials, and on spare parts whose value is not greater than 15% of the imported capital goods' total value.
- Investors have the right to redeem a refund of customs duty paid on inputs (raw materials and components) when buying capital goods or construction materials from local manufacturing industries.
- Income tax exemption of up to 6 years for manufacturing and agro-processing, and up to 9 years for agricultural investment.
- Additional 2-4 years income tax exemption for exporting investors located within industrial parks and 10-15 years exemption for industrial park developers.
- Loss Carry forward for half of the tax holiday period. Several export incentives, including Duty Draw-Back, Voucher, Bonded Factory, and Manufacturing Warehouse, and Export Credit Guarantee schemes.

1.4.1. The city benefit from the investment

The city will be benefited from investment. These are discussed below.

- **Employment opportunity**

Investment is expected to provide direct and indirect employment. These range from unskilled casual workers, semi-skilled and skilled employees.

- **Improving growth of the economy**

Through the use of locally available materials and exporting products, the investment contributes towards growth of the economy by contributing to the growth of domestic product. These eventually attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of local materials will be payable directly to the producers. In addition, domestic products save foreign exchange and exports also bring money to the country.

1.5. [Status of margarine manufacturing industry in Ethiopia](#)

Ethiopia has a private sector driven margarine manufacturing industry. According to the latest data sourced from Ethiopian investment commission there are 70 registered companies to invest on margarine manufacturers. However out of them only 2 of them are on operational stage while others are on implementation and pre-implementation stage.

2. Marketing study

2.1. Market analysis summary

The current drive and emphasis by the government on the diversification of the industrial base away from the other sector presents an opportunity for production industry to a valuable contribution towards achieving goal. Having undertaken a thorough and comprehensive research of the market we realized that there was a vast opportunity for domestic products. Aware of the fact operating in such a market is largely dependent on good networking, the promoter intends to establish networks and strategic relationships with various wholesalers and retailers to ensure a steady stream of orders. In so doing the owner intend to ensure that the products they produce are of extremely high quality and fully serve the customers purpose.

2.2. The Supply of margarine

2.2.1. Local margarine Supply

In Ethiopia there are medium level margarine manufacturing plant. However their capacity is not known

2.2.2. Import

The supply of margarine has been met both through import and domestic production. Although there is no apparent trend in the growth of imported margarine.

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Table 1 Volume of imported margarine from 2012 to 2020 in kg

Year	Gross weight (in Kg)	Net weight (in Kg)	CIF value in (ETB)	CIF value in USD	Total TAX in ETB	Total Tax USD
2012	1,620,438	1,603,819	35,681,797	1,997,235	4,809,828	269,223
2013	182,242	171,607	5,668,480	301,513	3,823,389	203,371
2014	129,189	118,884	4,592,589	227,992	2,362,445	117,280
2015	353,758	324,965	10,178,452	489,772	6,810,583	327,715
2016	73,729	67,963	2,273,896	105,280	1,533,743	71,012
2017	1,887,077	1,749,122	50,397,934	2,081,106	33,706,013	1,391,838
2018	541,726	510,324	14,609,682	527,997	9,853,694	356,115
2019	0	0	0	0	0	0
2020	3,402	3,037	348,216	9,963	235,023	6,725
Average	532,396	505,525	13,750,116	637,873	7,014,969	304,809

Source: ERCA and compiled by consultant

As it has been shown in table 6 import of margarine which was 1,603,819 kg at the beginning of the period (2012) has increased to 3,037 kg by the end of, 2020. A closer observation at the data set reveals that imported margarine over the study period has shown varying patterns. Based on the data obtained from Ethiopia customs Authority, the annual average volume of imported margarine is 505,525 kg from 2012 through 2021.

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2.2.2.1. Forecasted future import of margarine

Table 2 Future forecast of import of Margarine by trend adjusted exponential smoothing method

Year	Imported Margarine from 2012 to 2021 in kg.	Trend Adjusted exponential smoothing method
2012	1,603,819	
2013	171,607	
2014	118,884	
2015	324,965	
2016	67,963	
2017	1,749,122	
2018	510,324	
2019	0	
2020	3,037	
2022		189,695
2023		189,695
2024		189,695
2025		189,695
2026		189,695
2027		189,695
2028		189,695
2029		189,695
2030		189,695
2031		189,695
2032		189,695

Compiled: - by consultant

2.2.2.2. Margarine Demand Projection

The demand for margarine can be influenced by a number of factors. The demand for margarine is a function of population, price of feed, price of substitutes, and other exogenous factors. The size of population and its growth rate, disposable income prices and culture are few among many variables. For the purpose of this study, attempts have been made to forecast the likely future demand for margarine on the basis of the following assumptions:

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- i. Local supply of margarine assumed to be increased by 2.5% every year
- ii. Effective demand of margarine = local supply + import average

$$= 50,000 + 505,525$$

$$= 555,525$$

- iii. Per capital consumption = effective demand /urban population

Therefore, in order to estimate the demand for animal feed, the consumption approach is considered.

Table 3 Projected Demand and Gap for margarine in Ethiopia

Year	Number of population	Urban population 21%	Potential Demand for margarine in kg	Local supply of margarine	GAP b/n potential demand and local supply
2022	120,202,679	25,242,563	555,336.38	50,000	505,336
2023	123,207,746	25,873,627	583,450.28	51,250	532,200
2024	126,287,940	26,520,467	612,987.45	52,531	560,456
2025	129,445,138	27,183,479	644,019.94	53,845	590,175
2026	132,681,267	27,863,066	676,623.45	55,191	621,432
2027	135,998,298	28,559,643	710,877.51	56,570	654,308
2028	139,398,256	29,273,634	746,865.69	57,985	688,881
2029	142,883,212	30,005,475	784,675.76	59,434	725,242
2030	146,455,292	30,755,611	824,399.97	60,920	763,480
2031	150,116,675	31,524,502	866,135.22	62,443	803,692
2032	153,869,592	32,312,614	909,983.32	64,004	845,979

As it is indicated above table 4 unsatisfied demand supply gap for margarine in 2022 is 555 505,336

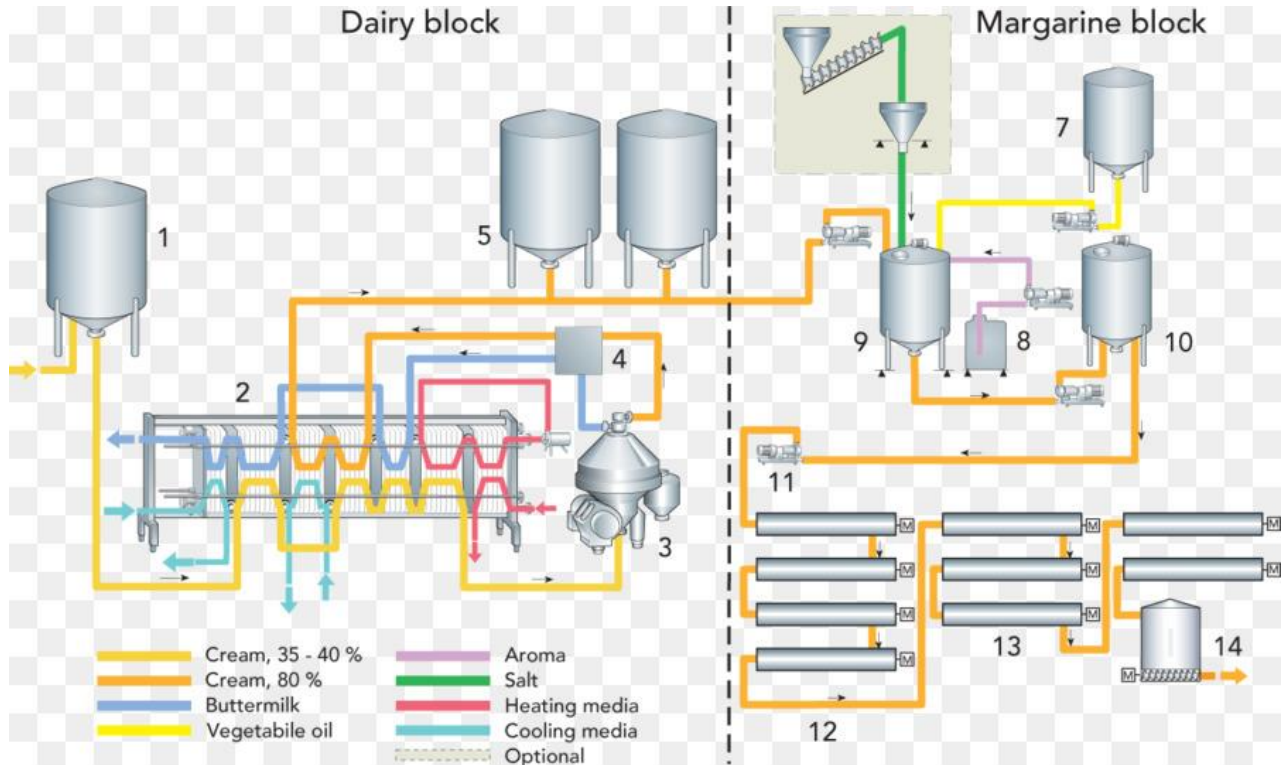
kg. This volume will increase to 845,979 kg in the year 2032.

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3. Technology and engineering

3.1. Technology

3.1.1. Margarine production process



1. Salt dosage, optional
2. Vegetable oil tanks
3. Flavor dosage
4. Mixing
5. Buffer tank
6. High pressure pump
7. Scrapped surface cooler
8. Pin rotars
9. Silo with screw conveyor in the bottom
10. Cream tank
11. Plate heat exchanger
12. Centrifugal cream concentrator
13. Cream standardization

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14. Pre-crystallization tanks

It consists of two blocks one is “dairy block” wherein the cream concentration, pasteurization and cooling of cream takes place and other is “margarine block” wherein preparation of the mix and phase inversion accompanied by working and cooling takes place.

Dairy block: Starts with pasteurized cream of 35 to 40 % fat content. Temperature is adjusted to 60 – 70°C before it enters the cream concentrator. Cream fat content is automatically controlled by the continuous standardization device and 82 – 84% fat level is reached in concentrator. Cream is then cooled to 18 – 20°C, before being routed to a holding/pre-crystallization tank.

Margarine block: In margarine block product mix is prepared and various ingredients are mixed together, according to the recipe. Concentrated cream is mixed with appropriate volumes of vegetable oil, salt and water phase. After thorough mixing, the mixture is pumped into a buffer tank. The process is continuous from the buffer tank, from which the product mix is taken to the high pressure pump. It is then fed into the scraped surface coolers, where phase inversion takes place. Before final cooling, the spread is held and worked by pin rotors. The pin-rotors, besides further crystallizing the emulsion, also physically breaks up and works the crystals to improve the texture of the final product. Product enters final cooling stage and then to storage silo. From silo, it is pumped into the filling machine, often a tub-filling machine.

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Table 4 Common permitted food additives for margarine

Item description	Amount permitted
Natural food colours(Beta carotene)	25mg/kg maximum
Antioxidant (Lecithin, propyl gallate)	200ppm(maximum)
Emulsifying agents (tartaric acid)	10gm/kg (maximum)
Preservative (sorbic acid)	1000mg/kg(maximum)
Acidity regulators(citric acid)	GMP
Flavours(natural flavoring substance)	4mg/kg (maximum)

3.1.2. Environmental and social impact assessment of the project

Typically, any developmental projects also trigger a set of environmental and social impacts. These environmental and social due to development projects occur in different forms. An Environmental and Social Impact Assessment (ESIA) has to be carried out to study the potential environmental and social impacts due to the production margarine . Potential environmental and social impacts due to the production of margarine products on attributes like air quality, noise, water quality, soil, flora, socio-economic, etc. have to be assessed as part of the ESIA study. Appropriate mitigation measures to help minimize/avoid impacts from the development have to be recommended in the study. The measures include avoidance measures, mitigation measures and environmental enhancement measures. For the purpose of including environmental costs, the costs of wastewater treatment plant and solid waste incineration systems are included in the cost of machinery and equipment. Social responsibility cost estimated to be 1% of fixed investment costs.

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3.1.3. Production Capacity and Production Program

3.1.3.1. Plant capacity

The annual production capacity of the plant in full capacity is 592, 236kg. The production capacity is based on projected demand and realistic market share that could be captured. The production commences three shift and 260 working days a year. The production program does not include Sundays and national and public holidays.

3.1.3.2. Production program

The plant initially produces 70 % of its annual rated capacity bound to initial operating problems such as machine set up and marketing. The production capacity will increase by 10 % and attain its full capacity by the fourth year of its commencement.

Table 5 Production program

	Period		Start-up			Full Capacity	
			70%	80%	90%	100%	100%
	Capacity utilization						
	Project year		1	2	3	4	5
1	Margarine	Kg	414,565	473,789	533,012	592,236	592,236

3.2. Engineering

3.2.1. Land, buildings and civil works

The required area (m^2) and construction cost for the production facilities essential for the successful operation of the processing plant is shown in Table 6. A total area ready for the processing plant is $5,000m^2$ out of which $3,851m^2$ is to be covered by building while uncovered area of $1,149m^2$ is left open for parking, storage of waste materials and future expansions. In order to estimate the land lease cost of the project profiles it is assumed that all the project will be located in different land level from level 1/1 to level 4/3, their current market lease price is from 39,073.31 birr per M^2 to 2,800.71 birr per M^2 respectively. Therefore, for the profile a land lease rate of birr 3,885 per M^2 have been taken, which is between the ranges.

The cost of construction of building should be appropriate to the size and expected profitability of business, costs of building generally differs by the type of construction materials used, the type of foundation, wall height and location. The current building cost for simple storage and processing room is from 1,800.00 Birr per m^2 to 25,000 Birr per m^2 . The total construction cost of buildings and civil works, at a rate of Birr 20,000 per m^2 is estimated at Birr 68.145 million. Therefore, the total cost of land lease and construction of buildings and civil works is estimated at Birr 87.57 million.

The proposed plant layout comprises the following buildings and structures.

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Table 6 Building costs

S/No	Descriptions	Total area	Estimated cost per square meter (in Birr)	Total estimated cost (in Birr)
1	Raw materials store	1,000M ²	20,000.00	20,000,000.00
4	production room	1,000M ²	20,000.00	20,000,000.00
6	Main product store	500 M ²	20,000.00	10,000,000.00
7	packing materials store	300 M ²	20,000.00	6,000,000.00
8	Office and toilet	200M ²	20,000.00	4,000,000.00
9	Canteen	160M ²	20,000.00	3,200,000.00
10	Guard house	6M ²	20,000.00	120,000.00
11	parking	600M ²	2,000	1,200,000.00
12	Green area	625M ²	1,000	625,000.00
13	Fence	LS		3,000,000.00
	TOTAL	3,851 M ²		68,145,000.00

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Table 7 Land lease period in Addis Abeba

Sector of development activity	Period of lease	Down payment
Education, health, culture and sports	90	10%
Industry (manufacturing)	70	10%
commerce	60	10%
For urban agriculture	15	10%
For others	60	10%

Sources: - city government of Addis Abeba land development and management bureau

Table 8 Land lease floor price in Addis Abeba

S/No	Land level	Current land lease floor price per M ²	Current lease price per M ² (Market price)
1	1/1	2,213.25	39,073.31
2	1/2	2,165.47	36,825.73
3	1/3	1,900.19	34,578.15
4	¼	1,552.93	31,119.21
5	1/5	1,531.91	29,096.45
6	2/1	1327.39	27,073.71
7	2/2	1,221.18	25,050.96
8	2/3	1,191.17	23,028.21
9	2/4	1,074.39	21,005.46
10	2/5	1,027.84	18,982.71
11	3/1	994.71	16,959.96
12	3/2	960.21	14,937.21
13	3/3	927.84	12,914.46
14	¾	904.77	10,891.71
15	3/5	873.74	8,868.96
16	4/1	814.06	6,846.21
17	4/2	786.45	4,823.46
18	4/3	748.80	2,800.71

Sources: - city government of Addis Abeba land development and management bureau

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3.2.2. Machinery and equipment

The main plant and machinery consists mixer, buffer tank, cream tanker, centrifugal and etc.. Major part of the machinery will be imported.

Table 9 Lists of Equipment Requirements for margarine production

S/No	Item description	Total Amount
1.	Salt dosage, optional	65,000,000.00
2.	Vegetable oil tanks	
3.	Flavor dosage	
4.	Mixing	
5.	Buffer tank	
6.	High pressure pump	
7.	Scrapped surface cooler	
8.	Pin rotars	
9.	Silo with screw conveyor in the bottom	
10.	Cream tank	
11.	Plate heat exchanger	
12.	Centrifugal cream concentrator	
13.	Cream standardization	
14.	Pre-crystallization tanks	
	Grand total	65,000,000.00

3.2.3. List of machinery supplier



GOYUM GROUP
● EXTRACTION ● REFINING ● RECYCLING

Phone: +91 9915043180/919915743183

Email: goyumsales@gmail.com

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4. Margarine production organizational structure

The selection of structure of the envisaged project is made based on the existing structure of manufacturing plants operating in the country, the capacity, complexity and technology mix of the plant. Organizational structure principles such as specialization, coordination, and departmentalization are also considered for design of structure that best suits the envisaged project

4.1. Manpower Requirement and Estimated Annual manpower costs

Table 10 Annual manpower costs

s/no	Description	Number of persons	Salary in birr	
			monthly	annually
1	General manager	1	45,000.00	540,000.00
2	executive secretary	1	15,000.00	180,000.00
3	Manager- admin. and finance	1	25,000.00	300,000.00
4	assistance manager- finance	1	20,000.00	240,000.00
5	accountant	1	15,000.00	180,000.00
6	cashier	1	10,000.00	120,000.00
7	personnel and general service	1	10,000.00	120,000.00
8	guards	5	3,000.00	180,000.00
9	driver ii	4	10,000.00	160,000.00
10	manager-production and technical	1	20,000.00	240,000.00
11	production clerk	1	4,000.00	48,000.00
12	chief quality controller	3	12,000.00	432,000.00
13	chief miller	1	10,000.00	120,000.00
14	machine operator	3	5,000.00	180,000.00
15	assistant machine operator	3	3,000.00	108,000.00
16	senior mechanics	3	12,000.00	432,000.00
17	senior electrician	3	12,000.00	432,000.00
18	store keeper	1	10,000.00	120,000.00
19	manager- commercial	1	20,000.00	240,000.00
20	purchaser	1	10,000.00	120,000.00
21	sales- manager	1	15,000.00	180,000.00
	total	38		4,672,000.00

5. Financial Analysis

5.1. General

The financial analysis evaluation, under consideration has been carried out for margarine. Manufacturing cost estimates of the envisaged factory are mainly consisted of capital investment as well as operating and maintenance costs. The capital investment costs include fixed investment costs (initial fixed investment and replacement costs) and working capital, while operating and maintenance costs comprise current expenses related to material inputs, labor, utility, repair and maintenance costs, spare parts, Overheads, Sales and distribution, interest and depreciation expenses.

The financial analysis and evaluation has been conducted taking assumptions:

1. It is assumed that about 70% of the total capital investment costs including the working capital requirement could be covered through development bank loans of short and long-term credits. The remaining balance 30% will be covered by equity capital contribution of the project owner.
2. Even though the project might secure loans under different term and conditions as well as from different financial sources, for the purpose of calculation of debt service scheduling, the current development bank of Ethiopia credit terms and conditions have been used. Consequently, It is assumed that the project will secure loan facility on the basis of 11.5 % annual interest rate, and 10 years' equal installments.
3. Even though the estimated project production life is more 10 years, the financial analysis has been undertaken for a period interval covering the first 10 years only, during which time

PROJECT PROFILE ON MARGARINE PRODUCTION

most of the capital assets are assumed to be depreciated, debts recovered and pay-back period accomplished.

4. It is assumed that the project will be start up production activity at 70 % capacity. During years 2 & year 3 the projects is anticipated to gradually increase capacity utilization to reach 100% in year 4. Therefore, starting from year 4 the project will be operational at full capacity.
5. For the project under reference promotional, sales and distribution expenses have been estimated at 3% of the sales revenue.
6. Maintenance and spare parts costs are 1.5% of the fixed investment costs.

5.2. Initial Fixed investment costs

Table 11 Initial Fixed investment costs

S/No	Fixed investment type	Unit of measurement	Quantity	Unit price	Total Amount	Remarks
1	Land	Square meter	5,000	3,885 birr/M ²	19,425,000.00	The period of land lease will be 70 years and 10% of the total lease amount will be paid in the first year
2	Buildings and civil works	Square meter	3,851	lump sum	68,145,000.00	
	Sub total				87,570,000.00	
3	Machineries	set	2	Lump sum	65,000,000.00	
4	Transformer	set	1	Lump sum	2,000,000.00	
5	Weighbridge	Set	1	Lump sum	4,000,000.00	
6	Truck and vehicles	Pcs	2	Lump sum	6,000,000.00	
7	Furniture and fixture	Pcs			500,000.00	
	SUB TOTAL				77,500,000.00	
	Fixed capital investment costs				165,070,000.00	
8	pre-operational expenses				2,000,000.00	
	Working capital				17,012,000.00	
	TOTAL INVESTMENT COSTS				184,082,000.00	

PROJECT PROFILE ON MARGARINE PRODUCTION

5.3. Working capital

Working capital is the financial means required for smooth operation and maintenance of a project mathematically, it is a difference between current assets and current liabilities. In the particular case of the project under consideration, the current assets comprise receivables, inventories (local and imported material inputs, spare parts, work in progress, and products ready for delivery) and cash in hand, while current liabilities comprise accounts payable to creditors.

5.4. Project Financing

Fixed capital investment costs and working capital requirements are assumed to be financed by equity capital of the owner and through loans of short and long-term credits.

As stated earlier even though the company obtains loans under different terms and condition as well as from different sources, for the purpose of calculation of debt service scheduling the current development bank of Ethiopia credit terms and conditions have been used. Accordingly it is assumed that the company will be able to obtain loan 70% of the total investment costs for construction of different buildings for purchase of machineries, for purchase of truck and vehicles , for working capital and for purchase of office furniture and pre operation expense which are 0 will be covered through bank loans that will have to be repaid back within 10 years, during which time interest will be paid on the loan. The remaining balance that of the total investment costs will be expected to be covered by equity contribution of the project promoter.

PROJECT PROFILE ON MARGARINE PRODUCTION

5.5. Production costs

As it is depicted in Annex Table 17 major categories of the total production costs are assembled into the following cost elements.

5.5.1. Material inputs

In the project under study the basic material inputs are hydrogenated oil and fat, skimmed milk, salt and additives and packing materials etc. Therefore, the current prevailing local and international market prices have been used for estimation of material inputs costs. At full capacity operation the material inputs costs are estimated at Birr 110 million per annum.

Table 12 Raw materials input plan in Birr for margarine production

	Period				Start-up			Full Capacity
	Capacity utilization				70%	80%	90%	100%
	Project year				1	2	3	4
	Materials input	Unit of measure	Quantity at full Capacity	Unit price				
1	Hydrogenated oil	Kg	500,000	200	70,000.0	80,000	90,000	100,000
2	Skimmed milk	Kg	80,000	75	4,200.0	4,800	5,400	6,000
3	Salt	kg	11,612	15	121.9	139	157	174
4	Additives				-	-	-	-
	Food colours	kg	12	1,200	10.1	12	13	14
	Antioxidant	Kg	100	700	49.0	56	63	70
	Emulsifying agents	kg	5	500	1.8	2	2	3
	Preservative	kg	500	450	157.5	180	203	225
	Acidity regulator	kg	5	1,500	5.3	6	7	8
	Flavours	kg	2	900	1.3	1	2	2
5	Packing materials	Pcs	296,118	15	3,109.2	3,553	3,998	4,442
	Total				77,656.0	88,750	99,843	110,937

PROJECT PROFILE ON MARGARINE PRODUCTION

5.5.2. Utilities

In estimating costs of utility expenses for operation and maintenance of the project, Costs of fuel, oil and lubricant, electricity and water consumptions have been taken in to consideration, the rates of which have been estimated on the basis of the proposed capacity utilization program of the project and at the current official charging rates. At full capacity operation the project will have the following utility expense per annum which amounts to Birr 4.66million.

Table 13 Utilities of the factory'000''Birr

Utility''000''Birr		Start-up			Full Capacity
		70 %	80 %	90 %	100 %
Capacity utilization		1	2	3	4
Project year					
Item description	Unit of measurement				
Fuel					
Gasoline for service vehicle	100km*260days*37Birr/LIT*8km/Li	84.18	96.20	108.1	120.25
Gasoline for transport truck	(200km*300days*37Birr/LIT*5km/Li)	932	1,066	1,199	1,332
Sub-Total		1016	1162	1307	1452
Change of oil and lubricant	10% of the fuel consumption	102	116	131	145
Sub-Total		1,118	1,278	1,438	1,597
Electricity	260days*24 hrs*600kwh* 0.69Birr/kwh	1,808	2,066	2,325	2,583
Sub- Total		1,808	2,066	2,325	2,583
Water	365days*100m ³ /day*10 Birr/m ³	255.50	292.00	328.50	365.00
Sub -Total		255.50	292.00	328.50	365.00
Telecommunication					
Telephone	5 lines* 500Birr/month/line+18Birr/line/month	31.08	31.08	31.08	31.08
Mobile	5 lines*500 Birr/month/line	30.00	30.00	30.00	30.00
Fax	2line*1,000Birr/month + 17 Birr/line/month	24.40	24.40	24.40	24.40
Internet	2,500 Birr/month	30.00	30.00	30.00	30.00
Sub-Total		115.48	115.48	115.48	115.48
TOTAL		<u>3,297.00</u>	<u>3,752.00</u>	<u>4,207.00</u>	<u>4,661.00</u>

PROJECT PROFILE ON MARGARINE PRODUCTION

5.5.3. Repair and maintenance

In the expenses under this title have been considered cost estimates required for annual repair and maintenance works including spare parts expenses. These costs include the annual repair expenses of structures and civil works as well as repair and maintenance expenses of machinery and equipment including accessory and general service facilities. The repair and maintenance and spare parts costs have been assumed to be (1.5% of fixed costs and spare part costs).

5.5.4. Salaries and wages

The costs of salaries have been calculated in accordance with the manning list proposed under the “organization and Management” section of this study. In the estimation of salaries and wages, the official minimum wage has been taken in to account. At full capacity operation the costs of salaries and wages will amount to Birr 5.646 Million.

5.5.5. Over heads

In the expenses under this title have been included land and building taxes, buildings, vehicles as well as machinery and equipment insurance, vehicles annual inspection; postage, telephone and e. mail, stationery and office supplies; printing and copying; audit fee; cash indemnity etc. The overhead costs and divided in to direct overheads and administration overheads.

PROJECT PROFILE ON MARGARINE PRODUCTION

Table 14 Overhead costs

Direct Overhead”000”Birr		Year 1	Year 2	Year 3	Year 4
Annual land lease Payment		2,775	2,775	2,775	2,775
Insurance					
Building and Civil works	0.10%	68	68	68	68
Machinery and Equipment	0.20%				
Motor vehicle and Truck	1%	60.00	60.00	60.00	60.00
Vehicles annual inspection and registration	25,000 Birr per annum per vehicle	50.00	50.00	50.00	50.00
Work cloth	Two times per annum per workers at 800 Birr	78.40	78.40	78.40	78.40
Cleaning and sanitation	An estimate of 300 Birr/day	78.00	78.00	78.00	78.00
Sub Total		3,109	3,109	3,109	3,109
Administration Overhead “000’ Birr					
Audit fee	40,000 Birr per annum	40.00	40.00	40.00	40.00
Office cleaning and sanitation	2,000 Birr per month	24.00	24.00	24.00	24.00
Stationery and office supplies	2,000 Birr per month	20.00	20.00	20.00	20.00
Printing and Copy	2,000 Birr per month	24.00	24.00	24.00	24.00
Sub Total		108.00	108.00	108.00	108.00
GRAND TOTAL		3,217	3,217	3,217	3,217

5.5.6. Financial costs

As it has been outlined earlier under” project Financing” the current Development Bank of Ethiopia credit terms and conditions for newly establishing projects have been used to compute the financial costs, estimated to be incurred in connection with that of the total investment costs assumed to be covered through loan financing. The amount of the loan capital to be obtained and the financial costs to be incurred thereof have been determined depending on the amount of fixed investment cost and pre-production expenses.

PROJECT PROFILE ON MARGARINE PRODUCTION

5.5.7. Depreciation

Depreciation charges should be taken in to account as part of the total production costs in order to calculate the total production costs, the net working capital and the gross or net-profit. For the given project under reference, the fixed assets and the pre-production capital expenditures have been depreciated and amortized respectively on “a straight line” depreciation method basis using the following rates of the original acquisition costs of the assets:

The rationale uses for the estimation of the depreciation and the amortization rates is based on the expected service life of the assets and repayment capacity of the project under consideration. Based on the above charging rates and consideration of the above facts, the total annual depreciation cost at full capacity operation have been estimated at Birr 29.08 million.

Table 15 Depreciation in Birr"000"

Period			Start-up			
			70 %	80 %	90 %	100 %
Capacity utilization			70 %	80 %	90 %	100 %
Project year			1	2	3	4
Item description	Original Value					
Structure and civil works	68,145,000.00	5% of original value	3,407	3,407	3,407	3,407
Machinery and equipment	65,000,000.00	15 % of original value	9,750	9,750	9,750	9,750
Transformer	2,000,000.00	15 % of original value	300.00	300.00	300.00	300.00
Motor vehicles and trucks	6,000,000.00	15 % of original value	900.00	900.00	900.00	900.00
Weighbridge	4,000,000.00	15 % of original value	600.00	600.00	600.00	600.00
Office equipment and furniture	500,000.00	20% of original value	100.00	100.00	100.00	100.00
Pre-operation expense	2,000,000.00	25% of original value	500.00	500.00	500.00	500.00
Total			15,557	15,557	15,557	15,557

PROJECT PROFILE ON MARGARINE PRODUCTION

5.6. Break Even point and ROI

5.6.1. Break Even point (BEP)

Three kinds of break-even point

- A. BEP Sales Revenue(BR)
- B. BEP production (Volume)
- C. BEP Percentage (%)

A. Break-even point(BEP) Sales

To determine BEP Annual Sales, multiply annual sales found in income statement by the annual fixed cost, and divided by Annual sales less Annual variable cost.

$$\text{BEP (sales)} = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}}$$

Annual sales = 186,554,000 Birr

$$\text{BEP (sales)} = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}} = \frac{186,554,000 \times 38,265,000}{186,554,000 - 85,729,000}$$

BEP (Sales) = 70,800,782 Birr

B. BEP production

To determine BEP production volume, divided BEP sales by the unit selling price (USP)

$$\text{BEP production} = 152,841,576 / 35 = 4,366,902$$

$$\begin{aligned} \text{c. BEP percentage} &= \frac{\text{Annual fixed costs} \times 100\%}{\text{Annual sales} - \text{Annual variables costs}} \\ &= \frac{38,265,000 \times 100\%}{86,554,000 - 85,729,000} \\ &= 38\% \end{aligned}$$

5.6.2. Return on investment

Return on investment = Net profit /Total capital requirement

$$= 68,300,000/184,082,000$$

$$= 37\%$$

The return on owners' investment (ROOI)

= Annual net profit /owners' investment

$$= 68,300,000/55,224,600$$

$$= 123\%$$

5.7. Project costs

Project capital investment costs are the sum of fixed capital investment (fixed investment plus pre-production capital expenses) and net working capital at full capacity, with fixed capital constituting the resources required for constructions and civil works, importation and installation of production machinery (margarine machinery) and equipment and general service facilities, whereas, the working capital corresponding to the resources needed for operation of the project totally and partially.

As it has been revealed in Annex Table 17 the total annual operating costs excluding depreciation and interest are estimated to range from 97 million Birr in year 1 to 134 million Birr in year 4 and then after remain constant for the rest of the project life.

The total annual production costs including depreciation and interest increase from 127 million Birr in year 1 to 161 million Birr in year 4 then starts declining until it reaches 140 million Birr in year 10.

PROJECT PROFILE ON MARGARINE PRODUCTION

5.8. Project benefits

For financial analysis and evaluation of the given project, the current material input price, and packing materials buying price and final packed margarine price at the project gate has been taken as a basis. As it has been stated earlier the project is envisaged to reach full capacity operation four years after commencement of production activities which are assumed to begin with 70% of the estimated total capacity.

At full capacity operation the project is envisaged to have the following revenue components.

Table 16 Source of revenue in Birr"000"

	Period			Start-up			Full Capacity	
				70%	80%	90%	100%	100%
	Capacity utilization							
	Project year			1	2	3	4	5
	Product type		Unit price					
1	Margarine	kg	450	186,554	213,205	239,855	266,506	266,506
	Total			186,554	213,205	239,855	266,506	266,506

Thus, according to the computation in Annex Table 19 and Annex Table 21, the net income and cash flow statements analysis revealed that at full capacity operation the project will generate a total income (gross revenue) amounting to 266 million Birr per annum. The corresponding Annex Table 19 of "Net Income Statement" shows a steady growth of gross profit starting from 59 million Birr in year 1 reaching the peak of 127 million Birr in year 10. In its 10 years of manufacturing activities, the project is expected to generate a total net profit of 670 million Birr and contribute 361 million Birr to the government treasury in form of 35% income tax.

PROJECT PROFILE ON MARGARINE PRODUCTION

According to the current investment Law, machinery and equipment are anticipated to be imported duty- free. The liquidity position of the project is very strong. The corresponding Annex Table 21 of “Cash Flow Statement” shows the positive cumulative cash balance of Birr 655 million and the project will not face any cash shortage throughout its production life.

The computation of the pay-back period as depicted in Annex table 26 indicates that the project will be able to reimburse itself from its net cash-income within four years after commencement of production activities, the period which is considered to be very good for the project of this nature.

In Annex Table 27 of the Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 390 million Birr at 17%D.F. and the benefit-cost ratio of 1.54 at 17% D.F. these results are most appreciable, especially, when related to the external capital borrowing interest rate which ranges from 8.50% to 18.5 % for newly establishing projects.

The project under study when implemented will have BEP at about 38% operation of the estimated full capacity. In addition to this, finally, summary of financial efficiency tests have been conducted in Annex table 25 Accordingly, all efficiency ratios indicated positive trends and consequently, it can be inferred that the project can operate in the frame work of free market mechanism on commercially and financially viable basis and is remunerative.

ANNEXES

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX II

CALCULATION OF ANNUAL PRODUCTION COSTS

Table 17 Annual total production costs''000''

Period	Start-up			Full capacity						
	70 %	80 %	90 %	100 %	100 %					
Project Year	1	2	3	4	5	6	7	8	9	10
Cost category										
I. Material inputs	77,656	88,750	99,843	110,937	110,937	110,937	110,937	110,937	110,937	110,937
II. Labor	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672
III. Utility	3,297	3,752	4,207	4,661	4,661	4,661	4,661	4,661	4,661	4,661
IV. Repair and Maintenance and spare parts (1.5 % of fixed costs)	2,476	2,476	2,476	2,476	2,476	2,476	2,476	2,476	2,476	2,476
VI Direct overheads	3,109	3,109	3,109	3,109	3,109	3,109	3,109	3,109	3,109	3,109
A. Direct Production costs	91,210	102,759	114,307	125,855	125,855	125,855	125,855	125,855	125,855	125,855
VII. Administration over head	108	108	108	108	108	108	108	108	108	108
VIII. Marketing and Promotional expense 3 % of sales revenue	5,597	6,396	7,196	7,995	7,995	7,995	7,995	7,995	7,995	7,995
B. Operating costs	96,915	109,263	121,611	133,958	133,958	133,958	133,958	133,958	133,958	133,958
Interest	14,819	13,954	12,989	11,914	10,714	9,377	7,886	6,224	4,370	2,304
Depreciation	15,557	15,557	15,557	15,557	15,057	14,957	11,111	3,407	3,407	3,407
C. Total production costs	127,291	138,774	150,157	161,429	159,729	158,292	152,955	143,589	141,735	139,669

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX IV CALCULATION OF WORKING CAPITAL REQUIREMENTS

- I. Minimum requirement of current assets and liabilities
- A. Accounts receivable: 30 days at total production costs minus depreciation and interest
- B. Inventory
1. Material inputs: 30days
 2. Spare parts : 90 days
 3. Work under process: two days at direct costs
 4. Product ready for delivery: 8 days at direct costs plus administration overheads
- C. Cash on hand : 90 days
- D. Accounts payable 52 days for material inputs and utilities

ii. Working capital requirement

Table 18 Calculation of working capital

Cost category	Minimum Days of coverage	Coeff-icient of turnover	Project year									
			Start up			Full capacity						
			1	2	3	4	5	6	7	8	9	10
I. Current asset												
A. A/R	26	10	9,692	10,926	12,161	13,396	13,396	13,396	13,396	13,396	13,396	13,396
B. Inventory												
1. Material inputs	26	10	7,766	8,875	9,984	11,094	11,094	11,094	11,094	11,094	11,094	11,094
2. Spare parts	90	4	619	619	619	619	619	619	619	619	619	619
3. Work under process	2	130	702	790	879	968	968	968	968	968	968	968
4. Product ready for delivery	8	32.5	2,914	3,270	3,625	3,980	3,980	3,980	3,980	3,980	3,980	3,980
C. Cash on hand			3,416	3,529	3,643	3,757	3,757	3,757	3,757	3,757	3,757	3,757
D. Current assets			25,108	28,010	30,912	33,814	33,814	33,814	33,814	33,814	33,814	33,814
II. Current liabilities												
A. A/p	26	10	8,095	9,250	10,405	11,560	11,560	11,560	11,560	11,560	11,560	11,560
III. Working capital												
A. Net working capital			17,012	18,760	20,507	22,254	22,254	22,254	22,254	22,254	22,254	22,254
B. Increasing in working capital			17,012	1,747	1,747	1,747	0	0	0	0	0	0

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX VI

PROJECTED NET INCOME STATEMENT

Table 19 Projected Net income statement "000"

Period	Start up			Full capacity						
	70 %	80 %	90 %	100 %						
Project year	1	2	3	4	5	6	7	8	9	10
Item description										
Product sales revenue	186,554	213,205	239,855	266,506	266,506	266,506	266,506	266,506	266,506	266,506
Less total production costs	127,291	138,774	150,157	161,429	159,729	158,292	152,955	143,589	141,735	139,669
Gross profit	59,263	74,431	89,698	105,077	106,777	108,214	113,551	122,917	124,771	126,837
Tax	20,742	26,051	31,394	36,777	37,372	37,875	39,743	43,021	43,670	44,393
Net profit	38,521	48,380	58,304	68,300	69,405	70,339	73,808	79,896	81,101	82,444
Accumulated undistributed profit	38,521	86,901	145,205	213,505	282,910	353,249	427,057	506,953	588,054	670,498

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX VII DEBT SERVICE SCHEDULE AND COMPUTATION PAYMENT OF EQUAL ANNUAL INSTALLMENTS

Table 20 Debt services schedule and computation

Item description	Project year									
	1	2	3	4	5	6	7	8	9	10
A. Investment and working capital										
1. Investment										
2. Increment working capital										
Total										
B. Loan receipts and balances										
1. Loan receipts										
2. Outstanding balance at end of year	128,857									
a. First year loan	128,857	121,335	112,948	103,596	93,168	81,542	68,578	54,124	38,007	20,037
Total										
A. Debt service										
1. First year Loan										
a. Interest	14,819	13,954	12,989	11,914	10,714	9,377	7,886	6,224	4,370	2,304
b. Repayment of principal	7,522	8,387	9,352	10,427	11,627	12,963	14,454	16,117	17,970	20,037

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX VIII CASH-FLOW STATEMENT FOR FINANCIAL PLANING

Table 21 Projected Cash flow statement

Period	Start up			Full capacity						
	70%	80%	90%	100%						
Capacity utilization	70%	80%	90%	100%						
Project year	1	2	3	4	5	6	7	8	9	10
Item description										
A. Cash - inflow	378,732	216,107	242,757	269,408	266,506	266,506	266,506	266,506	266,506	266,506
1. Financial resource (total)	192,178	2,902	2,902	2,902						
2. Sales revenue	186,554	213,205	239,855	266,506	266,506	266,506	266,506	266,506	266,506	266,506
B. Cash – outflow	332,176	160,557	178,248	195,978	193,671	194,173	196,041	199,320	199,968	200,692
1. Total assets schedule including replacement	192,178	2,902	2,902	2,902						
2. Operating costs	96,915	109,263	121,611	133,958	133,958	133,958	133,958	133,958	133,958	133,958
3. Debt service (total)										
a. Interest	14,819	13,954	12,989	11,914	10,714	9,377	7,886	6,224	4,370	2,304
b. Repayment	7,522	8,387	9,352	10,427	11,627	12,963	14,454	16,117	17,970	20,037
4. Tax	20,742	26,051	31,394	36,777	37,372	37,875	39,743	43,021	43,670	44,393
C. Surplus (Deficit)	46,556	55,550	64,509	73,430	72,835	72,333	70,465	67,186	66,538	65,814
D. Cumulative cash balance	46,556	102,106	166,615	240,045	312,880	385,213	455,678	522,864	589,402	655,216

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX XII TOTAL INVESTMENT COSTS

Table 22 Total investment costs''000''

Period	Start up			Full capacity							
Project year	1	2	3	4	5	6	7	8	9	10	11
Investment Category											
1. Fixed investment costs											
a. Initial fixed investment costs	165,070										
b. Replacement											
2. Pre-operational capital expenditure	2,000										
3. Working capital increase	17,012	1,747	1,747	1,747							
Total investment costs	184,082	1,747	1,747	1,747							

ANNEX XIII TOTAL ASSETS

Table 23 Total Assets

Period	Start up			Full capacity								
Project year	1	2	3	4	5	6	7	8	9	10	11	12
Investment Category												
1. Fixed investment costs												
c. Initial fixed investment costs	165,070											
❖ Cost of land												
d. Replacement												
2. Pre-operational capital expenditure	2,000											
3. Current assets increase	25,108	2,902	2,902	2,902								
Total assets	192,178	2,902	2,902	2,902								

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX XIV SOURCES OF FINANCE

Table 24 Sources of finance

Period	Start up			Full capacity							
	1	2	3	4	5	6	7	8	9	10	Total
Project year											
Sources of finance											
1. Equity capital	55,225	1,747	1,747	1,747							
2. Loan capital	128,857										
3. Current liabilities	8,095	1,155	1,155	1,155							
Total finance	192,177	2,902	2,902	2,902							

ANNEX XI SUMMARY OF FINANCIAL EFFECIENCY TESTS

Table 25 Summary of financial efficiency tests

Project year	Project year									
	1	2	3	4	5	6	7	8	9	10
Capacity utilization	70%	80%	90%	100%						
Financial ratio in %										
1. Gross profit : Revenue	32%	35%	37%	39%	40%	41%	43%	46%	47%	48%
2. Net profit : Revenue	21%	23%	24%	26%	26%	26%	28%	30%	30%	31%
3. Net profit : initial investment	21%	26%	31%	36%	37%	37%	39%	42%	43%	44%
4. Net profit : Equity	70%	85%	99%	113%	115%	116%	122%	132%	134%	136%
5. Gross profit : Initial investment	32%	40%	48%	56%	56%	57%	60%	65%	66%	67%
6. Operating costs : Revenue	52%	51%	51%	50%	50%	50%	50%	50%	50%	50%

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX XV CALCULATIONS OF PAYBACK PERIOD

Table 26 Calculation of payback period”000”

Year	Amount Paid Back			Total investment	End of year
	Net Profit	Depreciation	Total		
1	38,521	15,557	54,078	184,082	-130,004
2	48,380	15,557	63,937	1,747	-67,814
3	58,304	15,557	73,861	1,747	-4,300
4	68,300	15,557	83,857	1,747	+86,410

PROJECT PROFILE ON MARGARINE PRODUCTION

ANNEX XVI CALCULATIONS OF NET PRESENT VALUE AT 17% D.F.

Table 27 Calculation of NPV at 17% D.F.

Project year	Gross Revenue	1/(1+i) ⁿ At 17%	Present value at 17%	Project costs			
				Total investment	Operating costs	Total	Present value at 17%
1	186,554	0.854701	159,448	184,082	96,915	280,997	240,168
2	213,205	0.730514	155,749	1,747	109,263	111,010	81,094
3	239,855	0.624371	149,759	1,747	121,611	123,358	77,021
4	266,506	0.53365	142,221	1,747	133,958	135,705	72,419
5	266,506	0.456111	121,556		133,958	133,958	61,100
6	266,506	0.389839	103,894		133,958	133,958	52,222
7	266,506	0.333195	88,798		133,958	133,958	44,634
8	266,506	0.284782	75,896		133,958	133,958	38,149
9	266,506	0.243404	64,869		133,958	133,958	32,606
10	266,506	0.208037	55,443		133,958	133,958	27,868
Total			1,117,634				727,282

A. Benefit- cost ratio At 17% D.F. = 1.54

B. NPV At 17% D.F. = 390,352,000 Birr