Birzeit University

The Research Centre

Feasibility Study

of

Bethlehem Cold Storage Plant

Prepared by

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June 5, 1982

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Dr. Baker Abu Kishek,
Bir Zeit Research Center,
Bir Zeit University,   April 16, 1982
Bir Zeit,

Dear Dr. Abu Kishek:

I am pleased that the Bir Zeit Research Center has agreed
to undertake the feasibility study for the Bethlehem market cold
storage plant. Enclosed herewith are the study's terms of ref-
erence as developed jointly, over the past two weeks.

The Bethlehem project is one of the largest assisted by CDF
and the one which we hope will lead to other development pro-
jects of scale in the future. Thus we anticipate the feasibility
study the Bir Zeit Research Center will now undertake will serve
as a demonstration of professional and technical capacity to recom-
mend and evaluate other projects in the future.

As you know, the Bethlehem municipality is anxious to com-
plete the market and feasibility study as soon as possible and
the final approval needed for CDF to contribute its share to the
project rests on an early and successful conclusion of the feasi-
bility study.

I look forward to working with you on this study and others.

                                         Sincerely,

                                         Philip Davies

                                         PHILIP/Director - Director
                                         Community Development Foundation
                                         Save the Children, Inc.
                                         Jerusalem Field Officer

(a)

TERMS OF REFERENCE
BETHLEHEM MARKET COLD STORAGE PLANT
FEASIBILITY STUDY

PARTICIPANTS

1. Bethlehem Municipality
   Mayor Elias Freij and technical staff

2. Bir Zeit University Research Center
   Dr. Baker Abu Kishek, Director
   Mr. Said Haifa

3. Community Development Foundation
   Mr. Philip Davies, Director
   Mr. Shehadeh Dajani, Project Consultant

4. Bethlehem University
   Mr. Romell Soudah

OBJECTIVES

The feasibility study will concentrate on the section of the Bethlehem
Market which CDF will assist, namely, the cold storage facility. It
will also include reference to the costs and benefits of the market
as a whole. The following are major considerations to be taken into
account by this study:

1. The population who will use or benefit from the cold storage
   facility, including producers, wholesalers, retailers, consumers
   and the municipality.

2. The potential uses of the cold storage plant and criteria for
   deriving maximum benefit from it. This will include an exam-
   ination of what can be stored in terms of vegetable and fruit
   produce, fish and meat and what technical consider-
   ations should therefore be taken into account in planning and
   designing the plant.

(b)

8. Identify any further evalution reports or technical studies
which are to be recommended at a later time.

III METHODOLOGY

Information and data relevant to the cold storage plant will
be collected from the widest number of sources, including:

1. interviews with Mayor Freij, municipal planners and technical
   consultants;
2. economic and marketing data already collected by the Bethlehem
   municipality;
3. interviews with wholesalers and retailers in the West Bank
   and Gaza Strip;
4. discussions with agricultural specialists to assess the volume
   of produce and the need for its storage;
5. visits to storage units locally;
6. review of relevant literature.

IV Time Frame

An initial draft will be prepared by Dr. Abu Kishek and submitted
to the Community Development Foundation by May 15, 1982. Further
consultation and revisions as appropriate will be undertaken
between May 15 and June 30.

V TERMS OF CONSULTANCY

of $ 6,500 will be paid to the Bir Zeit Research Center for
undertaking this feasibility study.

(d)

3. The sources of produce which will be stored. This will be looked at in the context of overall West Bank/Gaza output and production.

4. The economic gains and increased value of production the cold storage facility is expected to realize. Attention will be focused on:

   (a) comparison of seasonal prices for stored products;
   (b) expected productive utilization of the project by producers, the Bethlehem Municipality, wholesalers, retailers and consumers;
   (c) anticipated product quality improvement derived from storage;
   (d) intangible benefits and projected social gains;
   (e) vulnerability factors relating to marketing outlets and avenues. This will entail a survey of current storage capability available locally as well as new marketing opportunities which the cold storage facility may open up.

5. An estimation of the facility's total costs including:
   a. fixed costs, including the value of the land of the unit, its construction and the depreciation of the cooling unit.
   b. variable costs, including maintenance costs, labor and utilities.

6. On the basis of an analysis of the data in (4) and (5), a comparison will be made which will consider the impact, benefits and costs of the Bethlehem market "with" or "without" the cold storage facility. The difference will identify the net additional benefit arising from the project, as well as such measures as Benefit/cost rates and the internal rate of return.

7. In addition to the above projections, based on the most probable courses of events, identify added risks and opportunities related to marketing outlets, competitive operations and changes in production.

(c)

Introduction

The municipality of Bethlehem has requested the Community Develop-
ment Foundation to finance "in a grant" part of the costs of the
cold storage project, which is in turn a part of a larger project
located in the vicinity of the city. This project directly serves
the city itself, Beit Sahour, Beit Jala and indirectly serves the
nearby villages of Bethlehem and Hebron districts.

The objective of this project is to improve the market operations
in the area through the following:

A. Reducing traffic in the major cities, particularly near the exi-
   sting local market areas.
B. Reducing pollution that results from the accumulation of wastes
   in the old local markets.
C. Smoothing the market supply and demand for certain agricultural
   products.
D. Reducing the waste of agricultural products that exists today.
E. Increasing the volume of stored products, thus helping producers
   and wholesalers to raise the level of their profits.

There are at the present time five small scale cold storage faci-
lities in the West Bank and Gaza Strip. Two of them are in Nablus
and are owned privately and used by the owners alone. The third
one in Tulkarem, and the 4th and 5th storages are owned by coope-
ratives, one in Jericho for vegetables and the second in Gaza for
fish storage.

Some wholesalers from the Occupied Territories have used and continue to use the existing cold storage facilities in Israel, but this is not a large scale operation. The reason for not using these facilities on a larger scale was attributed to language barriers, storage costs, lack of information concerning the existing storage locations, and lack of storage room during the critical periods.

The city of Bethlehem is a major vegetable and fruit marketing centre, serving a regional population of 80,000 people. The efficeincy of the existing market centre is limited, since it was established in 1928 at a time when the population of Bethlehem was much smaller; in Bethlehem alone, the population has grown from 3000 to nearly 40,000. Furthermore, modern transportation facilities bring a larger number of persons from outlying areas, to visit the many sites of attraction in the city, including recreation and tourism, as well as business centres.

The existing Bethlehem market place is located in the centre of the town over an area of one-half acre. The marketing facilities are generally unacceptable by modern standards due to over crowding and inadequate sanitation.

Approximately 100 tons of fruits and vegetables arrive daily at the local market. About 25 cars help to carry the fruit and vegetables

to the market place and then to 90 local retailers. Hundreds of visitors daily visit the old market place and engage in market activities. City roads leading to the market are narrow and make the trip a time consuming one.

A new market centre has been designated as essential to Bethlehem's economic development, and a major construction effort is now under way. The proposed market centre is located on 15.5 dunams of land (about 3.9 acres) within Bethlehem city limits, near the main highway connecting Hebron with Jerusalem.

Transportation from the city centre to the market will be made available through the city bus line. Furthermore there will be enough parking space to accommodate 200 cars.

The proposed market centre includes 12 wholesaler's stores and 24 retailer's stores in addition to the cold storage facility. Establishing the cold storage unit near the wholesalers and retailers in the proposed market will reduce the loss of agricultural products. Damages to fruits and vegetables can be reduced through storage overnight, or during the weekends and particularly during crises in which retailers and wholesalers have the farm products and cannot market them due to emergencies in the city or in the area.

The design is based on the construction of ten cold storage rooms of which two rooms will serve as deep freezers.

Source of Information

Information and data relevent to the cold storage plant will be
collected from the following sources:

A. Interviews with Mayor Freij, municipal planners and technical
   consultants.
B. Economic and marketing data collected by the Bethlehem munici-
   pality.
C. Economic and marketing data present in the Research Centre at
   Birzeit University.
D. Interviews with wholesalers and retailers in the West Bank and
   Gaza Strip.
E. Discussions with agricultural specialists to asses' the volume
   of produce and the need for its storage.
F. Visits to storage units that operate in the West Bank.
G. Visits to storage units that operate in Jordan (two in Amman)
   particularly the one in Irbed which was established by the muni-
   cipality of Irbed.
H. Visits to some of the storage units that operate in Israel.
I. Review of relevant literature.

Procedure of the Study

Feasibility study of this project will consist of six sections.
The first will concentrate on the major features of the Occupied
Territories economy in general, keeping in mind the area in the vici-
nity of Bethlehem.

The cost as a function of the capital investment in the project and
the cost of operation will be discussed in the second section, with
special attention to this type of public investment in the project.
This was introduced to explain the reason behind the proposed low
discount rate on investment, in estimating capital recovery or
capital costs. The third section is devoted to estimation of
direct benefits, and indirect benefits.

Financial and economic analysis are presented in the fourth and
fifth sections, and finally the conclusions and recommendations
will comprise the sixth section.

Section One

General Background

The major economic features of the Occupied Territories will be
covered under the following three sectors:

A. Population and Labor Force of Demographic Sector.

B. The Agricultural Sector.

C. The Industrial Sector.

The above sectors will be presented in the same order.

A. The Demographic Sector

1. The Population:

Total population of the Territories was 1,258,000 in 1981 and
distributed as follows:

East Jerusalem	112,000
West Bank	704,000
Gaza Strip	441,900

. It was estimated that 30% of the combined total population of the
West Bank and East Jerusalem are in the vicinity of the proposed
project.

Of the total population of the Territories, about 240,000 parti-
cipate in the labor force. This represent about 19% of the total
population, which is a relatively low rate in comparison with
developed countries. This low rate results from the fact that a
large proportion of the population (about 47% of the total popu-
lation) is under fourteen years of age and that only a small pro-
portion of the females (about 9% of the female population) over
14 years of age are in the labor force.

Distribution of the labor force by economic sectors in the Occupied
Territories and in Israel over the period 1970-1979 given in Table
No. (1).

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Table No. (1)

Distribution of Labour Force by Economic Sectors in the Occupied Territories and in Israel 1970-1979

(percentages)

Year	Distribution of Workers in the Occupied Territories by Economic Sector (1)				Distribution of Workers from the Occupied Territories Working in Israel by Economic Sector (1)				Total Workers (000)	Share of the Industrial Sector of Total Work Force (%) (2)
	Agriculture	Industry	Construction	Other	Agriculture	Industry	Construction	Other		
1970	38.7	13.8	8.4	39.1	24.4	11.6	54.3	9.7	23462	13.6
1971	36.8	13.8	5.6	43.8	22.3	14.8	52.3	10.6	21695	12.3
1972	35.5	13.9	6.2	46.4	23.1	17.1	49.5	10.3	27923	14.8
1973	31.3	15.1	6.4	47.2	19.3	18.1	51.7	10.9	31220	16.0
1974	33.8	14.0	6.2	46.0	19.1	17.5	52.5	10.9	31860	15.2
1975	31.8	14.5	7.3	46.4	14.3	18.4	54.4	12.9	32333	15.8
1976	31.4	14.4	8.2	46.0	15.4	19.7	50.3	14.6	33075	16.0
1977	30.5	14.2	9.1	46.2	16.2	21.3	45.3	17.2	33498	16.8
1978	29.8	15.2	9.5	45.5	16.8	22.2	44.8	16.2	36830	17.4
1979	28.0	16.8	10.1	45.1	14.8	22.8	46.2	16.2	39600	18.7

Source: The Industrial and Economic Trends in the West Bank and Gaza Strip,
Dr. Bakir Abu Kishk,
United Nations Economic Commission for Western Asia, Pe   (52).

Table No. (2)

Distribution of Labour Force by Occupation in the Occupied Territories 1976-1978

Economic Branch	West Bank			East Jerusalem			Gaza Strip			Total no. of workers in the Occupied Territories			% Change	
	1976	1977	1978	1976	1977	1978	1976	1977	1978	1976	1977	1978	76-77	77-78
Agriculture (Forestry & Fishing)	36570	35656	36018	923	1052	1001	18112	18238	18674	55605	54946	55693	-1.2	1.36
Industry (Mining & Manufacturing)	21796	22882	23373	4986	5054	5912	11674	11595	13978	38456	39531	43263	2.7	9.00
Construction (Building & Public Work)	27967	25374	27490	2356	2186	2499	16481	16078	17291	46804	43636	47280	-6.8	8.30
Commerce (Restaurants & Hotels)	16998	17511	16600	4063	4703	4476	10546	10512	10908	31607	32726	31984	3.6	-2.30
Transport, Storage & Communications	6702	5935	5578	1472	1408	1369	4407	5324	5494	12581	12667	12441	0.7	-1.80
Public Services	17463	16073	17264	4378	4246	4476	10606	12163	10908	32447	32482	32648	0.1	0.5
Others	4464	5023	5577	1452	1766	2002	3814	4329	4531	9730	11118	12110	14.2	8.90
Total	131700	128300	132800	19630	21020	21735	76300	77300	80800	227230	227120	235335	0	3.60

Source: Ibid, Page (51).

Percentage Distribution of Labour Force by
Occupation in Each Territory

Economic Branch	West Bank			East Jerusalem			Gaza Strip		
	1976	1977	1978	1976	1977	1978	1976	1977	1978
Agriculture	27.7	27.8	27.8	4.7	5.0	4.6	24.0	23.4	21.9
Industry-Mining & Manufacturing	16.6	17.3	17.6	25.4	26.9	27.2	15.3	15.0	17.3
Construction-Building & Public Works	21.3	19.7	20.7	12.0	10.4	11.5	20.8	20.8	21.4
Commerce-Restaurants & Hotels	12.9	13.6	12.5	20.7	22.4	20.6	13.9	13.6	13.5
Transport-Storage & Communications	4.8	4.6	4.2	7.5	6.7	6.3	6.3	6.9	6.8
Public Services	13.3	13.1	13.0	22.3	20.2	20.6	13.9	14.7	13.5
Others	3.4	3.9	4.2	7.4	8.4	9.2	5.0	5.6	5.6

Source: Ibid, Page (50).

2. Per Capita Income:

Per capita income is different for the different parts of the Occupied Territories . It was found to be 7224 shekels for the West Bank in 1980 (or about $1030) and about 4,950 shekels (about $678) for Gaza Strip.

The average per capita income for the Territories was low in 1980 when compared to the average per capita income in Israel. It was 25,785 shekels for the latter or about $3,530 during the same period.

Per capita income differentials between Israel and the Territories made it more difficult for the latter to grow, particularly under occupation and an economy that is experiencing a high rate of inflation, as shown in Table No. (4):

Table No. (4)

Consumer Price Index Over the Period 1975-1980
and By Location Where 1969=100

Year	West Bank	Gaza Strip
1975	367.4	452.7
1976	477.6	588.7
1977	541.8	640.0
1978	612.7	204.9
1979	1029.6	1216.6
1980	2461.0	3115.0

Source: Calculated from Israeli Statistical Abstracts.

B. The Agricultural Sector

The general economy of the Occupied Territories is similar to that in developing economies in which agriculture is an important sector in terms of labor employment (Table No. "3") and contribution to gross national product. Although the share of agricultural sector to GNP is declining it nevertheless continues to be the largest[1].

The major resources in agriculture include labor which was discussed above, and the land, which will be covered in this section. Land utilization under dry farming and irrigation will also be included.

Total land area of the Occupied Territories is 6,105,000 dunams (1,527,000 acres) of which the largest portion is in the West Bank and the rest is in the Gaza Strip.

Table No. (5) shows the distribution by location and the proportion of land under irrigation during 1978/79:

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(1) Declined from 31.6% in 1975 to 23.3% in 1979.
    Source: Table No. (13), Page (23), The Industrial and Economic Trends in the West Bank and Gaza Strip, 1981.

Items	West Bank	Gaza Strip
Total area (000) (acres)	1440	87.0
Cultivable land	404	42.0
Under irrigation	22	25.5
% of irrigated land	5.4	60.1

Source: Alwakae Elzerae Felmanatik El Mohtalah,

Arab Thought Forum 1981, Page (27).

The above table shows that dry farming is dominant in the West Bank while irrigation is the dominant method in the Gaza Strip. Since the potential use of irrigated areas is larger than that of dry farming, the average productivity of land is greater in the Gaza Strip compared to the West Bank.

The difference in the proportion of land under irrigation in both regions shows itself in the level of land utilization. Table No. (6) shows the type of land utilization in each region.

Type of Utiliztion	Total Area	West Bank	Gaza Strip
Field crops	174750	132250	42500
Vegetables & potatos	32775	25275	7500
Citrus	24475	6475	18000
Fruit (excl. citrus)	258150	245750	12750
Others	2725	2650	75
Total	493225	412400	80825

Source: Ibid, Page (28).

The total volume of agricultural products including livestock and livestock products is given in table No. (7):

Items	West Bank	Gaza Strip	Total
Field crops	51.9	—	51.9
Vegetables & potatoes	145.2	61.3	206.5
Melons & pumpkins	19.6	4.3	23.9
Olives	120.0	21.7	141.7
Citrus	75.4	168.1	243.5
Other fruit	89.3	—	89.3
Meat	23.1	52.0	75.1
Milk	36.7	152.0	158.7
Eggs (millions)	44.5	50.0	94.5
Fish	—	1.2	1.2

Source: Statistical Abstract 1981, P. (737).

Some of these products can be stored in cold storage facilities for differing periods, with a range from less than two weeks for cu-
_____ up to six months for potatoes.

Table No. (8) shows the storage period for different agricultural products and at the same time indicates the various types of agricultural products that can be stored in the proposed facilities.

Table No. (8)
Maximum Storage Period For
Various Agricultural Products

Product	Maximum Storage Period
Potatoes	4-6 months
Beans	30 days
Cauliflower	2-3 weeks
Cucumber	10-14 days
Oranges	8-10 weeks
Plums	1-7 weeks
Apples	4-8 months
Peaches	2-4 weeks
Grapes (black)	1-3 months
Dates	3-6 months
Frozen beef	6 months
Poultry meat	6 months
Fish	6 months
Dry onion	6 months

The average seasonal supply of vegetables and fruits is given in table No. (9):

Table No. (9)
Supply of Vegetables and Fruits (Tons)
to the Main Markets in the West Bank

Product	Tons	Product	Tons
Potatoes	8946	Okra	645
Tomatoes	23368	Other vegetables	15830
Cucumbers	12120	Total vegetables	88664
Eggplant	9738	Banana	14346
Peppers	1258	Grapes	38670
Cauliflower	6225	Apples	6474
Cabbage	3123	Plums	774
Dry onion	3986	Dates	275
Carrots	1153	Peaches	877
Peas	131	Pears	1578
Beans	2151	Total fruits	13854

Source: <u>Administered Territories Quarterly</u>,
<u>Statistics 1981</u>, Vo. XI.

Livestock products, consumption and average surplus or deficit for the year 79/80:

Table No. (10)(x)

Livestock Product	Total Product	Consumption	Surplus
Cows meat (ton)	2539	3529	- 990
Cows milk (million L)	15300	21164	-5864
Sheep meat (ton)	2600	3601	-1001
Sheep milk (million L)	14100	14100	--
Goats meat (ton)	8125	425	--
Goats milk (million L)	10000	10000	--
Fish	--	1380	-1380
Poultry meat (ton)	9400	12740	-3340
Poultry eggs (million)	44.5	62.5	-16.0

(x) It is a rough estimation based on total animals slaughtered in the Territories and per capita consumption of meat which was estimated by Abdel-Rahman Arafeh to be 11.3 Kg. per year.

C. The Industrial Sector - General Features

Industry in the West Bank and the Gaza Strip, with a few notable exceptions, consists largely of small scale enterprises which are little more than workshops; some produce the traditional handicrafts of the Territories, such as carpets and wickerwork furniture from Gaza, as well as glass from Hebron.

There are also enterprises which extract construction materials such as stone, gravel and marble.

The composition of the industrial sector in the Territories is the same today as it was before the 1967 war. An exception to the pre 1967 situation was introduction of subcontracting with Israel firms, particularly in the clothing industry. The main characteristics of the industrial sector in the West Bank and Gaza Strip has been the absence of substantial new industrial developments; most industrial production focusses on processing primary goods such as food, beverages, tobacco, textiles and clothing.

After the 1967 war the economy of the Territories was geared to complement the Israeli economy; thus its development has been determined by the needs of the Israeli economy. Since 1967, therefore, the policy has been to keep the West Bank and the Gaza Strip as markets for Israeli products, and as suppliers of cheap labor for Israel. Today it is a well known fact that the two Territories are the second largest market places for Israeli products after the United States. Labor exported from the Territories to Israel has reached one third of the total labor force of the Territories. More than 65,000 workers commute daily from the villages and cities of the Territories to work in Israel. Most of these workers are engaged in agriculture and construction.

Section Two

The Cost

An initial investment was made including the purchase of the land, site preparation, construction of the wholesale and retail stores and about 40% of the construction work on the cold storage facility. The share of the cold storage facilities in the initial investments was estimated on basis of its share in the total area constructed. This ratio was found to be 9%. Based on this the cold storage share in the road and land is given below:

Item	Total Cost ($)	The Cold Storage Share ($)
Land	100,000	9,000
Road	165,000	15,000
	265,000	24,000

In addition to the cost of land rent and road construction, approximately $105,000 has already been expended by the municipality for basic construction, and the remaining $70,000 will be expended at a later time, after final orders have been placed for speciefied items of the cold storage equipment.

The initial investment in constructing the 40% of the cold storage unit will not be included in the analysis because it has already been expended and there is no way to reverse the decision. It is therefore a sunk cost which does not affect the decision whether to participate in the additional cost of a cold storage unit or not.

The question to be investigated at this point is whether CDF should contribute toward further investment in the project, the answer to which depends on the estimated additional cost and on the expected benefit.

Kinds of Cost and Their Estimation

The major cost categories considered in this report are as follows:

A. Capital Costs

Those costs which are incurred by the municipality of Bethlehem in order to construct the project and install the needed equipment.

B. Operational Costs

Those costs which are incurred by the municipality of Bethlehem to operate the project thrghout its economic life.

C. Associated Costs

Those costs which must be incurred by the municipality of Bethlehem before the full scale of the anticipated benefits are realized. In the present case, it **primarily** includes cost for road construction to connect the project with the Hebron-Jerusalem main road.

D. Secondary or Indirect Costs

Those costs involved in making possible the gain of secondary and induced benefits, such as the establishment of new industries which will make use of the proposed project. No attempt was made to estimate these costs, since it is difficult to predict the nature and level of induced benefits.

E. Intangible Costs and Immeasurable Costs

Those include values that are not measured in the market, such as customer **convenience**, reduced pollution, improved traffic flow etc. since it is not possible at the moment to make the needed evaluation of these variables, they are excluded from the analysis. The analysis which follows is therefore limited to the first two items, i.e capital cost and operational costs.

A. Capital Cost

The tendency is to view capital acquired by a public authority through its taxing power as free capital, but this is not true because public money is not different from private money.

The investment opportunities personally available to the taxpayers serve as the basic guide to the cost of capital to the public. An example of this type of investment opportunity in the administration in the Bethlehem municipality is the rate of return on government bonds available for reinvestment by municipality. In present case, however, the capital is provided as a grant from other sources than the municipality's standard source of income.

Since the proposed grant of $500,000 which is to be provided for this specific purpose does not require payments of interest or principal to the donors, the contributed capital can be regarded as having zero opportunity cost. For the purpose of calculating capital recovery, therefore, the investment may be discounted at a minimum rate of interest, such as the 1% rate used below.

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Since the needed pieces of equipment have differing economic life and salvage value, they were treated separately (see Table No. 11). The major item to be purchased with CDF assistance is the compressor, with an economic life of 15 years. Based on this and other factors the life of the project will be expanded for two periods, with a replacement for the compressor during the 16th year of the project. At the end of this period the salvage value of each item has been estimated and its present worth will be added to total income.

Annual Cost

Annual costs are made of two components and they are:

1. Annual Capital Costs

Annual capital cost for each item will be calculated according to the following formula:

$$\text{Annual capital cost} = (P-L)(A/P)n^i + Li \quad (x)$$

where

i = The interest rate, set at 1% below.

n = The economic life of the item.

L = The salvage value of the item at the end of its economic life.

Li = The annual interest on the salvage value of the item during its work, calculated by multiplying the salvage value times the interest rate.

P = The initial cost of the item at the beginning of the project.

$(A/P)n^i$ = The capital recovery co-efficient for investment (P) and interest rate (i) over the (n) years.

Table No. (11) gives a summary of the above information concerning each component of the project.

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(x) Managerial and Engineering Economy by George Taylor, 3rd edition, 1980 published by D. Van Nostrand Company, 135 West South street, New York, N.Y. 10020, pp. (78-79).

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Information on Economic Life Cost and Salvage Value

Item	P $(000)	L $(000)	P-L $(000)	n	$(A/P)^n_i$ (%)	Li $	Sub total $	Annual cost for the Item
1.The compressor set								
a. compressor	320	2	318	15	0.07212	20	22934	
b. condenser	100	50	50	30	0.03875	500	2438	
c. evaporator	150	75	75	30	0.03875	750	3656	29028
2.Standby generator	125	70	75	30	0.03705	700	3539	3539
3.Insulation	180	0	180	48	0.02633	0	4739	4739
4.Electrical work control	40	0	40	48	0.02633	0.	1053	1053
5.Piping and drainage	25	0	25	30	0.03785	0	946	946
6.Electrical connections	18	0	18	30	0.03785	0	681	681
7.Office equipment	2.5	0	2.5	8	0.13069	0	327	327
8.Mechanical erection charger	45	20	25	48	0.02633	250	1158	1158
9.Fork lofter	15	5	10	12	0.08885	50	939	939
Total annual cost or capital recovery								42410

(x) Taylor, Ibid, page (490).

2. Annual Operational Costs

Operational costs include the following items:

Item	($)
Management	6,600
Accountant	4,800
Labor (4 workers x $2160 annually for each)	8,640
Insurance and fringe benefits - Estimated by the municipality at 18.5% of total wages	3,707
Power consumption	20,500
Maintenance and insurance	6,000
Utilities	1,800
Total operational cost	52,047

Total annual cost = 1+2 above = 42410+52047 =   94,457

Assuming that 90% of the total capacity of 500 tons i.e 450 tons will be utilized during the period 1984 - 1985, then average cost/ton/month

$$\text{month} = \frac{94457}{(12 \text{ months})450 \text{ tons}} = \$17.5/\text{ton/month}.$$

For the year 1983, where utilization of the facilities is expected on June 1983, the annual cost will be half of the above total and equal $\frac{94457}{2}$ = $47,228 and the expected level of utilization is about 50% of its capacity i.e 1500 tons. In 1984 and following years, the operational cost will be as given in the prodected income and expenditure statement.

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Benefits and Benefits Estimation

Kinds of Benefits

In any project, private or public, there are various types of
benefits that can be presented under the following categories:

A. Primary or Direct Benefits

These are gains which accrue to those people who make direct use
of the project. This includes proceeds from renting the storage
units. The estimated proceeds are equivalent to storage cost/ton/
month which was found to be $17.50 in 1982. Allowing it to increase
by 2% annually over the economic life of the project, the rent in
1983 will be $17.85. Total value of these proceeds was estimated
on the assumption that the utilization rate will be 50% in 1983,
and 80% in 1984 and will continue to rise by 5% each year there-
after, until reaching 95% in 1987. This level of 95% is assumed
to remain constant over the economic life of the project.

B. Indirect Benefits

There are two types of indirect benefits:

1. Short Term Storage

Benefits to wholesalers who can use the storage facilities to
store surplus vegetables, fruits or meat for a short period is
very important, particularly during surplus seasons or during
crises. Many wholesalers who have been interviewed emphasize
that they make use of the facilities not just to realize profit
but equally important to minimize losses which would otherwise
result.

The value of this item was estimated on the assumption that 100 tons of agricultural product goes into the market daily, and that at least 0.2% is spoiled because of limited storage facilities. Assuming 300 market days per year, the quantity saved in the first year is equal to $(100)\frac{.20}{100}(300)=60$ tons, value saved in dollars = (60)(Average price of all products).

Based on the consumer price index for the year 1982 it was found that the average prices for vegetables and fruits is about \$520/ ton. Thus the value of saved products = (60)520 = \$31,200. This value will be allowed to increase by 2% annually, to reflect the increase in total supply as a result of population growth and rising standard of living. Thus the saved value in 1983 = (31200)(1.02) = \$31,824.

2. Seasonal Storage

This includes benefits accruing to wholesalers who use the facili- ties to store fruits and vegetables during the low price seasons and to sell them when prices are higher.

For the purpose of estimation, the following table was constructed to show the change of prices for certain products and the expected average increase in prices:

Prices of Selected Agricultural Products at
Different Months During the year

Item	Lowest prices		Highest prices		Months of storage	Value added per kg.
	Month	Prices in dollar (x)	Month	Prices in dollar (x)		
Dry onion	6	0.26	2	0.73	8	0.47
Potatoes	4	0.44	12	0.73	8	0.13
Apple-Grand	8	0.67	12	0.87	4	0.20
Apple-Jonathan	9	0.76	12	0.86	3	0.10
Average value/ kg.		0.52		0.75		0.23

(x) Source: Consumer price index, prices were given by I.S. but
translated to $ at the current rate of exchange.

It can be seen from Table No. (12) that the average storage period
is about six months, and the average value added during that period
is $0.23/kg. or $230/metric ton.

Based on this and on the assumption that 100 tons of vegetables and
fruits can be stored every year, the estimated total value added
in 1982 will be $23,000 and the storage cost for the users during
6 months in 1983 will be equal to $10,710. This will leave the net
value added at $12,290 annually, which is assumed to be constant
over the period 1983-2012 because the rise in prices will be off-
set by the rise of storage cost per ton per month. Table No. (13)
will summarize the total direct and indirect benefits over the
same period.

Gross Benefits Over the Period 1983-2012

($)

Year	Direct Benefits	Indirect Benefits		Gross Benefits
		Saving From Damages	Net Value added for Stored Items	
1983	53550	31824	12290	97664
1984	87394	32460	12290	131508
1985	94713	33109	12290	140112
1986	103275	33771	12290	149336
1987	111267	34446	12290	158003
1988	113431	35135	12290	160856
1989	115700	35938	12290	163928
1990	118014	36555	12290	166859
1991	120374	37286	12290	169950
1992	122781	38032	12290	173103
1993	125237	38793	12290	176320
1994	127742	39599	12290	179631
1995	130296	40391	12290	182977
1996	132904	41199	12290	186393
1997	135560	42023	12290	189873
1998	138272	42863	12290	193425
1999	141038	43720	12290	197048
2000	143858	44594	12290	200747
2001	146736	45486	12290	204512
2002	149670	46396	12290	208356
2003	152664	47324	12290	212273
2004	155716	48270	12290	216276
2005	158831	49235	12290	220356
2006	162007	50220	12290	224517
2007	165247	51224	12290	228761
2008	168552	52248	12290	233090
2009	171923	53293	12290	237506
2010	175362	54359	12290	242011
2011	178864	55446	12290	246600
2012	182447	56555	12290	251292

C. Induced Benefits

Those are benefits which are realized by other individuals and communities as a result of economic activities stimulated by the implementation of the project. For example: the existence of cold storage facilities may encourage the establishment of a dairy industry to make use of the sheep and goat milk for the production of local chees and **yogurt** products (called labaneh locally). Storing these products throughout the year will replace the existing practice whereby individuals buy all the needed supply during the season and store it at home.

D. Intangible Benefits

These are benefits or services that are not measured in the market and do not give themselves easily for measurement. Examples of these benefits are given below:

1. Pollution Control in the City

The shift of the small old market from the city centre to location outside the city will reduce pollution created by the heavy traffic movement to the old market, and will also present the accumulation of waste vegetables and other agricultural products.

2. Reduction of Traffic Congestion

The reduction in the number of vehicles in the old market area would save time for shoppers who visit the city centre.

3. Economic Potential of Old Market

The potential use of the old market for other economic activities. It is estimated that the value of the old market site is about $150,000, but since the municipality has not made detailed or definite plans for the use of this area, this item will not be estimated at the present.

Some of the above items can be quantified under certain assumptions, but it is considered sufficient for our purpose to indicate their nature and importance.

Although induced and intangible benefits are important factors in considering the total benefit of the proposed project, values are not calculated or assigned to them in the present study. It should be noted, however, that these represent positive net benefits and add considerably to the net benefit of the project.

Project analysis covers two aspects: financial analysis, which is the subject of this section, and economic analysis, which will be discussed in the following section.

Financial analysis will be applied here to determine the financial viability of the project, and concerns the return on the equity capital contributed to the municipality by different sources, as well as the financial requirements needed to finance all stages of the project.

The objectives of the analysis are:

1. To insure that there are adequate incentives for the municipality of Bethlehem to undertake the project.

2. To provide a sound financing plan for the project.

3. To determine whether the financial requirements of the participants (or contributers) to the project are properly coordinated. This determination is made on the basis of an overall financial projection of the cold storage facility as a whole.

In assessing current and future financial positions, financial analysis relies on three main types of financial statements, namely:

A. Income and expenditure statements.

B. Balance sheets.

C. Sources and applications of funds statements.

The above statements will be presented and discussed in the same order.

A. The Income and Expenditure Statements

This is also known as the profit and loss statement. It summarizes the financial results of the operation in periods of one year.

It is concerned with the proceeds and recurrent costs to determine the profit or loss for a given year, through the projection of the accounts during the coming 30 years, starting with 1983.

The prime questions are whether the project can cover its expenses and still realize a profit, and whether the projection of the income and expenditure statements indicate it will continue to profit the future.

Since the project is still at the preparation stage, we are going to assess its profitability during its economic life for a period of thirty years.

This assessment uses ratios to help form sound judgements, which can be made through looking at:

1. The annual return on the net fixed assets in operation.
2. The ratio of net profits to total revenue received from renting the storage units.

The projected income and expenditure statement of the project is given in Table No. (14):

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Items \ Years	1982	1983	1984	1985	1986	1987	1988
1 Proceeds (1)	—	26775	87394	94713	103275	111207	113431
2 Personnel Expenditures (wages)	—	11874	23747	24223	24647	25201	25705
a- Management	—	3300	6600	6732	6866	7004	7144
b- Employees	—	2400	4800	4896	4944	5094	5196
c- Workers	—	4320	8640	8813	8989	9169	9352
d- 18.5% additional costs	—	1854	3707	3782	3848	3934	4013
3 Maintenance	—	3000	6000	6000	6000	6000	6000
4 Power Consumption	—	10250	16400	17425	18450	19475	20500 (2
5 Sub total = 2+3+4	—	25124	46147	47648	49097	50676	52205
6 Contengencies 10%	—	2512	4615	4765	4910	5068	5220
7 Total operating expenditure 7 = 5+6	—	27636	50762	52413	54007	55744	57425
8 Net profit before depreciation 8 = 1-7	—	-861	36632	42300	49258	55453	56006
9 Less Capital Recovery – depreciation	—	21205	42410	42410	42410	42410	42410
10 Net Profit 10 = 8-9	—	-22066	-5773	-110	6848	13043	13596

(1) were found on the assumption that utilization capacity in 1983=50%, 198
1985 = 85% , 1986 = 90% , 1987 = 95%, and this will stay at 95% during the project
economic life. The rent/ton/month equal average cost = 17.85% expected to increase
2% annually.

(2) Power consumption is assumed to increase by 2% annually to cover unexpected changes
in production on cost.

Proceeds shown in the table are estimated on the following basis:

Average proceeds per ton are estimated to be $17.5/ton/month. This figure, which is based on the average storage cost for both the freezer and the refrigeration section is comparable to Jordanian and Israeli rates. This rate per ton is expected to rise by 2% annually over the economic life of the project.

It can be seen from Table No. (14) that the project will reach its breakeven point at the end of 1985. Starting in 1986 the profit margin (net profits over proceeds) and return on fixed assets (net profit over net fixed assets) are positive.

After reaching the breakeven point in 1986, the project is expected to operate on a profitable basis and to show an increase in profit margin at a constant rate which is expected to be 2% for each of three consecutive years untill it reaches 28% in the year 2012, as shown in Table No. (15).

The profitability of the project is also reflected in the return on fixed assets which is expected to increase from 0.62% in 1986 to 3.55% at the end of the year 2012 as shown in Table No. (15). The year 2012 is the end of the projects economic life, which means that the project is not expected to operate beyond this year unless most of its equipment is replaced.

Profit Margin and Return on Fixed Assets

Period	Profit Margin "%"(1)	Return on Fixed Assets "%"(2)
1983	-32	-2.00
1984	-3.6	-0.52
1986	6.6	0.62
1987	12	1.18
1990	14	1.46
1993	16	1.82
1996	18	2.17
1999	20	1.99
2012	28	3.52

(1) Calculated from table No. (14).
(2) Calculated from table No. (14) and table No. (16).

B. Balance Sheet

Critical examination of the projected balance sheets for the
project implementation period is essential for forming a judgement
about the capital structure of the project entity.

Usually the financial analyst will consider a number of different
questions, such as the debt equity ratio, the relationship of total
debt to the equity holding, and other related questions. But in our
case, since the finance of the project will be through contributions,
the previous questions will be irrelevant. Instead of these questions
the analysis will concentrate on the following aspects:

Item	1982	1983	1984	1985	1986	1987	1988
Assets:							
1- Cash	---	---	---	28851	78109	133562	189568
Building	50000	70000	70000	70000	70000	70000	70000
Equipment	600000	1020000	1020000	1020000	1020000	1020000	1020000
Road Construction	10000	15000	15000	15000	15000	15000	15000
2- Total Fixed Assets	660000	1105000	1105000	1105000	1105000	1105000	1105000
- Depreciation	---	-21205	-63615	-106025	-148435	-190845	-233255
3- Net Fixed Assets	660000	1083795	1041385	998975	956565	914155	871745
Total Assets 1+3	660000	1083795	1041385	1027826	1034674	1047717	1061313
Liabilities:							
1- Equity	9000	9000	9000	9000	9000	9000	9000
2- Contribution	500000 (x)	1020000	1020000	1020000	1020000	1020000	1020000
3- Accumulated Profit	---	4709	-1064	-1174	5674	18717	32313
4- Financial Needs	151000	50086	13449	---	---	---	---
Total Liabilities	660000	1083795	1041385	1027826	1034674	1047717	1061313

(x) This is the initial contribution of the CDF to the project.

1. Liquidity of the Project

The project is expected to suffer a shortage of cash during the
first three years, starting in 1982 as shown in the table, and the
municipality should try to find a source to finance or cover
these financial needs. Starting in 1985 the project is expected
to have a surplus of cash increasing over time so it is
expected to have good liquidity over the remaining years.
The municipality could benefit from this surplus in cash by
investing in opportunities, which will provide a guaranteed and
reasonably high rate of return.

2. The Efficiency of the Project

To measure the efficiency of the project we use the following
ratios:

a. Total assets turnover:

This ratio measures the amount of proceeds which are generated
by one dollar of investment, and it is given by the ratio:

$$\frac{\text{Total proceeds}}{\text{Total assets}}$$

b. Fixed assets turnover:

This ratio measures the amount of proceeds which are generated
by one dollar invested in fixed assets, and it is given by the
ratio:

$$\frac{\text{Total proceeds}}{\text{Total fixed assets}}$$

Table No. (17) shows both ratios for selected years during the
economic life of the project:

Some Effeciency Ratios of the Project

Period	Total Assets Turnover (%)	Total Fixed Assets Turnover (%)
1983	2.50	2.40
1986	9.98	9.34
1989	10.75	10.47
1992	10.88	11.08
1995	10.92	11.60
1998	10.88	9.56
2001	10.77	10.15
2004	10.61	10.77
2007	10.40	11.29
2010	10.16	11.99
2012	9.98	12.47

Table No. (17) shows that:

The project is expected to generate a good return on investment starting in 1983. The turnover of the assets increases from 9.98% in 1986 to 10.92% in 1995. The decline in total assets turnover during the 1998-2012 period can be attributed to the replacement of the compressor in 1997 and the accumulated cash which has not been reinvested in the project itself.

Fixed assets turnover shows an increase until 1996, then starts to decrease in 1997 (due to the replacement of the compressor) and then begins to increase again thereafter.

3. Leverage of the Project

The project is not expected to depend upon debt in financing any part of its assets.

4. Equity Ratios

The project is expected to depend mainly upon contributions for financing. Equity has a minor role in financing, but while the project is operating, all of the profit will be retained in the project for re-investment opportunities.

C. Sources and Application of Funds Statement

The sources and applications of funds statements take into account all cash flows in and out for both the recurrent and the capital accounts. The starting point is the net profit or loss from the income and expenditure statement which must be adjusted for non-cash items such as depreciation. It will incorporate all capital expenditures and the cash surplus over the project development period. Table No. (18) gives the sources and applications of funds for the proposed project during the 1983-2012 period and shows the following:

1. The main sources of financing the project are expected to be from the contribution and equity in the first two years. These sources are expected to finance the building, equipment and road construction. After this stage, the project is expected to depend mainly upon cash flow its main sources of finance. Surpluses are expected, but there are no plans for investing these surpluses.

2. The surplus of cash is increasing at a rapid rate, this is due
   to the lack of investment opportunities.

3. The table indicates the amount of cash needed at the first stages
   of establishing the project, as well as its expected surplus of
   cash in later stages. The municipality is therefore expected to
   find sources of financing the project at the initial stages
   equal to the amounts shown in the table and in the balance sheet
   statement. It is also advised to utilize the idle cash which is
   expected to accumulate over time.

Items \ Years	1982	1983	1984	1985	1986	1987	1988	1989
Sources								
1- Net Profit	—	-22066	-5773	-110	6848	13043	13596	14851
2- Capital Recovery	—	21205	42410	42410	42410	42410	42410	42410
3- Change in Cash(a)	—	—	—	—	2076	51334	106787	162793
4- Cash Income 1+2+3	—	-861	36637	42300	51334	106787	162793	220054
5- Equity	9000	—	—	—	—	—	—	—
6- Contribution	500000	520000	—	—	—	—	—	—
7- Total Sources	509000	519139	36637	42300	51334	106787	162793	220054
Applications								
1- Change in Cash(b)	—	151000	76861	40224	—	—	—	—
2- Building	50000	20000	—	—	—	—	—	—
3- Equipment	600000	420000	—	—	—	—	—	—
4- Road Construction	10000	5000	—	—	—	—	—	—
5- Total Applications	660000	596000	76861	40224	—	—	—	—
Cash Surplus (Deficit)	-151000	-76861	-40224	2076	51334	106787	162793	220054

(a) from cash surplus in the previous year.

(b) from cash deficits last year also it includes the salvage value of
the tractor in 1994 and 2006 + the compressor in 1997.

Section Five
Economic Analysis

Economic analysis is different from financial analysis in that
financial analysis is concerned with a return to the equity capital
for the individual contributer or participant, whereas in economic
analysis we are concerned in the total return, productivity or
profitability to the whole society or economy of all the resources
committed to the project, regardless of who in the society receives
the benefits. It is the social or economic return of the project
which can be determined through the application of economic analysis.

Economic analysis of a project does not give any indication of income
distribution, and is neutral as well to capital ownership. Also, since
economic analysis does not specify who in the economy is to receive
the income which our project earns, it is also neutral to who owns the
capital. Economic measures of the project worth are valid to help
choose the best alternative from the social standpoint, whether
the capital comes from public revenues or from private sources,
from income taxes or other sources, and whether the project is to
be in the public sector or to be operated by individuals on their
own behalf.

The function of project analysis is not to replace the judgment of
the community leaders, rather it is to provide one more tool by
which judgment can be sharpened and the likelihood of error narr-
owed. Economic and financial analysis provides a framework within
which all aspects of a proposed project can be evaluated in a co-
ordinated systematic manner.

The motive for making economic analysis is maximization of total net benefit. **All** computations are designed to indicate which alternative, from a set of alternatives, contributes the maximum net profit at a certain time value of money. The general statement of philosophy is that no expenditure is justified unless it can be viewed as an acceptable investment.

A major difference between public and private enterprises is that private enterprises benefits only those who make expenditure, whereas public enterprises benefit many other persons. The whole project at hand (the market for the wholesalers, retailers and cold storage section) is a public project intended to provide services needed by the population of the Occupied Territories.
Proposals for public projects generally outline the benefits to be provided for public by the proposed expenditure.
Once the economic costs and benefits of a project have been identified and measured, the next step is to compare them in order to determine the net economic benefit, i.e. the excess of benefits over costs, from the standpoint of the economy. Techniques have been developed for expressing profitability in terms of a single number or index. Two of the most commonly used indices of profitability or investment worth are benefit-cost ratio and the internal rate of return, both of which are calculated below:

A. Cost Benefit Analysis

Cost-Benefit Analysis is a way of setting out the factors which need to be taken into account while making certain economic choices, mostly involving investment projects and decisions. As choice

involves maximization we have to discuss what it is that decision makers want to maximize. The general formulation is that we want to maximize the present value of the difference between all cost and all benefits, subject to special constraints.

Although this formulation is very general, it at least enables us to set out a series of questions, which constitute the general principles of cost-benefit analysis. These questions are related to:

1. Which costs and benefits to be included?
2. How they are to be valued?
3. At what interest rate are they to be discounted?

Since the first two questions were answered in the previous sections, **only the third question needs to the addressed below.**

Choice of interest rates for the design and evaluation of public projects is the most difficult economic problem and yet one of the most important ones faced in this field.

In our search for the optimal rate of interest to be adopted, some of these are:

a. The interest rate of Jordanian government bonds.
b. The rate of return on private investment.
c. The opportunity cost of capital.

Each of these rates, however, is variable, dependent upon institutional factors, subject to fluctuating exchange rates, and in the Israeli Shekels linked to a high rate of inflation. It is therefore difficult to select a single meaningful rate of interest for the purpose of comparative calculation.

These three methods were rejected because it was found that the
interest rate of 5% and over in cost-benefit analysis would preclude
the justification of most projects. The high capital intensity and
the long economic life of public projects make interest costs a
larger part of total cost than in most other fields of investment.

Since investments in this project will be provided in the form of
grants, it is a conditional contribution and its opportunity cost
in any other alternative is zero, and the city has the choice of
accepting or rejecting the grants and investing in the project. Use
of a low interest rate can be justified on the grounds that most
private investment decisions contain an inherent bias toward short-
lived projects. The use of pay off periods (capital recovery in the
financial analysis) is a private investment criteria, that on the
one hand serves as an adjustment to reflect the risk of durable
investments, but on the other hand produces a systematic under-
development of areas of investment. In some of these areas tech-
nology happens to call for long-life projects. Were the public
authority to specifically follow private practice blindly it would
overlook the very opportunities which are most suited for public
development.

Taking all the above into consideration, the one percent rate of
interest was taken to discount the streams of benefits and costs
created by the project.

Table No. (19) shows the present value of the costs and benefits of
the project and shows that B/C ratio equals 4983905/3102207 = 1.6.

Table No. (19)

The Stream of Costs and Benefits "Present Worth"
Over the Period 1982-2012

Actual	Code	Projected Costs ($)					Salvage Value During the Year
		Building & Equipment & Road	Operation & Maintenance	Gross Costs	Discount Factor (1%)	Present Worth	
1982	0	660000	--	660000	0.9901	653466	--
1983	1	447000	27536	474536	0.9803	465286	--
1984	2	--	50762	50762	0.9706	49270	--
1985	3	--	52413	52413	0.9610	50369	--
1986	4	--	54007	54007	0.9515	51386	--
1987	5	--	55744	55744	0.9420	52511	--
1988	6	--	57425	57425	0.9327	53560	--
1989	7	--	58439	57991	0.9235	53555	--
1990	8	2500	59470	61979	0.9143	56667	--
1991	9	--	60536	60536	0.9053	54803	--
1992	10	--	61615	61615	0.8963	55226	--
1993	11	--	62714	62714	0.8874	55652	--
1994	12	15000	63837	78837	0.8787	69274	5000
1995	13	--	64983	64983	0.8700	56535	--
1996	14	--	66148	66148	0.8613	56974	--
1997	15	320000	67341	387341	0.8528	330324	2000
1998	16	2500	68555	71055	0.8444	59999	--
1999	17	--	69795	69795	0.8360	58349	--
2000	18	--	71059	71059	0.8277	58816	--
2001	19	--	72347	72347	0.8195	59288	--
2002	20	--	73663	73663	0.8114	59770	--
2003	21	--	75444	75444	0.8034	60612	--
2004	22	--	76372	76372	0.7954	60746	--
2005	23	--	77768	77768	0.7876	61250	--
2006	24	17500	79191	96691	0.7798	75400	5000
2007	25	--	80642	80642	0.7720	62256	--
2008	26	--	82124	82124	0.7644	62776	--
2009	27	--	83634	83634	0.7569	63303	--
2010	28	--	85173	85173	0.7693	65524	--
2011	29	--	86746	86746	0.7419	64357	--
2012	30	--	88349	88349	0.7396	64901	--
Total		1464500				3102207	222000

project life =

Estimation of the Internal Rate of Return

Year	Proceeds ($)	Cost ($)	Net Income ($)	Present Worth of Net Income at 2%dis.	Present Worth of Net Income at 3%dis.
1982	--	660000	-660000	-647057	-640774
1983	53550	474636	-421086	-404735	-396916
1984	87394	50762	36632	34519	33523
1985	94713	52413	42300	39079	37583
1986	103275	54007	49268	44624	42499
1987	111267	55744	55523	49303	46499
1988	113431	57425	56006	48757	45538
1989	115700	57991	57709	49254	45556
1990	118014	61979	56035	46888	42946
1991	120374	60536	59838	49088	44525
1992	122781	61615	61166	49193	44188
1993	125237	62714	62523	49399	43852
1994	127942	18837	49105	37960	33438
1995	130296	64983	65313	49495	43180
1996	132904	66149	66755	49600	42847
1997	135360	387341	-251981	-183556	-157027
1998	138277	71055	59222	42294	35830
1999	141038	69795	71243	49881	41847
2000	143458	71059	72399	49697	41288
2001	146736	72347	74389	50062	41188
2002	149670	73663	76007	50148	40858
2003	152664	75444	77220	49949	40300
2004	155716	76372	79344	50317	40203
2005	158831	77768	81063	50398	39877
2006	162007	96691	65316	39812	31196
2007	165247	80642	84605	50558	39230
2008	168552	82124	86428	50635	38699
2009	171923	83634	88289	50711	38559
2010	175562	85373	90189	50746	38271
2011	178864	86746	92118	50855	37952
2012	182447	88349	94098	50931	37958
Salvage Value			222000	120158	88798
Total				269262	23751

Conclusion and Recommendations

Based on the previous financial and economic analysis of the cold storage project, we feel confident that the project is justifiable.

Cost-benefit ratio is reasonally high, 1.6:1, and the expected internal rate of return is above 3%. Although this rate of internal return is low for private investment, we believe that it is acceptable for a public investment where profit is not the only criteria. The project contribution to the social welfare of the community through pollution control, reduction of urban congestion in the city centre are very important factors and can be fully appreciated only by those who visit the old market site in the city centre. The potential utilization of presently used market centre for more productive uses, and the rate of return on cash surpluses reinvested in the project or in other investment opportunities is also quite significant.

Cash flow surpluses are expected to accumulate on account of capital recovery. It is our advice that the Bethlehem municipality should consider or look for short term investment opportunities to make full utilization of the surplus cash above what is needed for capital replacement in any given year.