## 6.6.2 Electricity Distribution and Supply System

620      Electricity to IIE will be received from one of the Two
Ring Main Cables of 11 kV which will be installed parallel to the
Boundary Ring Road (see paragraph 428). Since utilized voltage of small
and medium scale factories in Jordan is set to be 400 V/230 V, trans-
formers of 11 kV/0.4 kV will be provided in IIE and distribution voltage
is planned to be 400 V.

## 6.7 Telecommunication System in IIE

### 6.7.1 Estimation of Telephone Demand

621      As it was stated in section 4.3, the main telephone cable of
containing 600 lines has been already installed up to the existing
industrial area. Three hundreds out of 600 lines are scheduled for
the use of 350 factories in the existing industrial area, that gives
unit value of telephone demand to be 0.86 lines per factory. Meanwhile,
the unit values employed in the Amman Industrial Estate are one DEL
(Direct Exchange Line) per factory as minimum requirement and five
DEL per factory as maximum requirement.

622      Based upon the figures indicated above, telephone demand of
IIE is estimated to be about 500 lines as below:

   i)   Number of factories in IIE is 325 factories.

   ii)  Assuming that unit value of telephone demand is one
        DEL per factory, telephone demand of factories becomes
        to be 325 lines.

   iii) Assuming that unit value of telephone demand for
        administrative and supporting facilities is 0.02 lines/m$^2$,
        it becomes to be 70 lines.

        $$3,500 \text{ m}^2 \times 0.02 \text{ lines/m}^2 = 70 \text{ lines}$$

   iv)  The total telephone demand becomes to be about 400 lines
        by summing up items ii) and iii) above.

   v)   However, it is expected that telephone demand will
        increase as each factory expands its productive activities,
        and it is desirable to keep extra telephone lines in
        reserve. Therefore, unit value of telephone demand for
        Custom Built Factories is assumed to be two DEL per
        factory, and the resulted estimate of telephone demand
        becomes to be about 500 lines.

## 6.7.2  Telephone System in IIE

623       Since the minimum requirement to install exchange station is
set to be 1,000 telephone lines, PBX (private branch exchange) facilities
are quite often used to handle telephone lines less than 1,000.  However,
the estimated telephone demand of IIE is not enough to justify an
installation of PBX facility.  Moreover, it requires several operators
and running costs of which may be necessarily borne by management
organization of IIE.  Hence, an introduction of PBX to IIE is considered
to be inefficient.

624       In view of the telephone demand of IIE and the on-going
telecommunication improvement project in the Municipality (see paragraph
432), the Study Team recommends to extend trunk transmission equipment
to the site of IIE as a part of the on-going improvement project.

625       Within the site of IIE, five terminal equipment of 100
telephone lines shall be provided with an appropriate customer groups
and the cost of installing these equipment is assumed to be borne by
the Telecommunication Corporation.

## 6.8  Solid Waste Disposal of IIE

### 6.8.1  Estimation of Generated Solid Waste of IIE

626       Table 6.4 below indicates unit values of generated solid waste
per worker by types of industries which are derived from the Japanese
experience.

Table 6.4    Solid Waste Disposal per Worker
by Types of Industries

| Industries | t/worker/year |
|---|---|
| Agriculture Oriented Industries | 2.6 |
| Wooden Products and Furnitures | 5.4 |
| Metal Works and Machines | 95.4 |
| Non-Metallic Mineral Products, etc. | 20.9 |
| Plastic Products, etc. | 43.2 |
| Average | 20.0 |

Source:  Study Team.

627      If the unit value of metal works and machines industry is
employed, the maximum amount of generated solid waste becomes to be
267,000 tons/year, while if the average value is used, the amount of
generated waste becomes to be 56,000 tons/year.  Taking into account
that IIE is designed mainly for small  and medium scale industries,
there seems to be very few factories which generate large amount of
solid waste.  Hence, the amount of generated solid waste of IIE is
assumed to be 100,000 tons/year.


## 6.8.2  Disposal of Solid Waste Generated by IIE

628      As it was mentioned in section 4.9, the Municipality is
currently constructing a sanitary landfill which becomes available in
the middle of 1981 together with the improved collection system operated
by the Municipality.  Therefore, it is reasonable to use this landfill
site for disposal of solid waste generated in IIE.

629      Several places in the site of IIE should be designated as
dump yards to which each individual factory brings its own solid waste
and the collection and transportation of solid waste from these points
to the landfill site is assumed to be undertaken by the Municipality.

CHAPTER    VII

ESTIMATION  OF  DEVELOPMENT  COST  AND
        IMPLEMENTATION  SCHEDULE

## ESTIMATION OF DEVELOPMENT COST AND
## IMPLEMENTATION SCHEDULE

## 7.1  Development Costs of IIE

### 7.1.1  Share of Development Cost

701       Among development costs of IIE, it was suggested by the
Counterpart Committee that 50 percent of the cost of electricity supply
facilities such as installation of transformers and distribution network
shall be borne by IDA.  Also 50 percent of the cost of telecommunication
facilities except connection line and telephone sets was suggested to be
borne by IDA.  Land which is required for installation of these
facilities shall be provided by Irbid Development Authority (IDA) which
will be fully explained in the next Chapter.

702       In principle, other development costs shall be borne by IDA.
However, development costs of outer utility facilities are assumed to
be borne by relevant governmental agencies.

703.       Table 7.1 indicates financier, developer, owner and charge
collecter of utility facilities in IIE.

### 7.1.2  Unit Cost of Construction

704       Unit costs of construction materials used in the cost estima-
tion of IIE were derived from various sources such as Amman Industrial
Estate, Ministry of Public Works and Water Supply Corporation.  All
prices are expressed in terms of 1980 prices.  Tables 7.2 and 7.3
indicate unit costs of major construction materials and labor costs
respectively.

705       The cost of land acquisition was estimated based on the land
price indicated by the Committee for Land Assessment of Irbid.

Table 7.1  Cost Bearer of Utility Facilities in IIE

| | Development | | Operation/Maintenance | |
|---|---|---|---|---|
| | Financier | Developer | Owner | Charge Collector |
| **(1) Roads** | | | | |
| - Roads | IDA | IDA | Transferred to Municipality w/o charge | Municipality |
| - Storm Drainage | | | | |
| - Street Light | | | | |
| **(2) Sewer** | | | | |
| - Sewerage Pipes | IDA | IDA | Same as above | No charge |
| - Pumps | IDA | IDA | Same as above | No charge |
| **(3) Water Supply** | | | | |
| - Common Water Reservoir in IIE | IDA | IDA | IDA | Municipality |
| - Distribution Pipe under Roads | IDA | IDA | IDA | None |
| - Pipe on Factory Sites | IDA | IDA | IDA | None |
| - Meters | Municipality or Tenants | Municipality | Municipality | Municipality |
| **(4) Electricity** | | | | |
| - Distribution System on Roads | 50% IDECO 50% IDA | IDECO | IDECO | IDECO |
| - Meters and Private Lines | IDA | IDA | IDECO | IDECO |
| **(5) Telephone** | | | | |
| - Line on Roads | 50% Telecom Corp. 50% IDA | Telecom Corp. | Telecom Corp. | Telecom Corp. |
| - Connection Line | IDA | IDA | | |
| - Telephone Sets | Tenants | Telecom Corp. | | |

Source:  Study Team.

Table 7.2    Material Cost

| Material | Unit | Unit Cost |
|---|---|---|
| | | JD |
| Oil | ℓ | 1.0 |
| Mixed Concrete | c·m | 35.0 |
| Lumber | c·m | 40.0 |
| Broken Stone | c·m | 3.0 |
| Ballast | c·m | 3.0 |
| Reinforcing Steel Bar | t | 170.0 |
| Asphalt | t | 16.0 |
| Reinforced Concrete Pipe ($\phi$200) | m | 6.0 |
| "                      ($\phi$250) | m | 7.0 |
| Ductile Pipe   ($\phi$100) | m | 3.0 |
| "            ($\phi$150) | m | 4.5 |
| "            ($\phi$200) | m | 6.0 |
| "            ($\phi$250) | m | 8.0 |

Table 7.3    Labor Cost

| | |
|---|---|
| 1) Senior Supervisor (Foreign Labor) | JD 65/day |
| 2) Supervisor | JD 15/day |
| 3) Highly Skilled | JD 10/day |
| 4) Skilled | JD 8 - 10/day |
| 5) Common Labor | JD 5 - 6/day |

Table 7.4  Projected Development Cost of IIE

(Unit:  1,000 JD at 1980 Prices)

| Cost Items | Financial Cost | | | Share of Cost | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | Machine All Foreign | Material | | Labor | | | | Contractor's Profit |
| | Domestic Cost | Foreign Cost | Total Cost | | Foreign | Domestic | Skilled | | Unskilled | | |
| | | | | | | | Foreign | Domestic | Foreign | Domestic | |
| (1) Land Acquisition (27.5 ha) plus Contingency | 1,815 | 0 | 1,815 | | | | | | | | |
| (2) Land Development | 399 | 795 | 1,194 | 118.5 | 622.0 | 223.6 | 0.6 | 62.1 | 54.5 | 54.5 | 57.5 |
| Earthwork and Site Preparation | 50 | 225 | 275 | 82.4 | 132.0 | 13.8 | 0 | 11.0 | 11.0 | 11.0 | 13.8 |
| Road Pavement | 81 | 231 | 312 | 9.4 | 215.3 | 53.1 | 0 | 6.2 | 6.2 | 6.2 | 15.6 |
| Street Light | 2 | 12 | 14 | 0.8 | 10.4 | 0 | 0 | 1.3 | 0.4 | 0.4 | 0.7 |
| Drainage | 55 | 36 | 91 | 5.4 | 20.0 | 25.4 | 0 | 13.7 | 11.0 | 11.0 | 4.5 |
| Sewerage:  Pipe and System | 77 | 28 | 105 | 9.5 | 9.5 | 50.1 | 0 | 11.6 | 9.5 | 9.5 | 5.3 |
| Pump Station | 24 | 45 | 69 | 0.7 | 43.5 | 19.3 | 0 | 0.7 | 0.7 | 0.7 | 3.4 |
| Water Supply: Reservoir | 44 | 82 | 126 | 3.8 | 73.1 | 27.8 | 0 | 5.0 | 5.0 | 5.0 | 6.3 |
| Supply System | 3 | 28 | 31 | 2.2 | 24.8 | 0 | 0.6 | 0.6 | 0.6 | 0.6 | 1.6 |
| Landscaping | 33 | 5 | 38 | 0 | 0 | 20.9 | 0 | 6.0 | 4.6 | 4.6 | 1.9 |
| Electricity Distribution System [1] | 20 | 59 | 79 | 2.3 | 54.9 | 13.2 | 0 | 2.5 | 2.0 | 2.0 | 1.9 |
| Telephone Line on Roads [1] | 10 | 44 | 54 | 2.0 | 38.5 | 0 | 0 | 3.5 | 3.5 | 3.5 | 2.5 |
| (3) Building | 2,379 | 2,144 | 4,523 | 949.8 | 1,012.9 | 1,700.9 | 0 | 271.3 | 181.0 | 181.0 | 226.1 |
| Standard Factory Building | 734 | 625 | 1,359 | 285.4 | 285.2 | 530.2 | 0 | 81.5 | 54.4 | 54.4 | 67.9 |
| Custom Buit Factory | 1,472 | 1,359 | 2,831 | 594.5 | 651.1 | 1,047.5 | 0 | 169.8 | 113.3 | 113.3 | 141.5 |
| Common Facilities Building | 173 | 160 | 333 | 69.9 | 76.6 | 123.2 | 0 | 20.0 | 13.3 | 13.3 | 16.7 |
| (4) Machine and Equipment for Common Facilities | 10 | 185 | 195 | 185.3 | 0 | 0 | 0 | 5.8 | 0 | 0 | 3.9 |
| (5) Engineering 10% of (2) plus (3) in Total | 292 | 280 | 572 | 28.6 | 34.4 | 45.8 | 217.3 | 217.3 | 0 | 0 | 28.6 |
| (6) Working Capital [2] | 17 | 16 | 33 | 0 | 16.0 | 0 | 0 | 16.0 | .0 | 0 | 1.0 |
| Development Cost Sub-Total = (2) +...+(6) | 3,097 | 3,420 | 6,517 | 1,282 | 1,685 | 1,970 | 218 | 573 | 236 | 236 | 317 |
| (7) Contingency 10% of Sub-Total | 310 | 342 | 652 | 128 | 168 | 197 | 22 | 57 | 24 | 24 | 32 |
| (8) Development Cost  (2) + ... + (7) | 3,407 | 3,762 | 7,169 | 1,410 | 1,853 | 2,167 | 240 | 630 | 260 | 260 | 349 |
| (9) Total Project Cost  (1) + (8) | 5,222 | 3,762 | 8,984 | | | | | | | | |

Source:  Study Team.

Note:  1/ 50% of the cost is borne by IDA.
      2/ 1.5 months of O/M costs at full rate.

### 7.1.3 Estimation of Development Cost

706     Project cost of IIE was classified into each type of construction works and further divided into domestic and foreign portions as shown in Table 7.4. Total project cost of IIE at 1980 prices amounts to JD 8,984,000 which includes the cost of land acquisition equal to JD 1,815,000. Within the development cost of JD 7,169,000 exclusive of the cost of land acquisition, foreign portion amounts to JD 3,762,000, or 52 percent of JD 7,169,000, and domestic portion amounts to JD 3,407,000, or 48 percent.

707     Total proejct cost at 1983 prices is computed in accordance with the comment made on the Draft Final Report. The average inflation rate of project cost between 1980 and 1983 is assumed to be 15 percent. The total project cost to be JD 13,663,000 as shown on Table 7.5.

### 7.2  Implementation Schedule

708     Implementation schedule of IIE was formulated upon the consultation with the Counterpart Committee of this Study as shown in Figure 7.1.

   i)    Land acquisition shall be started right after the Feasibility Study, i.e., middle of 1981.

   ii)   Loan negotiation as well as soil investigation and topographic survey shall be started along with land acquisition.

   iii)  Detail design shall be started at the end of 1981 and, succeedingly, tender document for construction shall be prepared.  Construction works shall be initiated in January, 1983.

   iv)   Construction works shall be completed in two years and occupancy of factories shall be started in 1984.

709     According to the implementation schedule mentioned above, investment schedule of each cost item was developed and shown in Table 7.6.

Figure 7.1  Implementation Schedule

| Description | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|
| Land Acquisition | 6 | | | | | |
| Feasibility Study | 1 4 | | | | | |
| Appraisal | 3 | | | | | |
| Loan Negotiation | 5 | | | | | |
| Tender for Detail Design | 2 | | | | | |
| Soil Investigation/ Topographic Survey | 4 | | | | | |
| Detail Design | 3 | 6 | | | | |
| Tender for Construction | | 6 | | | | |
| Construction | | | 24 | | | |
|   Preparation | | | 1.5 | | | |
|   Earth Work | | | 1.5 | | | |
|   Water Supply | | | 5 | 4 | | |
|   Road Network | | | 9 | 4 | | |
|   Electricity | | | 6 | | | |
|   Telecommunication | | | 3 | 4 | | |
|   Sewage and Drainage | | | 8 | | | |
|   Standard Factory | | | 6 | 6 | 6 | |
|   Custom Built Factory | | | 6 | 3 | 9 | |
|   Administration Building | | | 6 | 12 | | |
| Land Lease | | 6 | 12 | 8 | | Full Occupancy |
| Occupancy | | | | 12 | 12 | 12 |

Source:  Study Team.

Note:  Numbers in figure are months.

Table 7.5  Project Development Cost of IIE at 1983 Prices [1]

(Unit:  1,000 JD at 1983 prices)

| Cost Item | Cost | | |
|---|---|---|---|
| | Domestic | Foreign | Total |
| (1) Land Acquisition plus Contingency | 2,760 | 0 | 2,760 |
| (2) Land Development | 607 | 1,209 | 1,816 |
| (3) Building | 3,618 | 3,261 | 6,879 |
| (4) Machines and Equipment for Common Facilities | 15 | 281 | 296 |
| (5) Engineering 10% of (2) plus (3) | 444 | 426 | 870 |
| (6) Working Capital | 26 | 24 | 50 |
| (7) Contingency 10% of (2) through (6) | 472 | 520 | 992 |
| (8) Development Cost (2) through (7) | 5,182 | 5,721 | 10,903 |
| (9) Total Project Cost (1) plus (8) | 7,942 | 5,721 | 13,663 |

Source:  Study Team.

Note:  1/ 1983 cost is estimated assuming 15% inflation per annum.

Table 7.6  Investment Schedule

(Unit: 1,000 JD at 1980 Prices)

| | 1981 | | | 1982 | | | 1983 | | | 1984 | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total |
| Land Acquisition + Cont. 1/ | 1,815 | 0 | 1,815 | | | | | | | | | | 1,815 | 0 | 1,815 |
| Engineering and Arch. Service + Cont. | 107 | 103 | 210 | 214 | 205 | 419 | | | | | | | 321 | 308 | 629 |
| Land Development + Cont. | | | | | | | | | | | | | | | |
| Site Preparation and Earth Work + Cont. | | | | | | | 55 | 247 | 302 | | | | 55 | 247 | 302 |
| Water Supply + Cont. | | | | | | | 29 | 67 | 96 | 23 | 54 | 77 | 52 | 121 | 173 |
| Road and Street Light + Cont. | | | | | | | 61 | 176 | 237 | 31 | 90 | 121 | 91 | 267 | 358 |
| Sewerage and Drainage + Cont. | | | | | | | 172 | 120 | 292 | | | | 172 | 120 | 292 |
| Landscaping + Cont. | | | | | | | | | | 36 | 6 | 42 | 36 | 6 | 42 |
| Electricity + Cont. | | | | | | | 22 | 65 | 87 | | | | 22 | 65 | 87 |
| Telephone + Cont. | | | | | | | 5 | 21 | 26 | 6 | 27 | 33 | 11 | 48 | 59 |
| Building + Cont. | | | | | | | 872 | 786 | 1,658 | 1,745 | 1,572 | 3,317 | 2,617 | 2,358 | 4,975 |
| Machines and Equipment + Cont. | | | | | | | | | | 11 | 204 | 215 | 11 | 204 | 215 |
| Working Capital + Cont. | | | | | | | | | | 19 | 18 | 37 | 19 | 18 | 37 |
| Total Financial Cost | 1,922 | 103 | 2,025 | 214 | 205 | 419 | 1,216 | 1,482 | 2,698 | 1,871 | 1,971 | 3,842 | 5,222 | 3,762 | 8,984 |

Source:  Study Team.

Note:  1/ Cont. stands for contingency.

CHAPTER     VIII

ORGANIZATION  AND  MANAGEMENT

## ORGANIZATION AND MANAGEMENT

## 8.1 Review of the Candidate Existing Organizations

### 8.1.1 Introduction

801     In the Pre-feasibility Study, the following two proposals
with regard to a desired administrative and managing body of IIE were
made taking equally into consideration both the national policies of
industrial promotion and regional development.

> i) To form a joint corporation between the Central Government
> and the Irbid Municipality, having representatives from
> the authorities concerned on its Board and to enter into
> a management service contract with the JIEC to run the
> project.

> ii) To form a quasi public corporation from the concerned
> agencies of the Central Government, Municipality, IDB,
> Pension Fund and the private sector who may have
> interests in the project directly or indirectly.

802     In this section, an attempt is made to re-examine the technical,
financial and legal framework of the existing candidate organizations
in order to assess their capability for establishing a desired adminis-
trative and managing body of IIE.

### 8.1.2 Irbid Municipality

803     Since the proposed site is within the Municipality of Irbid
and the Municipality already has experience in developing and managing
an industrial area with rental factory buildings, the possibility of
the Municipality undertaking and managing this proposed IIE is first
considered. There are a number of advantages for the Municipality to
be involved, namely:

> i) Most of the services are provided by the Municipality
> such as water supply, drainage, road and waste disposal,

ii) The Municipality is familiar with the needs of the
residents including those industrialists who are either
voluntarily or compulsorily relocated from the city
center,

iii) The Municipality is most concerned with economic
development of Irbid itself, and

iv) The proposed site for IIE faces with the existing
industrial area operated by the Municipality. Unified
management of the both areas will allow the Municipality
to improve services to those who are already located
there.

804      Needless to say, there are several problems with this alter-
native such as:

i) The resources of the Municipality are not sufficient.
to undertake this development (Annex 8.1).

ii) The Municipality is quite unfamiliar with measures
related to industrial promotion, licensing and
financing,

iii) The Municipality does not have enough competent
engineers and management experts to undertake this
project, and

iv) Civil service staffing regulation may not be attractive
enough to recruit qualified personnels from outside.

### 8.1.3  Government Agencies

805      Major concerned government agencies are the Ministry of
Municipal, Rural and Environmental Affairs (MMREA), Ministry of
Industry and Trade (MIT) and National Planning Council (NPC), but none of
them are appropriate for implementation and maintenance of IIE as sole
executing agency except for overall administrative control over the
businesses concerned with each agency.

#### a.  MMREA

806      MMREA has responsibility in local administration. This
project has been identified by a regional planning study initiated by
the Ministry and it is one of the three organizations represented in
the Counterpart Committee for the JICA mission for the Feasibility
Study of IIE. The Ministry already initiated within the Government a
procedure for purchasing the land of the proposed site. However, this
Ministry is essentially a planning and coordinating organization, and
when the project reaches the implementation stage, it should transfer
much of its responsibilities to an executing organization.

b. **MIT**

807     MIT is responsible for industrial and trade promotion and
development. It provides the industrial development guidelines,
industrial licenses and incentives which influence on attractiveness
of the proposed IIE. MIT sponsored the creation of JIEC, a semi
autonomous national authority to develop and manage industrial estates
in the areas designated as industrial zone and situated outside
Municipalities.[1]/ In view of the fact that the proposed location of
IIE is within the administrative boundary of Irbid Municipality
and JIEC will not be directly involved, MIT's involvement in IIE is
deemed necessary to coordinate between Amman Industrial Estate which
is the first project of JIEC and IIE so that the both projects may
grow successfully.

c. **NPC**

808     NPC has been interested in this project as the organization
in charge of national planning and also as the organization which
channels all public development assistance projects. Therefore, its
involvement is essential during the planning stage of IIE. But, in
later stages, it does not have to be directly involved.

## 8.1.4  Other Public Organizations

a. **IDB**

809     IDB is a statutory financial institution founded in 1965 to
provide long-term credit to the industrial sector and acts as inter-
mediary, agent and primary borrower of the foreign financial institu-
tions. It is a well established organization with prominent board
members and officers, and has contributed to the recent marked progress
of industrialization of the country. Also IDB was instrumental in
executing development planning of Amman Industrial Estate and organizing
JIEC, and has significant number of qualified industrial management
experts. IDB has Jordan Institute of Management (JIM) under its arm
which has provided training programs covering wide areas of management.
It is, therefore, considered essential that IDB provides substantial
assistance to IIE. IDB is a member of the Counterpart Committee for
this study.

b. **CVDB**

810     CVDB is another statutory financial institution newly
reorganized in 1980 to provide loans to municipalities and village
councils for such projects as water supply, school buildings, electricity
distribution, health clinics and commercial buildings. The previous
organization was known as Municipal and Villages Loan Fund (MVLF)

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[1]/   Provision of the Planning Law for Cities, Villages and Buildings.

established in 1966 but did not become effective development institution. Under the new set-up it is expected taht CVDB will expand its activities and play a central role for financing various important development projects sponsored by municipalities, village councils and corporations under their control. As the resources of the Municipality of Irbid are meager, CVDB could stand behind it to support the Municipality financially and provide not only a loan to the Municipality but also equity funds when required. Indeed, this would be likely the case.

### c. Yarmouk University

811 Yarmouk University is an important organization for the region and has built substantial facilities in Irbid and is further going to develop a huge main campus which is planned to be completed in 10 years from now with the estimated cost of JD 80 million. The University itself has a plan to have own workshops to produce necessary building materials and components required for construction of the facilities in order to save construction costs and also to provide practice for their students. However, there are a number of products to be purchased from outside the campus that will offer significant opportunities to those industrialists in Irbid. Also the University is aimed at being an open university to the surrounding communities. Specifically, it will allow industrialists to have an easy access to the technical infrastructure developed and owned by the University.

812 With the reasons mentioned above, it is thought that there is an interdepending relation between the University and IIE in terms of man power development and industrial promotion. Direct involvement in IIE by the University is much desired financially and technically.

### d. JIEC

813 As stated in the preceding paragraphs, JIEC was created under a new law enacted December, 1980 as a national authority to develop and manage industrial estates in the country. Accordingly, JIEC seems to be most appropriate organization to implement IIE. However, its activities are limited to the areas outside of municipalities. Also it has just started physical development of the first phase (75 ha) of the large industrial estate (ultimate size to be 253 ha) in Suhab situated outside but close to Amman Municipal Area. Being new organization with large project on hand, it looks quite difficult for JIEC to be directly involved in IIE at this moment in view of the efficiency of their management resources, even if they are allowed to touch on the project within municipal area. JIEC is a member of the Counterpart Committee for this study.

## 8.2 Necessity of Creation of IDA and Its Profile

### 8.2.1 Need for a New Local Organization

814    There are two basic alternatives for identification of the organization responsible for establishment and management of IIE: sectoral and areal. The sectoral alternative is to establish an organization quite similar to JIEC but is allowed to operate within municipalities. In this case it is conceivable that one organization is established which can operate within all municipalities within Jordan. But, such an organization is a duplication of JIEC and, what is more, denies the basic principle of municipal autonomy. Therefore, if the sectoral alternative is pursued, it has to end up in establishing one industrial estate corporation in each municipality. Except a possible exception of Amman, this system requires too much managerial resources to this small sector.

815    The other alternative is the areal approach. One obvious solution is to let the municipality to assume the entire responsibility. However, the establishment and management of industrial estates requires technical and managerial skills not existing in the present staff of the municipality. Moreover, tasks require an enterprising attitude which does not fit well to the regular tasks of municipalities.

816    There are other sectors which require an enterprising attitude and which should be done by a public organization within municipalities such as urban renewal, truck and bus terminals and parking facilities. The Amman Development Authority which was established on July 17, 1979 is a good example. To utilize very scarece technical and managirial human resources to the maximal extent and maintain flexibility in staff recruitment and remuneration, it is recommended that an authority tentatively called "Irbid Development Authority (IDA)" be established. IDA will be an autonomous organization and is enpowered to undertake a variety of activities within the municipality of Irbid and the Irbid Industrial Estate will be its first project.

### 8.2.2 IDA's Future Role and Its Relation with JIEC

817    In parallel with the development of IIE and subsequent population growth of the Municipality, there will be continuous needs for development of economic and social infrastructures other than industrial estate and all of which cannot be met by the governments. Therefore, IDA will be required to expand their business to those projects which will be viable on commercial basis under certain administrative guidelines.

### 8.2.3 Strong Financial Supports Needed

818    As business concession of IDA will be spatially limited within the administrative area of Irbid Municipality, it is logical that the Municipality desires to have majority shares of IDA. However,

its resources are not large enough to realize what they desire. Therefore, it is considered necessary to offer maximum financial supports to the Municipality by the Government of Jordan so that the municiaplity may hold the biggest shares in IDA.

819     As to the land acquisition, there are two ways. One is direct acquisition by IDA and another is acquisition by the Government of Jordan for subsequent leasing to IDA. Taking into consideration the fact that MMREA already initiated a procedure for purchasing the land and also the desire of the Municipality to hold biggest share at IDA under its limited financial capability, it is recommended that the latter method should be employed.


8.2.4  Profile of IDA

820     To enable IDA to effectively carry out its duties, the following provisions are recommended to be incorporated into the proposed Law.

    i)  Functions

        1)  To plan, implement and manage the following facilities to be developed within the administrative area of Irbid Municipality:

- Industrial Buildings
- Housing
- Office Buildings
- Commercial Buildings
- Car Parking
- Truck and Bus Terminals
- Other Related Facilities

        2)  To evaluate and process all applications for licensing and privileges of incentives for manufacturing and service establishments intending to locate in IIE and give recommendations to the higher authorities for fianl approval.

        3)  To act as intermediary between the prospective occupants and the local financing institutions to facilitate financial arrangements if it is needed by the either party.

        4)  To operate common facilities within the entire complex or estate to ensure required services for the occupants.

        5)  To participate in share holding in any company or institutions or any work that has the same objectives and interests.

    ii)  Delegation of Authority to IDA

To prescribe conditions, covenants, restrictions and regulations within the premises owned and/or managed by IDA.

iii). Powers to be Given to IDA

1) Where any immovable property is needed for execution of the approved project and cannot be acquired by agreement, IDA may request to the council of ministers the acquisition of such property under the laws governing acquisition of land for public purpose.

2) With prior approval from the higher authorities, IDA shall be given the rights to improve the existing public facilities on its account and develop and utilize the above space or underground space of the public facilities without damaging the original function of such facilities in order to realize higher and efficient utilization of space and to give more convenience and safety to the general public.

iv) Exemption from Rental Control, Duties and Taxes

1) The provision of the Proprietors and Tennant Law shall not apply to any immovable property owned by IDA. Any existing rental control provision shall not be applicable to the lease and/or sublease of land and property owned or managed by IDA.

2) Exemption of IDA and establishment located on the property owned or managed by IDA from duties and taxes to the same extents as stipulated for industrial estates in the Encouragement of Investment Law.

821      In view of the objectives and scope of business of IDA stated above, it is recommended that the following organizations participate in the equity investments in IDA, initial paid up capital of which is recommended to be JD 2 million.

    i)      The Municipality of Irbid
   ii)      The Cities and Villages Development Bank
  iii)      The Housing Bank
  iv)      Pension Fund
   v)      Yarmouk University Trust Fund

822      The highest decision-making body of IDA will be the Board of Directors which should be initially represented by:

    i)      The Municipality of Irbid
   ii)      Ministry of Municipal, Rural and Environmental Affairs
  iii)      Ministry of Industry and Trade
  iv)      Ministry of Finance
   v)      The Cities and Villages Development Bank
  vi)      The Industrial Development Bank
 vii)      The Housing Bank
viii)      Pension Fund
  ix)      Yarmouk University Trust Fund
   x)      Director General of IDA

Those representatives from the concerned agencies shall be decreased, increased and replaced with that of other agencies depending on the type of project IDA will undertake in future.

823     In order to reduce the required pre-operating expenses for IDA, it is suggested that IDA will be established in early 1982 before commencement of physical development of IIE, while all the preparatory works should be handled by the Committee organized for this study.[1]

## 8.3   Recommended Management Policies and Incentives to be Introduced

### 8.3.1   Introduction

824     On the basis of the precise definition of industrial estate,[2] there is no industrial estate at present in Jordan and the first one is going to be developed by JIEC, the first phase of which is expected to become operative by 1983.  IIE will be the second industrial estate in the country and the first in Irbid.  Therefore, it is considered a test project to evaluate the future potential of industrial development in Irbid as well as in Jordan, success of which depends on efficient management and aggressive marketing efforts supported by decent incentives.

### 8.3.2   Management Policies

825     IDA has responsibility to find new industrial entrepreneurs and to help the existing small-scale industries grow and modernize into medium-scale enterprises by providing fully serviced industrial buildings and plots with attractive conditions.'  Therefore, a success in marketing is a central duty of the management and keenest attention should be directed to this aspect though such duties as fund raising and land and building developments are equally important.

826     Major works of industrial promotion have to rely on MIT and IDB while IDA should assign a minimum of two persons to this task who have thorough knowledge of the identified industries in this Study. With regard to this, it should be noted that types of industries identified in Chapter III represents projections based on industrial characteristics and demand forecasts and should be regarded as a guideline for IDA's marketing of the factory land and buildings. Therefore, it is recommended that IDA's marketing policy should be · flexible enough to accommodate other types of industries than those listed, if IDA find them suitable for location in terms of their viability and adoptability to the environment.  Also it is recommended to recruit such qualified personnel as soon as possible and have them trained at JIM and/or the suitable foreign countries prior to the actual operation of marketing.

[1]   It consists of MMREA, IDB and JIEC.

[2]   See Annex 1.1.

827      It is recommended that IDA should adopt the marketing policy
of leasing land and buildings instead of selling them by the following
reasons.

    i) To help minimize the initial investment required for
    the industrial operators and facilitate their decision
    to locate in IIE.

    ii) To allow IDA to have more control over IIE and provide
    IDA with stable income on long-term to assure continuous
    quality services to the occupants.

    iii) To follow the JIEC's leasing policy not to give unneces-
    sary confusion to the prospective investors.

    iv) To simplify a procedure for liquidation when an investor
    terminates his operation by bankruptcy.

828      Standard Factory Buildings should be leased for five years,
renewable for another five years indefinite times.  The rental should be
subjected to change at the time of lease renewal to an extent that
inflationary pressure on O/M costs can be absorbed.  However, the rental
should be kept on or near the prevailing market rate.  The factory land
should be leased together with a Custom Built Factory Building to
prospective manufacturing firms on the same condition as for Standard
Factory Buildings.

829      Standard Factory Building should have several alternatives in
floor area so that it can offer choice to the occupants depending on
their specific activities.  Also it is recommended that Standard Factory
Building should be built in as consistent and simplified standards as
possible with the following reasons:

    i) To offer the builders and fabricators who wish to locate
    their factory in IIE a continuous business opportunity
    to construct the standardized buildings which will result
    in attaining scale of economy and upgrade their
    technology by reputation of the same method with using
    standardized building materials.·

    ii) To encourage building material and component manufac-
    turers to locate in IIE and offer them opportunity to
    standardize their products as well as to modernize
    their production method.

## 8.3.3  Incentives

830      As mentioned earlier, IDA will function to complement and
share responsibility of JIEC.  There is no doubt that earlier activation
of industrial development in Irbid region through IIE will bring
significant benefits to JIEC and Jordan as a whole in the long-run.
However, there will be competing situation in the earlier stage between
the industrial estate in Sahab and IIE, assuming that the latter will
be realized as planned.

831      Since the rectification of regional imbalance is one of the basic goals clearly stated in the current national development policies, the existing margin of incentives for the less-developed regions should be maintained at least at the same ratio when amendments of Law No. 53 of 1972 (Encouragement of Investment Law) are made. In addition, two years' extra tax holiday available in JIEC managed industrial estates should also be made available in the proposed IIE. Furthermore, coordination and adjustment of rental fee between the two are required in order to avoid unnecessary confusion to the prospective investors.

832      From the industrial investor's point of view, the above tax holiday incentives are relevant only when he can make profits. The provision of fully-serviced industrial plots readily available to those investors with simplified procedures and easy access to licensing and financing would be the most important incentive for prospective investors. In this regard, IDA should be allowed to delegate those authorities partially if not all and facilitate such required processing so that the prospective investors may not be discouraged by wasting time in travelling to Amman. In addition, the proposed IIE is recommended to have a common machinery workshop which contains sophisticated and expensive machinery which can hardly be purchased by small-scale factories.

833      Although it is not necessarily within our scope of work, the role of the Customs Office at Ramtha should be substantially expanded so that importing and exporting from and to Syria, Lebanon and the north and Iraq may not require those involved to go to Amman to have the papers processed and pay duties. This decentralization of authority to the Ramtha Customs Office would become a significant incentive for the development of IIE.

## 8.4  Organizational Structure and Staffing Needs of IDA
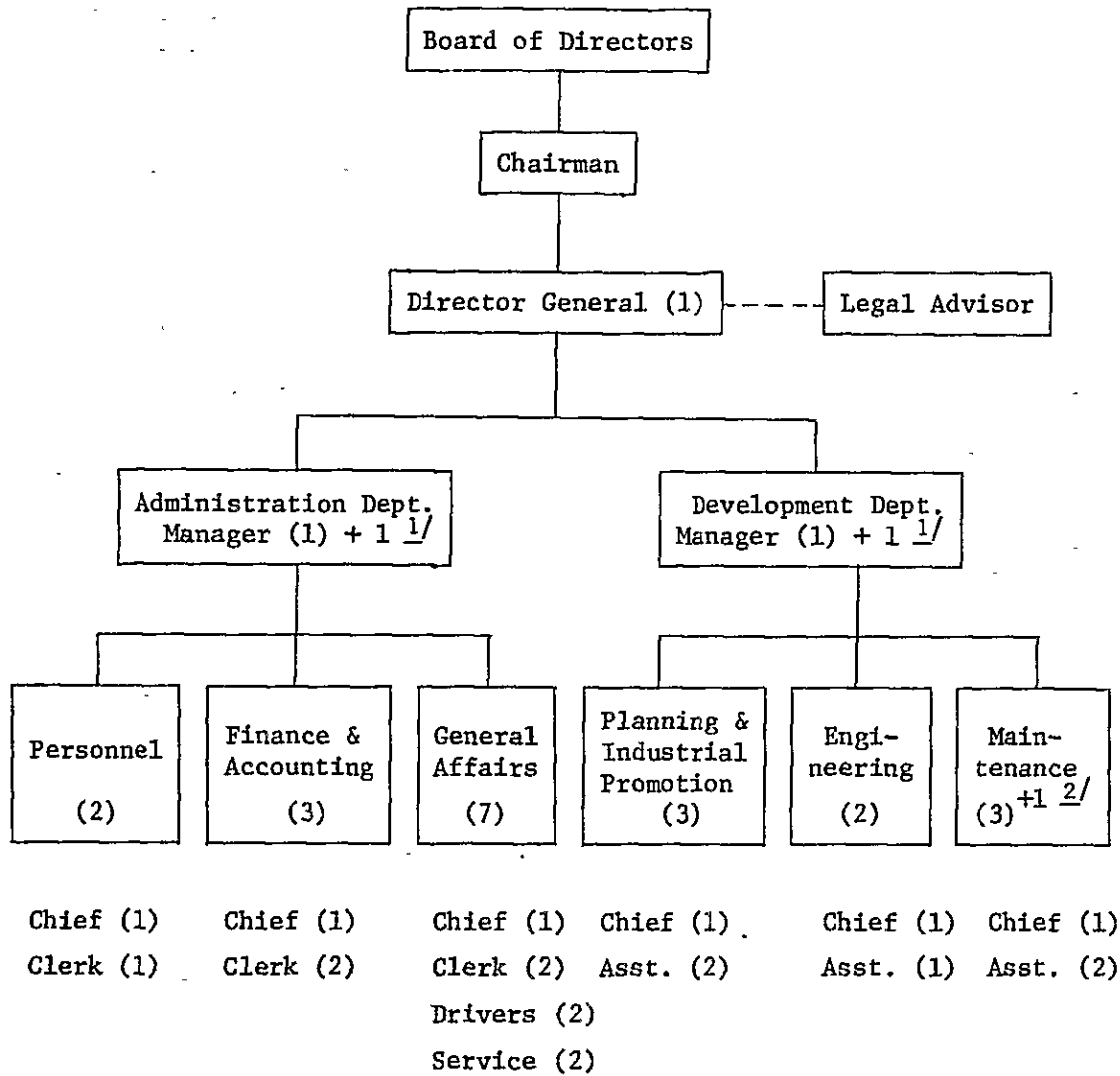
### 8.4.1  Introduction

834      The proposed organizational structure of IDA is shown in Figure 8.1. Since the management costs of the IDA are eventually past on to the occupants, special considerations must be paid to the following points to minimize the recurrent costs.

> i)   To keep the organizational structure simple and limit the number of permanent staff as small as possible, and

> ii)  To hire outside consultants to maximal extent for the temporary works that require professional services.

Once an organization is established, it tends to grow unnecessarily large and becomes bureaucratic as known as the Rule of Perkinson that will spoil efficiency and lose quick responsiveness required to satisfy the occupants. Therefore, the management of IIE should keep the tight policy to be a compact, active and responsive organization.

Figure 8.1  Proposed Organizational Structure and
Staffing Needs of IDA

Irbid Development Authority

Board of Directors

Chairman

Director General (1) ----- Legal Advisor

Administration Dept.
Manager (1) + 1 [1]/

Development Dept.
Manager (1) + 1 [1]/

| Personnel (2) | Finance & Accounting (3) | General Affairs (7) | Planning & Industrial Promotion (3) | Engineering (2) | Maintenance $(3)^{+1}$ [2]/ |

| Chief (1) | Chief (1) | Chief (1) | Chief (1) | Chief (1) | Chief (1) |
| Clerk (1) | Clerk (2) | Clerk (2) | Asst. (2) | Asst. (1) | Asst. (2) |
| | | Drivers (2) | | | |
| | | Service (2) | | | |

Notes:  1/  Secretary

2/  Foreign expert

## 8.4.2 Structure and Staffing

835      The Chairman and the Director General should be nominated by the Board of Directors. Daily operation should be executed by the Director General as an acting Chief Executive Officer. In selecting the Driector General from a number of candidates, special attention should be given to:

i)   Knowledge and understanding of industrial development,
ii)  Experience in financial and organizational management, and
iii) Knowledge of project appraisal.

Under the Director General, there will be two departments, each under a department manager as follows:

### a. Administration Department

836      This department will handle the finance and accounting, personnel, legal, public relation and all other administrative services for IDA. There are three divisions consisting of personnel, finance and accounting and general affairs. At the outset, the general affairs division can handle all the necessary business concerning the administration department. As their business grows and necessity arises, the department should be reorganized as planned. Twelve offices excluding the department manager will be required when IDA is in full operation of IIE.

### b. Development Department

837      This will be the heart of the operation of IDA and be composed of the following three divisions.

### i) Planning & Industrial Promotion Division

This division is the most important one among three and has three main functions;

1) Project planning
2) Preparation of promotional materials and marketing
3) Evaluation and processing of the prospective investors' application for licenses and investment incentives.

### ii) Engineering Division

This division will have the responsibility for most of the technical and engineering matters concerned with the project. Major works of the engineers assigned to this division will be supervision of the works performed by the contractors and consultants and also give approval of application for building license within the premises of IDA.

iii) Maintenance Division

This division is responsible for upkeeping of all the
facilities owned by IDA and operation of the common
facilities including the proposed workshop designed to
attract small-scale industrial operators.  In this
connection, it is suggested that the Government of
Jordan may request to either interested foreign govern-
ments or international institutions to send a qualified
expert on grant basis to assist operation of the work-
shop for a period of one to two years.

Eight permanent offices excluding the manager and foreign
expert will be required for this department when IDA is
in full operation of IIE.  During the development stage
of IIE, the personnel for the maintenance division will
not be necessary.

CHAPTER     IX

FINANCIAL  ANALYSIS

CHAPTER IX


FINANCIAL ANALYSIS


## 9.1 Introduction

901        For the purpose of financial analysis, the Base Case was set,
which is the case of IIE designed based on all the recommendations set
forth in previous Chapters. All the analyses in this Chapter are done
upon the Base Case except for sensitivity analysis.

902        Since it is the ordinary procedure in feasibility studies, all
the cost and benefit here are at first estimated at the constant prices
in the middle of 1980, when the exchange rates were US$1.0 = JD0.293 =
Yen 220. But in the actual world, there is always inflation. So, after
identification of the best alternative, analyses with inflation will be
made. Project life of IIE was assumed to be 20 years after the comple-
tion of its construction, i.e., 1984.


## 9.2 Revenue Projection

### 9.2.1 Sources of Revenue

903        From Chapter V "Land Use Planning," potential sources of
revenue for IDA from IIE are classified as follows;

   i)  Industrial land and floor

       1)  Rent on land (53,719 m$^2$) and Standard Factory
           Building (22,653 m$^2$)
       2)  Rent on land (132,834 m$^2$) and Custom Built
           Factory (43,560 m$^2$)

   ii) Commercial land and floor

       1)  Rent on commercial floors for a bank, restaurants
           and shops (848 m$^2$)
       2)  Rent on land (600 m$^2$) and building (150 m$^2$) for
           gas station

iii) Users' charge

    1) Users' charge of common workshop (288 $m^2$) and training program

    2) Users' charge of meeting rooms (300 $m^2$)

Pricing of these items will be estimated one by one in the following sections.


## 9.2.2 Pricing Policy

### 9.2.2.1 Cost Basis Approach

904      Table 9.1 shows the total present cost in the middle of 1981 at the 1980 prices discounted at 10 percent, which is JD 8,238 thousand. We can roughly assume that the full rent payment will start at the beginning of 1986 which is one year after the completion date of construction. Then the revenue period will be 19 years (= 2004 – 1985).

905      Since the revenue starts to flow-in in 1986, it is necessary to know the total cost in 1986. The total present cost in the middle of 1986 ($A_{1986}$) is:

$$A_{1986} = (1 + r)^5 \times A_{1981}$$

where,   $r = 0.1.$

Then,

$$A_{1986} = (1.1)^5 \times 8,238$$

$$= 13,267 \text{ (in thousand JD)}.$$

The annual rent which should come from the tenants can be calculated by the following formula:

$$a = \frac{(1+r)^n \times r}{(1+r)^{n+1} - 1} \times A_{1986}$$

where,   a: annual rent,

           r: interest rate (10%),

           n: period (19 years), and

           A: total present cost in the middle of 1986 discounted at the rate of interest rate (10%).

Then,

$$a = \frac{1.1^{19} \times 0.1}{1.1^{20} - 1} \times 13,267$$

$$= 1,417 \text{ (in thousand JD)}.$$

Thus, IIE should recover JD 1,417,000 every year to make roughly 10 percent return on its investment.

Table 9.1  Present Value of Total Cost

(Unit:  1,000 JD at 1980 Prices)

| | | Capital Investment | | | | Land Rent with Cont.2/ | O/M Cost Plus Cont. | Total | Present Value in 1981 1/ Discounted at 10% |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Engineering Plus Contingency | Land Dev. Plus Cont. | Building Plus Cont. | Machine & E. Plus Cont. | Working Capital Plus Cont. | | | | |
| 1981 | 0 | 177 | | | | | | 0 | 177 | 177 |
| 82 | 1 | 352 | | | | | | 96 | 448 | 407 |
| 83 | 2 | | 1,040 | 1,326 | | | 182 | 114 | 2,662 | 2,200 |
| 84 | 3 | | 273 | 2,654 | 215 | 37 | " | 119 | 3,480 | 2,615 |
| 85 | 4 | | | | | | " | 172 | 354 | 242 |
| 86 | 5 | | | | | | " | 219 | 401 | 249 |
| 87 | 6 | | | | | | " | 267 | 449 | 253 |
| 88 | 7 | | | | | | " | " | " | 230 |
| 89 | 8 | | | | | | " | " | " | 209 |
| 90 | 9 | | | | | | " | " | " | 190 |
| 91 | 10 | | | | | | " | " | " | 173 |
| 92 | 11 | | | | | | " | " | " | 157 |
| 93 | 12 | | | | | | " | " | 449 | 143 |
| 94 | 13 | | | | 215 | | " | " | 664 | 192 |
| 95 | 14 | | | | | | " | " | 449 | 120 |
| 96 | 15 | | | | | | " | " | " | 107 |
| 97 | 16 | | | | | | " | " | " | 90 |
| 98 | 17 | | | | | | " | " | " | 89 |
| 99 | 18 | | | | | | " | " | " | 81 |
| 2000 | 19 | | | | | | " | " | " | 73 |
| 01 | 20 | | | | | | " | " | " | 67 |
| 02 | 21 | | | | | | " | " | " | 61 |
| 03 | 22 | | | | | | " | " | " | 55 |
| 04 | 23 | | | | 0 1/ | | 182 | 267 | 449 | 50 |
| Total | | | | | | | | | | 8,238 |

Notes:  1/ There should be another investment in machines and equipment in this year. However, since this is the last year of the assumed life of this project, it is not feasible to make any investment. So, the machine and equipment investment was neglected in this year.

2/ The Government of Jordan is assumed to lease the land to IDA (paragraph 819). At the rate of interest to be 10% and assuming that land produce perpetual revenue (rent), then, the rent is derived by multiplying the price of land by the prevailing interest rate.

3/ Computed at the discount rate of 10%.

Source:  Study Team.

906        Rent per industrial land and rent per factory building floor
are calculated based on the assumption that required rent will be borne
solely by industrial land and factory building floor in proportion to
their shares in the capital investment cost.  Their shares are
calculated in Table 9.2.

Table 9.2    Shares of Industrial Land and Factory
              Building in the Capital Investment

(Unit: 1,000 JD )

| Item | Cost | Share (%) |
|------|------|-----------|
| Cost for Factory Building | | |
| Factory Building | 3,771 | |
| Engineering (10%) | 377 | |
| Contingencies (10% of above) | 415 | |
| Sub-total | 4,563 | 54.06 |
| Cost for Industrial Land | | |
| Land | 1,650 | |
| Land Development | 1,194 | |
| Common Facility Building | 333 | |
| Engineering (10% of above two) | 153 | |
| Machines & Equipments | 195 | |
| Contingencies (10% of all) | 353 | |
| Sub-total | 3,878 | 45.94 |
| Grand Total | 8,441 | 100.00 |

Source:  Table 7.4.

907        Table 9.3 shows the calculation of the annual rents.  As a
result, the annual rent of industrial land is estimated to be JD 3.49/m$^2$
and the annual rent per factory building floor to be JD 11.57/m$^2$
according to the cost basis approach.

Table 9.3    Annual Rent per Industrial Land
and per Factory Building Floor

| Item | Share in Cost (%) | Annual Rent (JD 1,000) | Size (m$^2$) | Annual Rent (JD/m$^2$) |
|---|---|---|---|---|
| Factory Building Floor | 54.06 | 766 | 66,213 | 11.57 |
| Industrial Land | 45.94 | 651 | 186,553 | 3.49 |
| Total | 100.00 | 1,417 | 252,766 | |

Source:   Table 9.2 and paragraph 903.

## 9.2.2.2   Market Price Approach

### a.   Introduction

908      Market price of the industrial land and factory building
floor to be provided by IIE is theoretically defined as the prevailing
price of industrial land and factory building floor with the comparable
conditions to those of IIE, i.e., with almost same time distance and same
utility and same institutional services.  Although it is impossible to
find this exact price, it is possible to approximate it by surveys.
Approximation effort are made in the following sections.

### b.   Land Rent

909      As to the land rent, two methods are available:   one is to
find out land rents by interviewing lease holders, and another is to
find out land price by interviewing free holders of land and to estimate
land rent based on the price.

910      Two kinds of data are available for the first method: data
from the General Survey in Irbid and the General Survey in Amman, and
data from the Applicant Interview Survey.  As to the former data, there
is a question about rents actually paid by industrialists.  Results are
shown in Annex 9.1 and 9.2.   As shown in the Annex the rent per donum
paid by industrialists leasing 0.5 donum or more ranges from JD 100 to
JD 800 with its mode at JD 200 to JD 250 per donum in Irbid, and ranges
from JD 150 to JD 3,300 with its mode at JD 500 per donum in Amman.
As to the latter data, the results are shown in Annex 9.3.   In this
case the rent ranges from JD 245 to JD 1,100.  Problems of these two data
are (1) interviewees are located at places with time distance equal to or
longer than IIE, (2) most of the establishment years, i.e., dates of
rent contract, are older than 1980, and (3) most of them were and are

receiving insufficient infrastructure services. So these data are hard to be adopted as the market price of IIE, and it seems certain that the market price of IIE will be located toward the upper end of the ranges indicated above.

911    A survey based on the second method was undertaken. The land price in the middle of 1980 was asked to the Land Assessment Committee of Irbid or to the owner of land who purchased the land in 1979. Six sites with the most comparable conditions to IIE were questioned or interviewed. Results of this survey is in Table 9.4. The first site out of six is located in the existing industrial area by assuming it could be sold, although it cannot be sold. The second is in the existing industrial zone adjacent to the existing industrial area, the third is a site close to the existing industrial area which was purchased by a manufacturer in 1979. The remaining three are the sites with the same time-distance to IIE and with paved road. All six have almost the same time-distance from the city center as IIE and a paved access road except one having dirt access road. But they are not comparable to IIE in terms of (1) no paved road to the land not facing to the street, (2) no institutional benefits such as the two years' extra tax holiday expected for IIE or easy procedure and access to licensing and financing, (3) no common facility services, (4) not full service of piped water and (5) not enough number of telephone lines.

912    Since datum 6 in Table 9.4 seems to be too low as compared to other data, it is better to exclude it as an extreme data. Then the land price in 1980 with almost the same distance as IIE and facing to a reasonable street ranges from JD 15,000 to JD 30,000 per donum. Among these, the most comparable site to IIE is the existing industrial area, and the site within the existing industrial area and facing to a street, i.e., datum 1, showed the price range of JD 22,000 to JD 25,000 per donum, which is just in the middle of the other prices. Thus JD 23,500 per donum which is the mean of the above prices can be used as a reasonable estimate for the land price of the existing industrial area. In the General Survey and Applicant Survey, the land rent desired by industrialists is, in almost all cases, 10 percent of the desired level of land price. Hence, the reasonable market land rent of the existing industrial area is assumed to be 10 percent of JD 23,500, that is, JD 2,350 per donum per year.

913    As compared to the existing industrial area, IIE shall have more services to offer as follows:

        i)   better water supply,
       ii)   better telephone services, and
      iii)   common workshop services.

A premium to be given by these extra services of IIE should be added on top of the rent estimated in the previous paragraph.

Table 9.4  Land Price, Irbid, 1980

| Site | Land within 100 m from Street | | | |
| | Land Facing to the Street (JD/Donum) | | | Land Not Facing to the Street (JD/Donum) |
| | Main Street | Secondary Street | Low Grade Secondary Street | |
|------|-------------|------------------|----------------------------|---|
| 1 | | 22,000 | | 15,000 |
| | | ? | | ? |
| | | 25,000 | | 18,000 |
| 2 | 30,000 | 25,000 | 18,000 | 12,000 |
| | | | | ? |
| | | | | 15,000 |
| 3 | 20,000 | | | 15,000 |
| | ? | | | ? |
| | 25,000 | | | 18,000 |
| 4 | 15,000 | | | 12,000 |
| 5 | | | | 12,000 |
| 6 | | 7,000 | | 6,000 |

Source:  Land Assessment Committee of Irbid and Study Team.

914      As to the water supply, IIE will offer full water supply
while the existing industrial area has no water supply.  Factories in
the existing industrial area buy water by tank trucks.  The cost of
tank truck water consists of (1) one $JD/m^3$ for water and (2)
JD $0.84/m^3$ of construction cost of water reservoir as well as a
pump by individual factory.[1]  Cost of piped water for factories to
be located in IIE shall be JD $0.086/m^3$ only, which is the average
effective water charge by the Irbid Municipality in 1979 (JD 0.078[2])
inflated by 10 percent to be 1980 price.  Thus the total saving per $m^3$

---

[1]  Construction cost of water  reservoir and pump of IIE is estimated
to be JD 126,000.  Total water to be supplied to IIE is 225,000 $m^3/Yr$
(750 $m^3/day$ x 300 operation days of factories).  If we assume the
economy of scale of water supply system is 1/1.5, the cost of individual
water is estimated to be JD 126,000 ÷ 225,000 $m^3$ x 1.5 = JD $0.84/m^3$.

[2]  Weston Report, Annex E-10.

of water per year by all factories to be in IIE becomes (1) JD 0.914
((1.000-0.086)/m³/Yr) plus (2) JD 0.084/m³/Yr (10 percent of 0.84)
totaling to be JD 0.998/m³/Yr. Water consumption by all factories in
IIE is estimated to be 225,000 m³/Yr. Here, it can be assumed that
this benefit from piped water can be represented by a premium on site
rent. The size of factory land is to be 186,553 m². Then, the premium
on factory land rent per m² ($P_W$) is:

$$P_W = \frac{0.998 \times 225,000}{186,553} \doteqdot 1.2 \ (JD/m^2/Yr).$$

915      As to the telephone service, the cost of no telephone to a
factory is (1) cost of having an office in downtown with telephone
plus (2) transportation cost between the downtown office and IIE.
Meanwhile, the cost of telephone in IIE is only telephone charge, which
can be cancelled out by the telephone charge at the downtown office.
The cost of the downtown office is (1) JD 200 (JD 25/m² x 8 m²) of
office rent per year plus (2) JD 1,000 of the annual salary of one
clerk, and the cost of transportation is (3) JD 150 of an motor cycle
operating cost including, depreciation, totaling to be JD 1,350/Yr.
Weighted average size of a factory land in IIE is to be 574 m²/factory.
Thus, the estimated premium on factory land rent per m² ($P_T$) is:

$$P_T = 1,350/574 = 2.4 \ (JD/m^2/Yr).$$

916      As to the common workshop services, the cost of no workshop
is (1) transportation cost of carrying the necessary machine parts from
Irbid to Amman and coming back plus (2) time cost used for this commuta-
tion. The transportation cost is JD 333 per year assuming twice-a-week
commutation, and the time cost is JD 200 per year, totaling to be
JD 533/Yr. Then, the estimated premium on factory land rent per m²
($P_{CW}$) is:

$$P_{CW} = 533/574 = 0.9 \ (JD/m^2/Yr).$$

917      Combining all above premiums, the total premium on factory
land per m² is estimated to be JD 4.5/m²/Yr, while the estimated rent
at the existing industrial area is JD 2.4/m²/Yr (=2,350/1,000). If we
take up conservatively only 10 percent of the estimated total premium, the
reasonable market rent of IIE will be JD 2.9/m²/Yr (=2.4 + 0.5 = 2.9).

918      Having examined all above data derived from the two methods,
the best estimate of the market land rent of IIE will be the estimate
made by the second method, i.e., JD 2.9/m²/Yr for factory land. This
estimated market rent should further be examined in terms of competi-
tiveness against the proposed rent for the Amman Industrial Estate
at Sahab. This will be discussed in Section 9.2.2.3.

c. <u>Floor Rent</u>

919     As to the floor rent, it is impossible to find present market prices of floor rent separately from land rent. All available data are rent on floor implicitly including the land rent on which the floor is situated. Thus, in order to find out pure floor rent excluding land rent, at first the combined rent on floor and land should be estimated and then the land rent estimated in the previous section should be deducted from the combined rent. As to the combined rent, three data are available.

920     The first data are the General Survey in Irbid and General Survey in Amman, in which there is a question about rents actually paid by industrialists. Results are shown in Annex 9.4 and 9.5. As shown in the Annex, taking out extreme rents in the highest and the lowest brackets, the combined rent paid by industrialists leasing less than 0.5 donum ranges from JD $1.5/m^2$ to JD $13.5/m^2$ with its mode at JD 3 or $4/m^2$ in terms of all data and from JD $4.7/m^2$ to JD $13.5/m^2$ in terms of 1980 data in Irbid, and ranges from JD $3.3/m^2$ to JD $20/m^2$ with its mode at JD $20/m^2$ in terms of all data and from JD $8/m^2$ to JD $20/m^2$ in terms of 1978 and 1979 data in Amman.

921     The second is the data about a rental commercial building adjacent to the existing industrial area. The floor is facing to a low grade secondary street forming a boundary of the existing industrial area, and has 8 small stores. In total, 206 $m^2$ of floor was let out at JD 4,150 per year with JD 5,000 of key money, that is concession money, at its contract date in 1979. Here, the key money is not the cost to tenants since tenants can recover it from succeeding tenants at an inflated rate, but it is really an income to the owner. Since IIE is a governmental undertaking and shall not charge the key money to tenants and since we are trying to find the market price that tenants are willing to pay, the key money should be excluded from the price. Thus, the combined price of this commercial floor is JD $20.1/m^2$.

922     The third data are the rent charged to tenants in the existing industrial area. They are in Table 9.5, and range from JD $4.3/m^2$ to JD $11.5/m^2$ with their mode at JD $4.3/m^2$.

923     The most comparable data are those of Phase III in Table 9.5, whose rent is actually contracted in 1980 and whose location is in the existing industrial area. And there is some tenants who agreed to pay JD $11.5/m^2$. Taking account of extra services by IIE, the market rent will be more than JD $11/m^2$. According to the first data, there are relatively many factories paying JD $20/m^2$. Since JD $20/m^2$ is the rent in Amman, the rent in Irbid would be less. In addition, a commercial floor with the most comparable condition to IIE was let out at JD $20/m^2$ in 1980. Since a rent of industrial floor is generally less expensive than that of commercial floor, the market rent of IIE will be less than JD $20/m^2$. Thus, it is reasonable to assume that the combined market rent of IIE to be JD $15/m^2$.

Table 9.5    Rent in Existing Industrial Area

| Phase | Year | Moving Method | Type | Price/Type (JD) | Key Money | Rent (JD/m$^2$) |
|---|---|---|---|---|---|---|
| Phase I | 1970 | Compulsory | With front yard | | None | |
| | | | 144 m$^2$ | 150 : main | | 2.0 |
| | | | 74.1 m$^2$ | 400 | | 5.4 |
| | | | | 450 | | 6.1 |
| Phase II | | Voluntary | Without yard | | None | |
| | | | 56.3 m$^2$ | 230 : main | | 4.1 |
| | | | 54.9 m$^2$ | 260 : main | | 4.7 |
| | | | 74.9 m$^2$ | 275 | | 3.7 |
| | | | | 320 | | 4.3 |
| | | | | 420 | | 5.6 |
| Phase III | 1979–1980 | Compulsory | Without yard | | None | |
| | | | 40.0 m$^2$ | 170 : main | | 4.3 |
| | | | | 450 | | 11.3 |
| | | | | 460 | | 11.5 |

Source:  Irbid Municipality.


924      Since the market land rent was estimated to be JD 2.9/m$^2$/Yr, the market rent of pure factory floor is estimated to be JD 12.1/m$^2$ (=15 - 2.9).  This floor rent should, also, be re-examined by the floor rent proposed for Amman Industrial Estate.


9.2.2.3   Prices in Amman Industrial Estate

925      Prices proposed for Amman Industrial Estate at Sahab (hereinafter referred to as AIE) are in Table 9.6.  Although AIE Report does not specify the base year for cost calculation, it seems to be mid-1978 prices according to the Report's context.  The cost of living in Jordan rose by 27.3 percent and the whole sale price by 33.9 percent from 1978 to 1980.  If we assume that the market rent of land and floor increased by 30 percent from 1978 to 1980, the rents proposed for AIE are estimated to be JD 0.78/m$^2$ for the land and JD 13/m$^2$ for the floor at mid-1980 prices.

Table 9.6    Prices Proposed for Amman Industrial Estate

| Item | Policy | Pricing Policy | Price at 1978 Prices |
|------|--------|---------------|---------------------|
| Land | Lease only | Annual rent being 6% of prevailing market price. Market price increasing 40% every 5 years. | 0.6 $JD/m^2/Yr$ 40% increase every 5 years. |
| Factory Building | No factory building | n.a. | n.a. |
| | Selling standard factory | Price being cost plus 10% profit margin. $P = (Cost) \times 1.1$ | 74 $JD/m^2$ for Phase I (1979-82). |
| | Leasing standard factory | Annual rent = (Net return of 9% per annum on the total building cost plus engineering plus Contingencies) + (Annual cost = depreciation plus property tax plus administration, maintenance and insurance) | Phase I (1979-82). 10 $JD/m^2/Yr$ 40% increase every 5 years. |

Source:   Chemech Industries Ltd. and Jardanel Engineering Office, Amman Industrial Estate and Free Trade Zone, Phase I Final Report, NPC and IDB of Jordan, 1979.

926      The estimated market rents for IIE are JD 2.9/$m^2$ for its land and JD 12.1/$m^2$ for its floor.  As compared to the rents for AIE, the land rent of IIE is 3.7 times higher and the floor rent is 6.9 percent less than that of AIE.  So, the floor rent seems to be competitive against that of AIE but the land rent seems to be incompetitive. This large difference in land rents is mainly created by (1) the market prices of industrial land, i.e., 29 JD/$m^2$ for IIE and 13 JD/$m^2$ (after adjusting to 1980 prices) for AIE and (2) the conversion factors from the land prices to the rents, i.e., 10 percent for IIE and 6 percent for AIE.  At first, since commercial banks' real estate loan is lent at 9 to 10 percent in 1980, it is better taking-up 10 percent conversion factor than taking up 6 percent.  Although AIE's report does not specify the data for proposing the land price of JD 10/$m^2$ in 1978, it seems that the price difference is created by their locational difference.  IIE is located at only 3 km away from the Irbid center, and this location provides IIE with privilege to enjoy all urban

services available in the Irbid Municipality such as housing service
and supporting industries. Meanwhile, AIE is located at 13 km away
from the Amman center not being allowed to enjoy any urban services of
Amman. So, the price difference between JD 29/m² and JD 13/m² seems
to be reasonable.

927        As to the competitiveness, large-scale industries might
prefer to be in AIE but small and medium-scale industries that are
main target of IIE will prefer to be close to the city even if the
price is high, since they cannot survive without customers from the
city and without supporting activities in the city. In addition, most
of the target industries of IIE are regional market oriented, so they
cannot move to another city.

928        Finally, it should be noted that AIE's rents are scheduled
to increase by 40 percent every five years. Let us compare the two
rents of the same unit of factory land and building computed by the
IIE rent and AIE's rent. It is in Table 9.7.

Table 9.7    Rent Comparison of AIE and IIE[1/]

|  |  | (Unit: JD/unit/Yr) | | |
|---|---|---|---|---|
|  |  | 1980 | 1985 | 1990 |
| AIE Rent | Land | 281 | 393 | 550 |
|  | Floor | 1,664 | 2,330 | 3,261 |
|  | Total | 1,945 | 2,723 | 3,811 |
| IIE Rent | Land | 1,044 |  |  |
|  | Floor | 1,549 |  |  |
|  | Total | 2,593 | 2,593 | 2,593 |

Source:   Study Team.

Note:    1/  These are computed based on the assumption
             that factory land is 360 m², and factory
             building floor is 128 m². The ratio of the
             floor to the land is 35.5 percent, which is
             the average ratio of IIE.

As shown on the Table, after five years, the AIE's rent becomes 5 per-
cent higher than the IIE's rent. Needless to mention, the rent of
AIE exceeds that of IIE in 1990. Thus, after five years, the IIE rent
becomes lower than that of AIE. Taking account of the 20 years of
lease, the IIE rent is less expensive than that of Sahab. Consequently,
the land and floor rent of IIE will be competitive to those of AIE with
those condition stated above.

## 9.2.2.4 Pricing of Revenue Sources Other than Factory Land and Floor

### a. Commercial Floor Rent

929    As already discussed before, there is data of a rental commercial building next to the existing industrial area. Its combined rent, that is, the rent for both floor and land, is JD $20.1/m^2$ at present. Taking account of larger size of customers and better infrastructure services which IIE shall provide, it can be assumed that the commercial floor rent of IIE be 10 percent higher than the above rent, i.e., JD $22/m^2$, which is about 47 percent higher than the combined market rent of industrial floor in IIE.

### b. Gas Station Rent

930    The market rent of the gas station land is assumed to be the same as that of industrial land, i.e., JD $2.9/m^2$, and the market rent of the gas station building is assumed to be the same as that of commercial building, i.e., JD $19.1/m^2$ (22.0 - 2.9 = 19.1).

### c. Users' Charge on Common Workshop and Training Program

931    Generally speaking, users' charge on public facilities covers its operation and maintenance cost and does not cover the capital cost. Based on this principle, the users' charge on the common workshop in IIE is estimated in Table 9.8. As shown on the Table, JD 14,471 should be recovered every year as the users' charge.

Table 9.8    O/M Cost of the Common Workshop

| Cost Item | Cost (JD) |
|---|---|
| (1) Salaries and Wages | One division chief (400/month) ⎫ x 1/2 (share <br> One senior assistant (350/month) ⎬ of workshop) <br> One junior assistant (250/month) ⎭ <br> 1,000x12x0.5=6,000 (JD/Yr/workshop) |
| (2) Office Overhead Expenses | 30% of (1) = 1,800 (JD/Yr/workshop) |
| (3) Promotional Expenses | 0 |
| (4) Facility Maintenance Expenses | 3% of building, machine and equipment costs <br> = 0.03 x (288 $m^2$ x 95 JD/$m^2$ + 195,000 JD) <br> ≒ 6,671 (JD/Yr/Workshop) |
| Total O/M cost = (1)+...+(4) | 14,471 (JD/Yr/workshop) |

Source: Study Team.

### d. Users' Charge on Convention Rooms

932    The same general principle as above is adopted for the user's charge on convention rooms. O/M cost of the convention rooms is computed in Table 9.9. According to the Table, JD 2,025 should be recovered every year as the users' charge.

Table 9.9    O/M Cost of Convention Rooms

| Cost Item | Cost |
|---|---|
| (1) Salaries and Wages | One clerk (150/month)<br>= 150 x 12 x 0.5 = 900 (JD/Yr) |
| (2) Office Overhead Expenses | 30% of (1) = 270 (JD/Yr) |
| (3) Promotional Expeneses | 0 |
| (4) Facility Maintenance Expenses | 3% of building<br>= 0.03 x (300 $m^2$ x 95 $JD/m^2$)<br>= 855 (JD/Yr) |
| Total O/M Cost = (1) + ... + (4) | 2,025 (JD/Yr/convention rooms) |

Source:  Study Team.

### 9.2.2.5  Summary of Pricing Policy

933    Best estimate of the market rent of various revenue items is summarized in Table 9.10.

Table 9.10    Summary of Market Rent for IIE

(Unit:  $JD/m^2/Yr$)

| Revenue Item | Rent | | | Users' Charge (JD/Yr) |
|---|---|---|---|---|
| | Land | Floor | Combined | |
| Factory | 2.9 | 12.1 | 15.0 | − |
| Commercial Floor | n.a. | n.a. | 22.0 | − |
| Gas Station | 2.9 | 19.1 | 22.0 | − |
| Common Workshop | n.a. | n.a. | n.a. | 14,471 |
| Convention Rooms | n.a. | n.a. | n.a. | 2,025 |

Source:  Study Team.

### 9.2.3 Land and Floor Lease Schedule

934     As shown in Figure 7.1, land and floor lease contract can start right after the detail design of IIE, but actual occupancy of the land and floor shall not start before the completion of some part of Standard Factory Building and Custom Built Factory. Consequently, the occupancy of land and floor can start 6 month after the start of factory building construction, i.e., at the beginning of 1984.

935     As discussed in Section 9.2.1, there are six sources of revenue. As to the Standard Factory Buildings, they will be occupied as soon as they become available. Therefore, it is assumed that 50 percent of them will be occupied in 1984 and the remaining 50 percent in 1985. As to the Custom Built Factory, they will be occupied within two years phases after their completion and the peak of occupany will be right after the completion of IIE, i.e., 1985, since all the off-site and on-site infrastructure services will become available at the end of 1984. Therefore, it is assumed that 20 percent, 50 percent and 30 percent of them will be occupied in three phases of 1984, 1985 and 1986 respectively. In addition, if the inflation rate of construction activities is taken into account, it is better to build factories as early as possible rather than postponing their construction to the further future. As to commercial floors, they will also start to be occupied after the completion of IIE. So, it is assumed that 50 percent of them will be occupied in 1985 and the rest in 1986. As to the gas station, it is assumed to be occupied in 1985.

936     Table 9.11 showing the land and floor lease schedule was constructed based on the assumptions mentioned above.

#### Table 9.11    Land and Floor Lease Schedule

| Revenue Source | Unit | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | Total |
|---|---|---|---|---|---|---|---|---|
| (1) Standard | | | | | | | | |
| Factory | % | | | | 50 | 50 | | 100 |
| Land | m² | | | | 26,860 | 26,859 | | 53,719 |
| Floor | m² | | | | 11,327 | 11,326 | | 22,653 |
| (2) Custom Built | | | | | | | | |
| Factory | % | | | | 20 | 50 | 30 | 100 |
| Land | m² | | | | 26,567 | 66,417 | 39,850 | 132,834 |
| Floor | m² | | | | 8,712 | 21,780 | 13,068 | 43,560 |
| (3) Commercial | | | | | | | | |
| Floor | % | | | | | 50 | 50 | 100 |
| Land | m² | | | | | 424 | 424 | 848 |
| Floor | m² | | | | | 424 | 424 | 848 |
| (4) Gas Station | % | | | | | 100 | | 100 |
| Land | m² | | | | | 600 | | 600 |
| Floor | m² | | | | | 150 | | 150 |

Source:  Section 9.2.3.

937      Revenue from users' charges is dependent on the rate of
utilization of facilities, and the rate is dependent on occupancy rate
of factory land. The occupancy rate calculation is shown in Table 9.12.

Table 9.12    Occupancy Rate of Factory Land

| | At the End of | | | | |
|---|---|---|---|---|---|
| | 1983 | 1984 | 1985 | 1986 | 1987 |
| Occupancy of Factory Land | | | | | |
| (Computation) | 0 | $\dfrac{26,860+26,567}{186,553}$ | $\dfrac{53,427+26,859+66,417}{186,553}$ | | |
| (%) | | = 28.6 | = 78.6 | 100.0 | 100.0 |

| | In the Middle of | | | | |
|---|---|---|---|---|---|
| | 1983 | 1984 | 1985 | 1986 | 1987 |
| (%) | 0 | 14.3 | 53.6 | 89.3 | 100.0 |

Source: Table 9.11.


9.3  Operation and Maintenance Costs Estimate

938      Operation and maintenance costs (OMC) of IIE cover the follow-
ing category of expenses:

    i)    Salaries and Wages
    ii)   Office Overhead Expenses
   iii)   Promotional Expenses
   iv)   Facilities Maintenance Expenses

Under the standard accounting practice, promotional expenses are normally
included in the office overhead. However, since IDA as executing
organization is a new entity and also the project concept is not familiar
to the local communities, extra defrayals for public relations and
marketing including expenses for preparation of the marketing aids as
well as extensive travels will be required in the beginning. Such
period will be the first three years and then the expenses will be sub-
stantially reduced to the level reasonably absorbed within the overhead
expenses. Accordingly, it is recommended to separate this promotional
expenses from the general overhead expenses at the initial stage.

a. <u>Salaries and Wages</u>

939    Taking into consideration the salary of the similar organization in Jordan, the reasonable salary scale of IDA will be as follows:

Table 9.13   Proposed Salary Scale of IDA

| Position | Career Experience (Years) | Monthly Salary (JD) |
|---|---|---|
| 1. Chairman | Gov. high official | 500[1/] |
| 2. Director General | 20 up | 850 |
| 3. Department Manager | 15 up | 600 |
| 4. Division Chief | 10 up | 400 |
| 5. Senior Assistant | 8 up | 350 |
| 6. Junior Assistant | 6 up | 250 |
| 7. Clerk | | 150 |
| 8. Secretary | | 100 |
| 9. Typist | | 80 |
| 10. Driver | | 80 |
| 11. Mis. Service Staff | | 80 |

Source: Study Team.

Note:   1/  Part time duty.

b. <u>Office Overhead Expenses (OOE)</u>

940    OOE will cover the following expenses.

    i)   Office rent
   ii)   Office supply
  iii)   Transportation
   iv)   Social securities
    v)   Library
   vi)   Communications
  vii)   Utilities
 viii)   Depreciation
   ix)   Meetings
    x)   Miscellaneous

According to the survey on a similar organization in Jordan, it is
reported that OOE will be in the range of 25 percent to 30 percent of
the salaries. Therefore, 30 percent of the salaries is assumed to be
reasonable for estimation of IDA's OOE.

c. Promotional Expenses

941      Promotional expenses will cover the following:

i)   Preparation of the marketing aids such as brochures
ii)  Advertisements (Newspaper, TV, etc.)
iii) Public relations
iv)  Travels (both local and abroad)

It is estimated that JD 10,000 per year will be required for the first
3 years.

d. Facilities Maintenance Expenses (FME)

942      Facilities maintenance expenses will cover the following
maintenance works and its required annual expenses are assumed to be
3 percent of the initial investment.

i)   Upkeeping all the facilities owned by IDA.
ii)  Operation of the common workshop but exclude it personnel
     cost.

e. Utility Cost

943      In addition to above, utility cost is usually incurred if any
of the utilities is supplied by an industrial estate. But, in the case
of IIE, all the utility facilities are assumed to be operated and
managed by respective entities different from IDA. So, these are not
included in the O/M cost of IDA but will be covered by individual
tenants.

944      OMC as well as FME were arranged according to the implementa-
tion schedule of IIE and are shown in Tables 9.14 and 9.15 respectively.


9.4 Financial Analysis

9.4.1 Specification of Alternatives

945      Alternatives are generated by different assumptions in lease/sales
of industrial land, existence/nonexistence of custom made factories and
purchasing/borrowing of the estate land by IDA. Five cases are assumed
as in Table 9.16.

Table 9.14　Operation and Maintenance Cost

| | 1981 0 | 1982 1 | 1983 2 | 1984 3 | 1985 4 | 1986 5 | 1987 6 | .... | 2004 23 |
|---|---|---|---|---|---|---|---|---|---|
| (1) Salaries & Wages | 0 | 66 | 80 | 84 | 96 | 96 | 96 | .... | 96 |
| (2) Office Overhead Expenses | 0 | 20 | 24 | 25 | 29 | 29 | 29 | .... | 29 |
| (3) Promotional Expenses | 0 | 10 | 10 | 10 | 0 | 0 | 0 | .... | 0 |
| (4) Facility Maintenance Expenses | | | | | 47 | 94 | 142 | .... | 142 |
| Total | 0 | 96 | 114 | 119 | 172 | 219 | 267 | .... | 267 |

Source:　Section 9.3.

Table 9.15　Facility Maintenance Expenses[1]

| | 1981 0 | 1982 1 | 1983 2 | 1984 3 | 1985 4 | 1986 5 | 1987 6 | .... | 2004 23 |
|---|---|---|---|---|---|---|---|---|---|
| (1) Building | | | | | 45 | 90 | 136 | .... | 136 |
| (2) Machines & Equipments | | | | | 2 | 4 | 6 | .... | 6 |
| (3) Total = (1) + (2) | | | | | 47 | 94 | 142 | .... | 142 |

Source:　Section 9.3.

Note:　[1]　3% of building, machines and equipments.

## 9.4.2 Financial Cost of Capital

946     According to IDB, term loan available in commercial market
are:

  i)  Consortium loan of commercial banks and insurance company
      or IDB or others is at 9 percent plus 1 percent in 1980,
      and

  ii) Real estate and commerical center loan by commercial
      banks is at 9.1 percent for 7 years in 1980.

According to the official comment made on the Draft Final Report, the
interest rate on local syndicate loans in 1980 was 10.25 percent and
the debt financing interest rate on local borrowing shall not be less
than 12 percent. Based on this comment, it is decided to adopt the
interest rate of 12 percent for the debt financing from local borrowing.
As to the foreign financing, the World Bank loan is at 8.25 percent and
the loan of Japanese Export-Import Bank is between 8 and 9 percent.
So, the cost of foreign loan seems to be at 9 percent. Meanwhile, JIEC
is financed by equity capital participation of Jordan Government and
her appratus and by foreign loans. As to the loans, it is to receive
loans from Kreditanstalt für Wiederaufbau (KfW) at 4 percent and from
European Investment Bank at 8.5 percent through IDB. Also, IDB's loan
to entrepreneurs in Irbid is at 7 percent plus 1 percent. Taking
account of these, it seems the financial cost for equity capital is 9
percent in 1981 which is the starting date of project.


## 9.4.3 Financial Analysis

947     Financial feasibility indicators of 5 Alternatives were
calculated in Annex 9.6 to 9.9.2 and their results are in Table 9.16.
They are classified into 2 groups: the first group consisting of
Alternatives 1, 2 and 5 has Custom Built Factory and the second group
consisting of Alternatives 3 and 4 does not have Custom Built Factories.

948     The second group shows a lower return than the first group,
since the second group lacks the Custom Built Factory which is a profit
center. Thus, it is recommended to provide Custom Built Factory in
terms of financial profitability.

949     What is left is the first group, i.e., Alternatives 1, 2 and
5. Among them the sales policy, i.e., Alternative 1, shows better FIRR
than Alternatives 2 and 5. Thus, in terms of pure financial internal
rate of return, sales policy is the best. However, from the organiza-
tional and institutional point of view, leasing policy is recommended
as being discussed in previous Chapters. Consequently, Alternatives
2 and 5 are recommended, although they show the lower financial internal
rate of return than the sales policy. Among these two, Alternative 5
shows better FIRR than Alternative 2. In addition, the official
comments on the Draft Final Report recommended us to take up the policy
for IDA to purchase the land. Thus, Alternative 5 is recommended.

Table 9.16 Specification of Alternatives

(Unit: JD at Mid-1980 Prices)

| Alternative | Policy on Factory Land & Bldg. | Pricing of Custom Built Factory Rent or Price | Pricing of Other Revenue Sources | | | IRR (%) |
|---|---|---|---|---|---|---|
| | | | Standard-Factory | Commercial Floor | Gas Station | |
| Alternative 1 | Sales of Custom Built Factory land and floor (Land is purchased by IDA) | At market prices Land at JD 29/m$^2$ Floor at JD 121/m$^2$ | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 12.1/m$^2$/Yr No increase | At market rents Combined rent at JD 22/m$^2$/Yr No increase | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 19.1/m$^2$/Yr No increase | 8.9 |
| Alternative 2 | Lease of Custom Built Factory land and floor (Land is borrowed by IDA) | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 12.1/m$^2$/Yr No increase | Same as above | Same as above | Same as above | 8.6 |
| Alternative 3 | No Custom Built Factory, and land sales (Land is purchased by IDA) | At market price Land at JD 29/m$^2$ No increase | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 12.1/ m$^2$/Yr No increase | At market rents combined rent at JD 22/m$^2$/Yr No increase | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 19.1/m$^2$/Yr No increase | 8.2 |
| Alternative 4 | No Custom Built Factory, and land lease (Land is borrowed by IDA) | At market rent Land at JD 2.9/m$^2$/Yr No increase | Same as above | Same as above | Same as above | 7.7 |
| Alternative 5 | Lease of Custom Built Factory land and floor (Land is purchased by IDA) | At market rents Land at JD 2.9/m$^2$/Yr Floor at JD 12.1/m$^2$/Yr No increase | Same as above | Same as above | Same as above | 8.7 |

Source: Study Team.

IX-21

## 9.4.4 Betterment of Recommended Policy

950      In the previous section, Alternative 5, that is the leasing
policy at the market rents, is recommended. Although its rent as a
whole is cheaper than that of AIE, its initial rent is still higher
than AIE rent. In order to reduce the relatively high initial cost to
potential tenants, another alternative with lower rent at the beginning
and with gradual increase thereafter in real term was designed. That
is Alternative 5-1, which is based on Alternative 5. This has the rents
which is 20 percent lower than the market rents at the beginning and
the rents will be increased by 20 percent every 5 years. By this 20
percent deduction at the initial stage, the initial rent becomes almost
comparable to the AIE's rent.[1] Its FIRR computation is in Table 9.17.

951      Alternative 5-1 is better than Alternative 5, since:

   i)   Alternative 5-1 shows the FIRR of 8.9 percent, which is
        almost identical but slightly higher than the FIRR of
        Alternative 5.

   ii)  Its starting rent is lower than Alternative 5, creating
        easier access for industrialists to move in, and

   iii) Its rents' increase will reflect the increase in real-
        estate value, which will be caused by urban expansion
        of Irbid city, relative to the general inflation.

Besides, the 20 percent increase is more reasonable than 40 percent as
assumed in AIE. Thus, Alternative 5-1 is recommended.

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[1]  The average ratio of the factory floor to the factory land in IIE
is 35.5 percent. Here we assume a hypothetical land and building with
360 $m^2$ of land and 128 $m^2$ of factory floor, the ratio of its floor to
its land is 35.5 percent. The combined rent for land and floor of this
unit becomes JD 1,945/Yr in terms of AIE's rent and JD 2,070/Yr in terms
of Alternative 5-1 rent.

Table 9.17   Financial Analysis of Alternative 5-1

(Unit: Million JD at 1980 Prices)

| Year | | Total Cost (M. JD) | Rent | | Revenue from | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Land Rent (JD/m²/Yr) | Floor Rent (JD/m²/Yr) | Custom Built Factory Land | Custom Built Factory Floor | Standard Factory Land | Standard Factory Floor | Commercial Floor | Gas Station | Users' Charge | Final Value of Land | Total (M. JD) |
| 1981 | 0 | 2.025 | | | | | | | | | | | 0 |
| 82 | 1 | 0.515 | | | | | | | | | | | 0 |
| 83 | 2 | 2.812 | | | | | | | | | | | 0 |
| 84 | 3 | 3.961 | 2.3 | 9.7 | 0.031 | 0.042 | 0.031 | 0.055 | | | 0.005 | | 0.164 |
| 85 | 4 | 0.172 | | | 0.137 | 0.190 | 0.093 | 0.165 | 0.003 | 0.001 | 0.011 | | 0.600 |
| 86 | 5 | 0.219 | | | 0.260 | 0.359 | 0.124 | 0.220 | 0.008 | 0.003 | 0.016 | | 0.990 |
| 87 | 6 | 0.267 | | | 0.306 | 0.423 | 0.124 | 0.220 | 0.010 | 0.003 | 0.016 | | 1.102 |
| 88 | 7 | 0.267 | | | 0.306 | 0.423 | 0.124 | 0.220 | 0.010 | 0.003 | 0.016 | | 1.102 |
| 89 | 8 | 0.267 | 2.8 | 11.6 | 0.372 | 0.505 | 0.150 | 0.263 | 0.012 | 0.003 | 0.016 | | 1.321 |
| 90 | 9 | 0.267 | | | 0.372 | 0.505 | 0.150 | 0.263 | 0.012 | 0.003 | 0.016 | | 1.321 |
| 91 | 10 | 0.267 | | | 0.372 | 0.505 | 0.150 | 0.263 | 0.012 | 0.003 | 0.016 | | 1.321 |
| 92 | 11 | 0.267 | | | 0.372 | 0.505 | 0.150 | 0.263 | 0.012 | 0.003 | 0.016 | | 0.321 |
| 93 | 12 | 0.267 | | | 0.372 | 0.505 | 0.150 | 0.263 | 0.012 | 0.003 | 0.016 | | 1.321 |
| 94 | 13 | 0.482 | 3.3 | 14.0 | 0.438 | 0.610 | 0.177 | 0.317 | 0.015 | 0.004 | 0.016 | | 1.577 |
| 95 | 14 | 0.267 | | | 0.438 | 0.610 | 0.177 | 0.317 | 0.015 | 0.004 | 0.016 | | 1.577 |
| 96 | 15 | 0.267 | | | 0.438 | 0.610 | 0.177 | 0.317 | 0.015 | 0.004 | 0.016 | | 1.577 |
| 97 | 16 | 0.267 | | | 0.438 | 0.610 | 0.177 | 0.317 | 0.015 | 0.004 | 0.016 | | 1.577 |
| 98 | 17 | 0.267 | | | 0.438 | 0.610 | 0.177 | 0.317 | 0.015 | 0.004 | 0.016 | | 1.577 |
| 99 | 18 | 0.267 | 4.0 | 16.8 | 0.531 | 0.732 | 0.215 | 0.381 | 0.018 | 0.005 | 0.016 | | 1.898 |
| 2000 | 19 | 0.267 | | | 0.531 | 0.732 | 0.215 | 0.381 | 0.018 | 0.005 | 0.016 | | 1.898 |
| 01 | 20 | 0.267 | | | 0.531 | 0.732 | 0.215 | 0.381 | 0.018 | 0.005 | 0.016 | | 1.898 |
| 02 | 21 | 0.267 | | | 0.531 | 0.732 | 0.215 | 0.381 | 0.018 | 0.005 | 0.016 | | 1.898 |
| 03 | 22 | 0.267 | | | 0.531 | 0.732 | 0.215 | 0.381 | 0.018 | 0.005 | 0.016 | | 1.898 |
| 04 | 23 | 0.267 | 4.8 | 20.1 | 0.638 | 0.876 | 0.258 | 0.455 | 0.021 | 0.006 | 0.016 | 1.456 | 3.726 |

Note:   FIRR = 8.86% [1]
        NPV = 41.93 (million JD) at 12% [2]      1/: Computed by DCF of IBM.

Source:  Study Team.

## 9.4.5 Financial Feasibility and Financial Arrangement

952     So far Alternative 5-1 is recommended as the policy to be adopted. Now it is necessary to see the financial feasiblity of Alternative 5-1. Financial feasibility of this project is dependent on who will finance it. To know whether or not this project is commercially viable under a private undertaking, we should assume that all the project cost be financed by the local borrowing which is at 12 percent as discussed in Section 9.4.2. The FIRR of Alternative 5-1 is quite lower than 12 percent, and consequently this project is not commercially viable. Thus, in order to make this project be financially feasible, the participation of the Central Government in its equity capital and in arranging foreign loans for the project is required.

953     Most of projects raise both equity capital and loan capital. Syndicate loans from international banks generally require the debt-equity ratio at 70:30 these days. Thus, it is reasonable to assume that 70 percent of the project cost be financed by loan. But according to the official comment on the Draft Final Report, the 70 percent debt is too high in Jordan. Considering the fact that the maximum debt-equity ratio required by IDB for the project in less developed regions is 60:40, the debt-equity ratio for IIE is moderately assumed to be 50:50. So the equity participation by the Central Government or its financing agencies up to 50 percent of the project cost is recommended. In addition, remembering that the foreign portion accounts for 42 percent of the total project cost (see Table 7.4), it is recommended that the Central Government try to arrange foreign loans from bilateral or multilateral aid agencies up to 42 percent of the project cost. The rest, which is 8 percent, is assumed to be financed by local borrowing. By these arrangements, the average financial cost of this project can substantially be reduced as shown below:

| Source | Interest Rate or Dividend | Share in Total Project Cost (%) |
|---|---|---|
| Equity | 7.5 | 50 |
| Foreign Loan | 9.0 | 42 |
| Local Borrowing | 12.0 | 8 |
| Average | 8.5 | 100 |

If the Central Government or public financing agencies participate the equity up to 50 percent with the expected internal rate of return of 7.5 percent on its equity, it can reduce the average financial cost down to 8.5 percent, which is lower than the FIRR of Alternative 5-1. As a conclusion, in order to make this project be financially feasible, the above financial arrangement is recommended. With this arrangement, the project will be financially feasible.

### 9.4.6 Local Borrowing Finance and Building Cost Reduction

954    In the previous section, a specific financial arrangement was recommended. However it could happen that the arrangement cannot be available to the project. The worst case is to finance the project totally by the local borrowing, i.e., the cost of finance is at 12 percent as discussed in Section 9.4.2. In order to make this project feasible at this cost of finance, reduction of the project cost is the must. For this purpose, new Alternatives 1-2, 2-a, 3-a, 4-a, 5-a and 5-1-a are generated. Since the land development cost is hard to be reduced, reduction of all building costs is assumed. Thus, new Alternatives are basically revised versions of Alternatives 1 to 5-1 with 20 percent reduction in all building costs[1] as shown in Table 9.17.a. Financial rate of return calculation is on Annex 9.9.3 to Annex 9.9.8. Computation results are as follows:

| Alternatives [1] | IRR (%) |
|---|---|
| Alternative 1-a | 12.8 |
| "      2-a | 10.6 |
| "      3-a | 9.3 |
| "      4-a | 8.8 |
| "      5-a | 10.1 |
| "      5-1-a | 10.1 |

Source: Annex 9.9.3 to 9.9.8.

955    By 20 percent reduction of all building costs, Alternative 1-a alone achieves the FIRR over 12 percent. Thus, if the project is solely financed by the local borrowings, only one recommendable policy is Alternative 1-a, i.e., the custom built factory land and floor should be sold and building costs must be reduced by 20 percent.

956    If Alternative 5-1-a is prefered because of the institutional reasons explained in previous chapters, the intervention of the Central Government to this project in raising low-interest equity capital and in arranging foreign loans is again required in order to reduce the financial cost down to roughly 10 percent. Necessary financial arrangement is shown in Table 9.18.

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1/   Architectural design standard of the original plan is intended to be high grade in order to improve working conditions and productivity. By reducing the building cost by 20 percent, building standard becomes lower grade consequently. However, it is still much better compared to factory buildings in the existing industrial area. For reduced cost of buildings, see Annex 7.2. Changes in the architectural details due to the reduced cost are also shown in Drawings No. 5.1 to No. 5.15.

Table 9.17.a  Investment Schedule of Project with 20 Percent Reduction in All Building Cost

(Unit: 1,000 JD at 1980 prices)

| | Year | | | | | | | | | | | | Total | | |
| | 1981 | | | 1982 | | | 1983 | | | 1984 | | | | | |
| | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Acquisition + Cont. | 1,815 | 0 | 1,815 | | | | | | | | | | 1,815 | 0 | 1,815 |
| Engineering and Architectural Service + Cont. | 91 | 86 | 177 | 180 | 172 | 352 | | | | | | | 271 | 258 | 529 |
| Land Development + Cont. | | | | | | | 344 | 696 | 1,040 | 96 | 177 | 273 | 439 | 874 | 1,313 |
| Building + Cont. | | | | | | | 697 | 629 | 1,326 | 1,396 | 1,258 | 2,654 | 2,094 | 1,886 | 3,980 |
| Machines and Equipments + Cont. | | | | | | | | | | 11 | 204 | 215 | 11 | 204 | 215 |
| Working Capital + Cont. | | | | | | | | | | 19 | 18 | 37 | 19 | 18 | 37 |
| Total Cost | 1,906 | 86 | 1,992 | 180 | 172 | 352 | 1,041 | 1,325 | 2,366 | 1,522 | 1,657 | 3,179 | 4,649 | 3,240 | 7,889 |

Table 9.18   Financial Arrangement

| Source | Interest Rate or Dividend (%) | Share in Total Project Cost (%) |
|---|---|---|
| Equity | 10.5 | 50 |
| Foreign Loan | 9.0 | 42 |
| Local Borrowing | 12.0 | 8 |
| Average | 10.0 | 100 |

Thus, in order to make Alternative 5-1-a feasible, Central Government or public financing agencies must participate the equity up to 50 percent with the expected rate of return of 10.5 percent.

957      As a conclusion, it is at first recommended to adopt Alternative 5-1-a and to request Central Government for particpating the above financial arrangement. Then, if this financial arrangement is not available, it is recommended to adopt Alternative 1-a.

9.4.7   Financial Analysis Based on 1983 Prices

958      So far, all the financial analyses were undertaken at 1980 prices, based on the conservative principle of finance and on the generally accepted procedure of feasibility study. In the actual world, however, there is always price inflation. So, actual money required for the project will certainly larger than the amount estimated at 1980 prices. In order to come close to the actual money required for the project, although it does not exactly represent the actual money, it might be better to use the 1983 prices rather than 1980 prices, which are the prices in the starting year of construction. Also, the official comment on the Draft Final Report requested us to use 1983 prices. So, after this section, all the financial analyses will be made at mid-1983 prices, although it is not so common practice in a feasibility study. In addition to above, the official comment also recommended us that all financial analysis shall be made without inflation. So, after this section, all the financial analyses will be made at constant prices measured at 1983 prices. Also, after this section, all analyses will be made on the recommended alternative, i.e., Alternative 5-1-a.

959      To serve for the above intention, inflation between 1980 and 1983 must be estimated. According to Table 2.2, the average annual inflation rate of construction cost between 1975 and 1979 was 16.4 percent, and the supplement to the official commnent suggested us that the inflation rate of construction cost in recent years was not less than 15 percent per annum. Thus, it seems reasonable to assume 15 percent inflation rate for construction activities for the purpose of estimating the actual costs. All other costs are assumed to inflate at the same annual rate of 15 percent since an economy has inner- dynamics to equilibrate an extreme inflation rate to a general inflation

rate in a long run if there is no disturbance. Thus, the peculiarity of the inflation rate in construction cost will be dissolved into a general inflation rate as the economy grow. In the same manner, rents of industrial land and building floors is assumed to inflate at annual rate of 15 percent.

960     Financial feasibility analysis of Alternative 5-1-a based on this 1983 prices is on Table 9.19. The internal rate of return is 10.1 percent which is the same as that at 1980 prices, since the same inflation rate of 15 percent was adapted to both the cost and the benefit. Since the IRR is 10.1 percent, it is still recommended for the Central Government to participate in financial arrangement suggested in the previous section in order to make Alternative 5-1-a be feasible. This is the rough calculation and the more detailed cash flow analysis will be undertaken in the following section.

Table 9.19     Financial Analysis of Alternative 5-1-a, Base Case[1]/

(Unit:  Million JD at 1983 prices)

| Year | | Total Cost | Revenue | Year | | Total Cost | Revenue |
|---|---|---|---|---|---|---|---|
| 1981 | 0 | 3.109 | 0 | 1996 | 15 | 0.417 | 2.336 |
| 82 | 1 | 0.699 | 0 | 97 | 16 | 0.417 | 2.336 |
| 83 | 2 | 3.871 | 0 | 98 | 17 | 0.417 | 2.336 |
| 84 | 3 | 5.148 | 0.243 | 99 | 18 | 0.417 | 2.812 |
| 85 | 4 | 0.268 | 0.889 | 2000 | 19 | 0.417 | 2.812 |
| 86 | 5 | 0.342 | 1.467 | 01 | 20 | 0.417 | 2.812 |
| 87 | 6 | 0.417 | 1.633 | 02 | 21 | 0.417 | 2.812 |
| 88 | 7 | 0.417 | 1.633 | 03 | 22 | 0.417 | 2.812 |
| 89 | 8 | 0.417 | 1.957 | 04 | 23 | 0.417 | 5.520 |
| 90 | 9 | 0.417 | 1.957 | | | | |
| 91 | 10 | 0.417 | 1.957 | | | | |
| 92 | 11 | 0.417 | 1.957 | Notes: | 1/ IRR = 10.07 (%) 2/ | | |
| 93 | 12 | 0.417 | 1.957 | | NPV = Δ1.67 (Million JD | | |
| 94 | 13 | 0.752 | 2.336 | | at 1983 prices | | |
| 95 | 14 | 0.417 | 2.336 | | discounted at 12%) | | |

2/ Computed by DCF of IBM.

Source: Table 9.17

## 9.4.8  Cash Flow Analysis

961      The cash flow analysis is on Table 9.20.  In addition to the total project cost of JD 11,997 million, JD 0.910 million of commercial bank's medium term loan is needed to finance the deficit of the current account caused by operation and maintenance cost and depreciation reserve required at the beginning of the IDA's operation.

962      As shown on the table, with the financial arrangement recommended in the previous section, this project can pay back all its liabilities and can pay reasonable amount of dividend to the equity participants.  The internal rate of return on equity capital is computed on Table 9.21.  If only the dividend is counted as the return to the equity, its internal rate of return is 4.7 percent, but if the annual cash increase in IDA is also distributed to equity participants as dividend, its internal rate of return can increase up to 10.4 percent. This rate of return is a little less than the rate of return expected in Table 9.18 since an additional borrowing from commercial banks is required for financing.

Table 9.20　Income Statement and Funds Flow Statements [1]

| For the Period Ending Dec. 31 of | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Revenue** | | | | | | | | | | |
| Rents | 0 | 0 | 0 | .249 | .913 | 1.506 | 1.676 | 1.676 | 2.009 | 2.009 |
| Terminal Value of Land | | | | | | | | | | |
| **Operating Expenses** | | | | | | | | | | |
| Operation and Maintenance Cost | 0 | .146 | .173 | .181 | .262 | .333 | .406 | .406 | .406 | .406 |
| Depreciation [2] | | | | | .478 | .478 | .478 | .478 | .478 | .478 |
| **Profit before Interest and Taxes** | 0 | Δ.146 | Δ.173 | .068 | .173 | .695 | .792 | .792 | 1.125 | 1.125 |
| **Source of Fund** | | | | | | | | | | |
| Equity Capital Payment [3] | 3.097 | .681 | 2.220 | | | | | | | |
| Foreign Loan Capital Payment [4] | | | 1.551 | 3.488 | | | | | | |
| Local Borrowing Capital Payment [5] | | | | .960 | | | | | | |
| Commercial Bank's Medium [5] Term Loan | | | | .459 | .451 | | | | | |
| Profit before Interest and after Depreciation | 0 | Δ.146 | Δ.173 | .068 | .173 | .695 | .792 | .792 | 1.125 | 1.125 |
| Depreciation | | | | | .478 | .478 | .478 | .478 | .478 | .478 |
| Total Sources | 3.097 | .535 | 3.598 | 4.975 | 1.102 | 1.173 | 1.270 | 1.270 | 1.603 | 1.603 |
| **Application of Funds** | | | | | | | | | | |
| Capital Expenditure for IIE Land | 2.760 | | | | | | | | | |
| Const. | .269 | .535 | 3.598 | 4.835 | | | | | | |
| Interest to Foreign Loan Capital | | | | .140 | .454 | .454 | .454 | .454 | .454 | :454 |
| Repayment of Foreign Loan Capital | | | | | | | | | | |
| Interest to Local Borrowing Capital | | | | | .115 | .115 | .115 | .115 | .115 | .115 |
| Repayment of Local Borrowing Capital | | | | | | | | | | .367 |
| Interest to Commercial Bank's M.T. Loan | | | | | .055 | .109 | .107 | .093 | .078 | .020 |
| Repayment of Commercial Bank's M.T. Loan | | | | | | .017 | .116 | .130 | .478 | .169 |
| Dividend | | | | | | | | | | |
| Total Application | 3.029 | .535 | 3.598 | 4.975 | .624 | .695 | .792 | .792 | 1.125 | 1.125 |
| Increase or Deficit in Cash | .068 | 0 | 0 | 0 | .478 | .478 | .478 | .478 | .478 | .478 |
| Cumulative Balance of Cash | .068 | .068 | .068 | .068 | .546 | 1.024 | 1.502 | 1.980 | 2.458 | 2.936 |

(Unit:　Million JD at 1983 prices)

Note:　1/ All cost items include contingencies of 10%, and inflated to 1983 prices by the annual inflation rate of 15%. All benefit items also inflated at the same rate of 15%.
　2/ Straight line depreciation after 1984.
　3/ Total amount is JD 5.998 million and the expected rate of return is 10.5%.
　4/ Total amount is JD 5.039 million and the interest rate is 9%.
　5/ Total amount is JD 0.960 million for local borrowing plus JD 0.910 million for commercial banks loan. Their interest rate is 12%.

Source:　Table 9.1, 9.14 & 9.17.

| 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.009 | 2.009 | 2.009 | 2.398 | 2.398 | 2.398 | 2.398 | 2.398 | 2.887 | 2.887 | 2.887 | 2.887 | 2.887 | 3.452 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 2.214 |
| .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 | .406 |
| .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 |
| 1.125 | 1.125 | 1.125 | 1.514 | 1.514 | 1.514 | 1.514 | 1.514 | 2.003 | 2.003 | 2.003 | 2.003 | 2.003 | 4.782 |
| 1.125 | 1.125 | 1.125 | 1.514 | 1.514 | 1.514 | 1.514 | 1.514 | 2.003 | 2.003 | 2.003 | 2.003 | 2.003 | 4.782 |
| .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 |
| 1.603 | 1.603 | 1.603 | 1.992 | 1.992 | 1.992 | 1.992 | 1.992 | 2.481 | 2.481 | 2.481 | 2.481 | 2.481 | 5.260 |

$$\left.\begin{array}{l}.454\\ \\.007\end{array}\right\}\quad.672$$

|  | | .327 |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 | .672 |
| .071 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| .593 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | .453 | .453 | .515 | .842 | .842 | .842 | .842 | 1.331 | 1.331 | 1.331 | 1.331 | 1.331 | 1.896 |
| 1.125 | 1.125 | 1.125 | 1.514 | 1.514 | 1.514 | 1.514 | 1.514 | 2.003 | 2.003 | 2.003 | 2.003 | 2.003 | 2.568 |
| .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | .478 | 2.692 |
| 3.414 | 3.892 | 4.370 | 4.848 | 5.326 | 5.804 | 6.282 | 6.760 | 7.238 | 7.716 | 8.194 | 8.672 | 9.150 | 11.842 |

Table 9.21    Internal Rate of Return
on Equity Capital[1]/

(Unit:  Million JD at 1983 prices)

| Year | Equity Payment | Dividend | Annual Cash Increase |
|------|---------------|----------|---------------------|
| 1981 | -3.097 | 0.000 | 0.068 |
| 82 | -0.681 | 0.000 | 0.000 |
| 83 | -2.220 | 0.000 | 0.000 |
| 84 | 0.000 | 0.000 | 0.000 |
| 85 | 0.000 | 0.000 | 0.478 |
| 86 | 0.000 | 0.000 | 0.478 |
| 87 | 0.000 | 0.000 | 0.478 |
| 88 | 0.000 | 0.000 | 0.478 |
| 89 | 0.000 | 0.000 | 0.478 |
| 90 | 0.000 | 0.000 | 0.478 |
| 91 | 0.000 | 0.000 | 0.478 |
| 92 | 0.000 | 0.453 | 0.478 |
| 93 | 0.000 | 0.453 | 0.478 |
| 94 | 0.000 | 0.515 | 0.478 |
| 95 | 0.000 | 0.842 | 0.478 |
| 96 | 0.000 | 0.842 | 0.478 |
| 97 | 0.000 | 0.842 | 0.478 |
| 98 | 0.000 | 0.842 | 0.478 |
| 99 | 0.000 | 1.331 | 0.478 |
| 2000 | 0.000 | 1.331 | 0.478 |
| 01 | 0.000 | 1.331 | 0.478 |
| 02 | 0.000 | 1.331 | 0.478 |
| 03 | 0.000 | 1.331 | 0.478 |
| 04 | 0.000 | 1.896 | 2.692 |

Note: [1]/ If only the dividend is counted as the return to the
equity, its IRR is 4.72%[2]/  If the annual cash
increase in IDA is distributed to equity participants as
dividend, its IRR is 10.39%[2]/

[2]/ Computed by DCF of IBM.


9.4.9  Financial Sensitivity Analysis

963     Sensitivity analysis is to be undertaken to examine the
financial feasibility of the project by assuming alternative conditions
involving uncertainties or risks.

964     FIRR and NPV of following cases involving conditions worse
than the base case were examined.  Its computation is in Annex 9.10
to 9.15.  The results are as follows:

Table 9.22    Sensitivity Analysis of Cost Increase
and Revenue Reduction Cases 1/

| Case | Conditions | FIRR (%) | Net Present Value at 12.0% (Million JD) |
|------|-----------|----------|-----------------------------------------|
| 0 | Return on Project Base Case | 10.07 | Δ1.67 |
| 1 | All Cost Increase by 10% | 8.85 | Δ2.90 |
| 2 | Revenue Reduction by 10% | 8.73 | Δ2.73 |
| 3 | Occupancy Delay by 2 yrs 2/ | 9.14 | Δ2.56 |
| 4 | All of Above | 6.79 | Δ4.77 |
| 5 | Land to Be Given to IDA at No Cost | 13.69 | 1.09 |
| 6 | Land Cost Increase by 100% | 7.81 | Δ4.43 |

Note:   1/ Analyses are based on the Base Case.

2/ Originally all the industrial land and floor is assumed
to be fully occupied by the end of 1986.  In this case,
it is assumed to be fully occupied by the end of 1988.
Incremental occupancy rate of all industrial land and
floor is assumed to be 20% a year from 1984 through 1988.

Source:   Annex 9.10 to Annex 9.15.


As shown on the Table, 10 percent cost increase will reduce the FIRR
down to roughly 9 percent, 10 percent revenue reduction also will
reduce the FIRR down to roughly 9 percent, and the two years delay in
occupancy will reduce the FIRR down to 9 percent.  In the worst case
assuming all of above conditions, the FIRR will go down to 7 percent.
Land cost has a significant effects on the IRR.  If the land be given
to IDA without cost, the project can enjoy the IRR of as much as 14
percent.  But if the land cost is doubled, the IRR go down to 8 percent.


9.4.10   Conclusion of Financial Analysis

965      After all the analyses above, it is firstly recommended to
adopt Alternative 5-1-a which can attain the internal rate of return
of 10.1 percent.  In order to make this Alternative feasible, it is
also recommended for Central Government to participate in its equity
and to help IDA achieving the financial arrangement suggested on Table
9.18.  When Central Government or its agencies can participate in IDA's
equity, it or they can enjoy the internal rate of return of 10.4 percent

on its equity at its maximum. Considering the importance of industrial development in the Irbid Region for the purpose of reducing the regional income disparity, the strong action by Central Government is recommended. If the above financial arrangement cannot be available, it is recommended to adopt Alternative 1-a which can attain the internal rate of return of 12.8 percent. Since the cost of local borrowing is 12 percent, the project will be commercially feasible.

966      Total project cost of Alternative 5-1-a or 1-a is estimated to be JD 11.997 million at 1983 prices. In addition to this, JD 0.910 million of commercial bank's medium term loan is required to finance the deficit of the current account expected at the beginning of the IDA's operation. These cost can be paid back or can receive reasonable returns by Alternative 5-1-a or 1-a.

CHAPTER   X

ECONOMIC  ANALYSIS

**CHAPTER X**

## ECONOMIC ANALYSIS

### 10.1 Introduction and Analysis Method

**a. Analysis Method**

1001    In the Pre-Feasibility Study Report of IIE in March, 1980, industrial benefits and costs pertinent to all the industrial activities in IIE was added to benefits and costs of IIE itself. That is, IIE was treated as one combined project of IIE itself and industries in IIE. In this report, however, IIE alone is analyzed in order to evaluate IIE itself. That is, not all but a part of the net benefits generated by the industrial activities in IIE is treated as the benefits of the IIE project, which is represented by the rent paid by industrial activities in IIE.

1002    Basic assumption used here is that industrial activities in Irbid with IIE will increase more than industrial activities without IIE will grow. That is, industries to be located in IIE can be divided into two groups: industries newly generated by IIE and industries which anyhow will find their land in Irbid without IIE. These two groups are treated separately in economic analysis.

1003    The product of IIE is a complex of land-factory-and-services for industiral use. So, economic analysis has to identify the value (i.e., the benefit) of this land complex and the cost to produce it to the economy. The economic value of the land complex can be measured by the price that the potential industrialists are willing to pay for it, which is financially represented by the rent. Thus, the basic method for measuring economic benefits is to find out the financial rent that industrialists are willing to pay and then to convert it into economic rent by a conversion factor. Since the land complex is used by industrialists for production purpose, the standard conversion factor can basically be used for this purpose instead of consumption conversion factor. The numeraire used here is the investment/saving in terms of the border JD.

## b. Shadow Exchange Rate

1004    In terms of currency exchanges, Jordan is adopting a free market policy. There is no black market of US dollar and are many small private money changers downtown in Amman and other local towns. Money changers' rate is little higher than the rates at banks but they are almost identical. Thus, there is no distortion in foriegn exchange market, and what we have to take care is only the standard conversion factor.

## c. Standard Conversion Factor

1005    The standard conversion factor (SCF) is computed in Annex 10.1, and the SCF is estimated to be 0.913.

## d. Consumption Goods Conversion Factor

1006    The consumption goods conversion factor (CGCF) is computed in the same manner as SCF, which is in Annex 10.2. The CGCF is estimated to be 0.791.

## e. Shadow Wage Rates

1007    Jordan is in labor scarce economy even in terms of unskilled labor and particularly in terms of skilled labor. So, in principle no shadow pricing for labor is necessary.

1008    In the unskilled labor market, many foreign laborers are existent in Irbid Governorate, and the market wage rate of unskilled industrial labor seems to be identical to that of foreign laborers. Here, one interesting issue appears. If the IIE project hires the domestic unskilled labor, the wage paid is the real cost to the Jordan economy. The reason is that the cost of labor is defined as the foregone output, i.e., the marginal product of labor in its alternative use. So, their shadow wage rate ($SWR_d$) is:

$$SWR_d = \text{(wage rate)} \times SCF$$

SCF is used since wage represents outputs foregone elsewhere instead of consumption created. Then, if the IIE project hires foreign unskilled labor, they remit some portion ($\alpha$) of their wage to their mother country and consume the rest. Then, their shadow wage ($SWR_f$) will be:

$$SWR_f = \text{(wage rate)} \{(1 - \alpha) \, CGCF + \alpha\}$$

For the IIE project, it is assumed that half of unskilled labor is hired from abroad and that the foreign unskilled labor remits half of their income to their mother country. Then the average SWR of total unskilled labor ($SWR_u$) is:

$$SWR_u = \text{(wage rate)} \, (0.5 \times SCF + 0.25 \times CGCF + 0.25)$$

$$= \text{(wage rate)} \times 0.904$$

1009      As the skilled labor, they are "tradables" in recent years since they can go to Gulf countries and earn two or three times more than in Jordan.  But the Government of Jordan has recently adopted the policy not to encourage skilled labor go out to Gulf countries.  Also, there are some institutional barriers to go out such as application process of passport and visas.  Thus, we assumed that present state of skilled labor market shows the equilibrium situation of going out and staying in Jordan.  Then, the market rate of skilled labor wage represents the economic cost.  Consequently, the shadow wage rate of skilled labor ($SWR_s$) is:

$$SWR_s = (\text{wage rate}) \times SCF$$

1010      As to the foreign skilled labor such as construction manager at site, it is assumed that 50 percent of their income will be remitted to their mother country.  Then, the shadow wage rate of the foreign skilled labor ($SWR_{FS}$) is:

$$SWR_{FS} = (\text{wage rate}) \ (0.5 \times CGCF + 0.5)$$

$$= (\text{wage rate}) \times 0.896$$

## 10.2  Economic Cost

### 10.2.1  Type of Economic Cost

1011      Types of economic cost are simple.  They are:

     i)   Economic land cost,
    ii)  Economic development cost of IIE, and
  iii)  Economic operation and maintenance cost of IIE.

The latter two can be estimated based on financial cost by (1) deducting transfer items, (2) adjusting exchange rate, and (3) using shadow wage rate of labor.  The economic land cost can be estimated based on opportunity cost of land, and in estimating this opportunity cost, urbanization projection is required.  These are discussed in the followings.

### 10.2.2  Economic Cost of Land

1012      Economic cost of land is generally defined as the opportunity cost of land, i.e., (1) net agricultural production foregone where yet unurbanized, or (2) rent of the land where urbanized.  Thus, urbanization projection is required.

    a.  Urbanization Projection

1013      The Pre-feasibility Study Report projected the urbanization in its Chapter II as follows:

|   | Urbanization Process | | |
|---|---|---|---|
| 1983 | 20 percent of the proposed site, | | |
| 1984 | 40 | " | , |
| 1985 | 60 | " | , |
| 1986 | 80 | " | , |
| 1987 | 100 | " | . |

Source: Integrated Regional Development Study of
Northern Jordan, Vol. 5, Pre-feasibility
Study of Industrial Estate, JICA.

where the proposed site is the same site as the site for IIE. However, there has been one significant change after the Report in the assumption for this projection. It is the population of Irbid Municipality. The preliminary result of the 1979 Population Census made available in January, 1980 shows the population of Irbid Municipality in 1979 being 112,954, which is fairly low as compared to the population projection used to the above urbanization projection. The difference is shown in Annex 10.3. At the population of 182,600, it is projected that the urbanization at the density of 10 persons per hectare at the urbanization frontier reaches at the present boundary of Irbid Municipality. Then, according to the new population projection adjusted to the 1979 Census in Annex 10.3, the urbanization will reach the Municipality boundary in 1993. The site of IIE is located roughly 2/3 of the distance between the 1979 urbanization frontier and the boundary. Then, the urbanization will reach IIE roughly in 9 years ((1993-1979) x 2/3) after 1979, i.e., 1988. Besides, it is assumed that the site of IIE will be fully urbanized by 1993. Thus, the revised urbanization projection on the site of IIE is as follows:

|   | Urbanization Process Revised | | |
|---|---|---|---|
| 1988 | 10 percent of the proposed site, | | |
| 1989 | 28 | " | , |
| 1990 | 46 | " | , |
| 1991 | 64 | " | , |
| 1992 | 82 | " | , |
| 1993 | 100 | " | . |

b. <u>Rent of Urbanized Land</u>

1014    Urbanized land prices in 1980 at the urbanization frontier
surveyed by the Japanese Team are shown below:

| Site | Price of Sub-divided Land (JD/Donum) |
|------|--------------------------------------|
| 13   | 12,000 - 15,000                      |
| 14   | 12,000 - 15,000                      |
| 15   | 10,000 - 14,000                      |
| 16   | 10,000 - 14,000                      |
| 17   | 10,000 - 14,000                      |

Source:  Study Team

Examining these data, the average subdivided urbanized land price is
estimated to be JD 12,000 per donum in 1980.  Among this price, roughly
30 percent is attributable to the land development cost such as road,
water and power.  Thus, the pure housing land-price is estimated to be
JD 8,400 per donum.  The annual rent of urbanized land can be calculated
by the following formula:

$$a \times \frac{(1+r)^{n+1} - 1}{(1+r)^n \times r} = A$$

where,    $a$ : rent of land;
          $r$ : opportunity cost of capital (= 8 percent);
          $n$ : period (= 50 years);
          $A$ : urbanized land price at the edge of urbanized
               area in 1980 at 1980 prices (= JD 8,400/donum)

By this formula, we can get JD 700 ($\coloneqq$ JD 702.2) per donum for the annual
rent of urbanized land.

1015    After the full urbanization in 1993, the population within
Irbid Municipality is assumed to grow at 0.7 percent per annum.  This
growth should be the population density growth since it occurs after
its full urbanization.  It can be assumed here that the real price of
land is to grow at the same rate as the density growth and consequently
that the rent is to grow at the same rate.  Thus, after 1993, the
urbanized land rent is assumed to grow at 0.7 percent per annum in real
terms.

c. <u>Net Agricultural Production of Land</u>

1016　　The site of IIE is presently used for wheat cultivation.
According to the Agricultural Survey made in mid-1978 by the Japanese
Team for the Phase I Study of the Integrated Regional Development Study
of Northern Jordan, the net income generated by wheat farming in the
greater Irbid area was JD 33.2/ha or JD 3.32/donum at 1978 prices.
The wholesale price of seeds and pulses increased 14 percent from 1978
to 1980 (Central Bank of Jordan).　So, the 1980 price is estimated to
be JD 3.8 per donum.

1017　　Another interview survey was made to officials of the Ministry
of Agriculture in Irbid in this Feasibility Study.　Two data are obtained
as in Tables 10.1 and 10.2.　If we assume that good year and bad year
come alternately, the average net income is JD 5.4/donum.　Taking
account of these data, the net production of wheat at the site of IIE
is estimated to be JD 5.0 per donum.

d. <u>Economic Price of Wheat at Border JD</u>

1018　　The latest available data on c.i.f. price of wheat at Aqaba
is that of 1979.　In 1979, 211,180,000 kg of wheat was imported at
JD 13,614,000, then the c.i.f. price was JD 0.0645 per kg.　Assuming
the 5 percent inflation of international wheat price and taking account
of exchange rate decrease from 0.295 JD/US$ in 1979 to 0.293 JD/US$ in
1980, the c.i.f. price of wheat in 1980 is estimated to be JD 0.0673
per kg.

1019　　The gravity center of wheat consumption seems to be Amman,
and the transportation cost from Aqaba to Amman in 1980 is JD 0.0044
per kg, and the transportation cost from Irbid to Amman is JD 0.0011
per kg.　Thus, the economic cost of wheat measured at border JD is
0.0703 (= 0.0673 + 0.0033 x 0.913) per kg as compared to the farm gate
price of wheat in Irbid being JD 0.1000 per kg.

e. <u>Economic Cost of Land</u>

1020　　Combining these items a. through d., the economic cost of
land is estimated as shown in Table 10.3.

Table 10.1    Rent of Comparable Agricultural Land, 1980

| Item | Rent |
|------|------|
| Land rent for agricultural use at a comparable site of IIE | JD 10/donum/Yr |

Source:  The Ministry of Agriculture


Table 10.2    Net Wheat Production on Land between the Proposed Boundary and Outer Ring Roads, Recent Average at 1980 Prices

| | Production and Cost Item | | | JD/donum |
|------|------|------|------|------|
| Production | One time/year, JD 0.1/kg at Farm Gate | Good Year 150 kg | | 15.0 |
| | | Bad  Year  70 kg | | 7.0 |
| Cost | Plowing by Machine Covering All Cost | | | 1.0 |
| | Seed | | | 1.0 |
| | Seeding | | | 0.5 |
| | Fertilizer (2 kinds total) | | | 0.7 |
| | Weeding by Machine | | | 0.5 |
| | Harvesting | | | 1.0 |
| | Labor for Handling and Carrying to Farm House | | | 0.5 |
| | Ganny Sack (0.2 x 2 sacks) | | | 0.4 |

(Cost items braced total: 5.6)

| | | | | |
|------|------|------|------|------|
| Net Production | Good Year | | | 9.4 |
| | Bad Year | | | 1.4 |

Source:  The Ministry of Agriculture

Table 10.3   Economic Cost of Land

| | Wheat Production Foregone | | Urban Land Services Foregone (Border JD) | Total Economic Cost (Border JD) | Total Cost with Contingency (10%) |
|---|---|---|---|---|---|
| | Wheat Production Foregone (Financial) (JD) | Economic Cost of Foregone Wheat (Border JD) | | | |
| 1981 | 1,375[1/] | 967 | | 967 | 1,000 |
| 1982 | " | " | | " | " |
| 1983 | " | " | | " | " |
| 1984 | " | " | | " | " |
| 1985 | " | " | - | " | " |
| 1986 | " | " | | " | " |
| 1987 | 1,375 | 967 | 0 | 967 | 1,000 |
| 1988 | 1,238 | 870 | 17,575 | 18,445 | 20,000 |
| 1989 | 990 | 696 | 49,211 | 49,907 | 55,000 |
| 1990 | 743 | 522 | 80,846 | 81,368 | 90,000 |
| 1991 | 495 | 348 | 112,482 | 112,830 | 124,000 |
| 1992 | 248 | 173 | 144,117 | 144,290 | 159,000 |
| 1993 | 0 | 0 | 175,753[2/] | 175,753 | 193,000 |
| 1994 | | | 176,983 | 176,983 | 195,000 |
| 1995 | | | 178,222 | 178,222 | 196,000 |
| 1996 | | | 179,469 | 179,469 | 197,000 |
| 1997 | | | 180,725 | 180,725 | 199,000 |
| 1998 | | | 181,991 | 181,991 | 200,000 |
| 1999 | | | 183,264 | 183,264 | 202,000 |
| 2000 | | | 184,547 | 184,547 | 203,000 |
| 2001 | | | 185,839 | 185,839 | 204,000 |
| 2002 | | | 187,140 | 187,140 | 206,000 |
| 2003 | | | 188,450 | 188,450 | 207,000 |
| 2004 | | | 189,769 | 189,769 | 209,000 |

Source:   Study Team

Note:   1/   275 donum (land size) x JD 5 (net wheat production)
        2/   275 donum x JD 700 (urban rent per year) x 0.913 (SCF)

### 10.2.3 Economic Cost of Foreign Machines and Materials

1021    Since the financial cost is computed based on the price at
site, the cost of foreign machines and foreign material should be
converted into the border JD by deducting custom duties. According to
custom officials of Jordan Government, most of foreign construction
machines are duty free and are charged by only 4 percent for import
licensing plus 2 percent for surtax. Thus the conversion factor for
foreign construction machines (FMCF) is:

FMCF = 0.94

According to custom officials also, the custom duties on construction
materials ranged from 10 percent to 30 percent. Taking their average of
20 percent, the conversion factor for foreign construction materials
(FCONCF) is:

FCONCF = 0.80

### 10.2.4 Economic Cost of IIE Development

1022    Economic cost of IIE development exclusive of land cost is
computed in Table 10.4. The total economic development cost excluding
land cost is estimated to be JD 5,941,000 at 1980 prices in terms of
border JD.

### 10.2.5 Economic Cost of Operation and Maintenance

1023    Conversion factors for operation and maintenance costs are
computed in Table 10.5, and economic cost of IIE operation and mainte-
nance is computed in Table 10.6. It starts from JD 87,000 in 1982
growing to JD 244,000 by 1987 and remains the same till the end of the
project life at JD 244,000 at 1980 prices in terms of border JD.

### 10.2.6 Total Economic Cost

1024    Combining all above data, the total economic cost stream was
computed in Table 10.7.

Table 10.4  Economic Cost of IIE Development

(Unit: JD 1,000 at 1980 Border Price)

| | Financial Cost | | | Breakdown of Cost | | | | | | | | Economic Cost (Border) (1,000 JD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount of Cost (1,000 JD) | Share (%) | Foreign Portion (1,000 JD) | Machine All Foreign | Material Foreign | Material Domestic | Labor Skilled Foreign | Labor Skilled Domestic | Labor Unskilled Foreign | Labor Unskilled Domestic | Contractor's Profit | |
| (1) Land Development | 1,194 | | 795 | | | | | | | | | 947 |
|   Earthwork and Site Preparation | 275 | 4 | 225 | 0.30 | 0.48 | 0.05 | 0 | 0.04 | 0.04 | 0.04 | 0.05 | 221 |
|   Road Pavement | 312 | 4 | 231 | 0.03 | 0.69 | 0.17 | 0 | 0.02 | 0.02 | 0.02 | 0.05 | 244 |
|   Street Light | 14 | 0 | 11 | 0.06 | 0.74 | 0 | 0 | 0.09 | 0.03 | 0.02 | 0.05 | 11 |
|   Drainage | 91 | 1 | 36 | 0.06 | 0.22 | 0.28 | 0 | 0.15 | 0.12 | 0.12 | 0.05 | 72 |
|   Sewerage: Pipe and System | 105 | 2 | 28 | 0.09 | 0.09 | 0.48 | 0 | 0.11 | 0.09 | 0.09 | 0.05 | 86 |
|     Pump Station | 69 | 1 | 45 | 0.01 | 0.63 | 0.28 | 0 | 0.01 | 0.01 | 0.01 | 0.05 | 55 |
|   Water Supply: Reservoir | 126 | 2 | 82 | 0.03 | 0.58 | 0.22 | 0 | 0.04 | 0.04 | 0.04 | 0.05 | 99 |
|     Supply System | 31 | 0 | 28 | 0.07 | 0.80 | 0 | 0.02 | 0.02 | 0.02 | 0.04 | 0.05 | 24 |
|   Landscaping | 38 | 1 | 5 | 0 | 0 | 0.55 | 0 | 0.16 | 0.12 | 0.12 | 0.05 | 31 |
|   Electricity Distribution System | 79 | 1 | 59 | 0.03 | 0.69 | 0.17 | 0 | 0.04 | 0.02 | 0.02 | 0.03 | 63 |
|   Telephone Line | 54 | 1 | 44 | 0.04 | 0.71 | 0 | 0 | 0.07 | 0.07 | 0.07 | 0.04 | 41 |
| (2) Building | 4,523 | | 2,144 | | | | | | | | | 3,761 |
|   Standard Factory Building | 1,359 | 19 | 625 | 0.21 | 0.22 | 0.38 | 0 | 0.06 | 0.04 | 0.04 | 0.05 | 1,131 |
|   Custom Built Factory | 2,831 | 39 | 1,359 | 0.21 | 0.23 | 0.37 | 0 | 0.06 | 0.04 | 0.04 | 0.05 | 2,353 |
|   Common-Facilities Building | 333 | 5 | 160 | 0.21 | 0.23 | 0.37 | 0 | 0.06 | 0.04 | 0.04 | 0.05 | 277 |
| (3) Machine and Equipment for Common Facilities | 195 | 3 | 185 | 0.95 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0.02 | 179 |
| (4) Engineering 10% of (1) plus (2) | 572 | 8 | 280 | 0.05 | 0.06 | 0.08 | 0.38 | 0.38 | 0 | 0 | 0.05 | 487 |
| (5) Working Capital | 33 | 0 | 16 | 0 | 0.98 | 0 | 0 | 0.48 | | | 0.04 | 27 |
|   Sub Total | | | 3,420 | | | | | | | | | 5,401 |
| (6) Contingency 10% of Sub Total | 652 | 9 | 342 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 540 |
| (7) Total Cost | 7,169 | 100 | 3,762 | | | | | | | | | 5,941 [1] |

Source: Study Team.

Note: [1] Exclusive of land cost.

Table 10.5　Conversion Factor for Operation
and Maintenance Cost

(Unit:　Share)

|  | Share of Cost | | | | Combined Conversion Factor |
|  | Foreign Imports | Domestic Imports | Skilled Labor | Unskilled Labor | |
|---|---|---|---|---|---|
| (1) Salaries and Wages | 0 | 0 | 0.98 | 0.02 | 0.909 |
| (2) Office Overhead Expense | 0 | 1.00 | 0 | 0 | 0.913 |
| (3) Promotional Expenses | 0.20 | 0.80 | 0 | 0 | 0.930 |
| (4) Facility Maintenance Expense | 0.35 | 0.15 | 0.40 | 0.10 | 0.923 |

Source:　Study Team.

Table 10.6 Economic Cost of IIE Operation and Maintenance Cost

(Unit: JD 1,000 at 1980 prices)

| | Salaries and Wages | | Office Overhead Expenses | | Promotional Expenses | | Facility Maintenance | | Total O & M Economic Cost (1,000 Border JD) |
|---|---|---|---|---|---|---|---|---|---|
| | Financial | Economic | Financial | Economic | Financial | Economic | Financial | Economic | |
| 1981 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1982 | 66 | 60 | 20 | 18 | 10 | 9 | 0 | 0 | 87 |
| 1983 | 80 | 73 | 24 | 22 | 10 | 9 | 0 | 0 | 104 |
| 1984 | 84 | 76 | 25 | 23 | 10 | 9 | 0 | 0 | 108 |
| 1985 | 96 | 87 | 29 | 25 | 0 | 0 | 47 | 43 | 156 |
| 1986 | 96 | 87 | 29 | 26 | 0 | 0 | 94 | 87 | 200 |
| 1987 | 96 | 87 | 29 | 26 | 0 | 0 | 142 | 131 | 244 |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| 2004 | 96 | 87 | 29 | 26 | 0 | 0 | 142 | 131 | 244 |

Source: Study Team.

Table 10.7   Economic Cost Stream of IIE Project

(Unit:  Million JD)

| | | Economic Cost | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Land Cost (Million Border JD) | Engineering Plus Contingency | Land Dev. Plus Cont. | Building Plus Cont. | Machines Plus Cont. | O & M Cost | Total (Million Border JD) |
| 1981 | 0 | 0.001 | 0.179 | | | | 0 | 0.180 |
| 1982 | 1 | " | 0.357 | | | | 0.087 | 0.445 |
| 1983 | 2 | " | | 0.827 | 1.379 | | 0.104 | 2.311 |
| 1984 | 3 | " | | 0.215 | 2.758 | 0.197 | 0.108 | 3.279 |
| 1985 | 4 | " | | | | | 0.156 | 0.157 |
| 1986 | 5 | " | | | | | 0.200 | 0.201 |
| 1987 | 6 | 0.001 | | | | | 0.244 | 0.245 |
| 1988 | 7 | 0.020 | | | | | " | 0.264 |
| 1989 | 8 | 0.055 | | | | | " | 0.299 |
| 1990 | 9 | 0.090 | | | | | " | 0.334 |
| 1991 | 10 | 0.124 | | | | | " | 0.368 |
| 1992 | 11 | 0.159 | | | | | " | 0.403 |
| 1993 | 12 | 0.193 | | | | | " | 0.437 |
| 1994 | 13 | 0.195 | | | | | " | 0.439 |
| 1995 | 14 | 0.196 | | | | | " | 0.440 |
| 1996 | 15 | 0.197 | | | | | " | 0.441 |
| 1997 | 16 | 0.199 | | | | | " | 0.443 |
| 1998 | 17 | 0.200 | | | | | " | 0.444 |
| 1999 | 18 | 0.202 | | | | | " | 0.446 |
| 2000 | 19 | 0.203 | | | | | " | 0.447 |
| 2001 | 20 | 0.204 | | | | | " | 0.448 |
| 2002 | 21 | 0.206 | | | | | " | 0.450 |
| 2003 | 22 | 0.207 | | | | | " | 0.451 |
| 2004 | 23 | 0.209 | | | | | 0.244 | 0.453 |

Source:  Study Team.

## 10.3 Economic Benefit

### 10.3.1 Type of Economic Benefit

1025    Generally, economic benefits of an industrial estate to a national economy comprises:

  i) Direct benefit

  1) Newly available land-factory-services complex, which can be measured either by incremental industrial products or by rent paid to the land complex by industrialists; and

  2) Other incomputable benefits such as:
  - Promotion of industrialization,
  - Agglomeration benefit such as transportation
  - Cost reduction and cooperative purchasing and joint shipment,
  - Accumulation benefit of managerial and technological know-hows at factories,
  - Up-grading of workers' skill,
  - Health and safety effect, and
  - Amenity improvement of city center and factory environment.

  ii) Indirect benefit

  1) Augmented business in industrial sector and in other sectors such as agriculture, forestry, construction, transportation and commerce, (i.e., backward and foreward linkages);

  2) Value added generation (particularly wages) and the multiplier effect through consumption;

  3) Promotion of economic and urban development and minimization of urban hazards; and

  4) Effect on balanced regional growth.

1026    In addition to above, some documents point out benefit of (a) foreign exchange earnings and savings, (b) number of employment created or wages to be paid to unskilled workers, (c) incremental value added created by industries located, (d) taxes to be collected by a government, or (e) construction work of an industrial estate itself. These items (a) through (e) are of course benefits created by an industrial estate but all of these are already counted in the direct benefit mentioned above. Thus, these cannot be added to the benefit account for IRR calculation, although these can be mentioned separately from IRR. In addition, the benefits specified as item 1) of the direct benefit is the largest and the only one countable among the benefit items i) and ii) specified in the previous paragraph. So, this will be estimated as a representative of the economic benefit.

## 10.3.2 Identification of Economic Benefit of Land-Factory-Service Complex

1027    As stated above, the benefit of the land complex can be measured by rent. Rent paying industries being interested in IIE can be classified into four groups as follows:

|  | A<br>Industries who will Find Their Land without IIE | B<br>Industries who Relocate or Expand or Invest Only with IIE |
|---|---|---|
| I. Purely Relocated Part of Relocating Industries |  |  |
| II. Expanded Part of Relocating Industries and Newly Generated Industries |  |  |

Since cost and benefit of a new investment is measured by the difference between with and without, the costs and benefits of new IIE investment in relation to the Group A can be defined as follows:

| Group A | Cost | Benefit |
|---|---|---|
| IIE | Investment Cost : $I_w$ | Saved Investment Cost Outside of IIE: $I$ w/o |

If the industries in the Group A require the same quality and services as those of IIE, it is certain that the cost saved ($I$ w/o) is higher than the price or rent of IIE. That is, there is a producer's surplus. If we can define the demand curve for industrial land, it is possible to measure producer's surplus. In order to measure this producer's surplus derived from the factories in Group A, the demand curve and the share of the land demanded by Group A factories will be estimated in the following sections. The benefit of the Group B industries is clearly at the price or rent of IIE.

1028    The benefits of industries in the Group II can be measured purely based on the above-stated assumptions, but the industries in the Group I seem to have an extra benefit of relocation besides the benefits stated above. They are:

| Group I | | Costs | Benefits |
|---------|---|-------|----------|
| IIE | Investment Cost: Iw | | Willingness to Pay to IIE Land: WTPw |
| | | | plus |
| | | | Reduced Traffic Disturbance: TD |
| | | | plus |
| | | | Willingness to Pay by Other People |
| | | | on Existing Land: WTP NON-IND |
| | | | minus |
| | | | Foregone WTP of Existing Industries |
| | | | to Existing Industrial Land: WTP IND |
| | | | minus |
| | | | Cost of Moving: T |

Here, it can reasonably assumed that:

$$WTP_{NON-IND} - WTP_{IND} = T.$$

Then, the cost and benefits of IIE for the Group I can be simply defined as follows:

| Group I | | Costs | Benefits |
|---------|---|-------|----------|
| IIE | Investment Cost: Iw | | Willingness to Pay to IIE Land: WTPw |
| | | | plus |
| | | | Reduced Traffic Disturbance: TD |

Thus, it is necessary to estimate the reduced traffic disturbance, which will be handled in the following section.

## 10.3.3 Demand Curve Specification

1029    In the demand analysis section, it is estimated that there will be the factory land demand of 186.6 donum at the rent of JD $2.9/m^2/Yr$ and the factory floor demand of 66.2 donum at the rent of JD $12.1/m^2/Yr$. If we assume a hypothetical unit of land-and-floor complex with 1 $m^2$ of land and 0.355 $m^2$ of factory floor, this unit can become the representative unit of IIE which has the rent of JD $7.20/m^2/Yr$. Then the demand can be expressed as the demand of 186,600 units at the rent of JD $7.20/m^2/Yr$. The land demand by industrial type is shown below:

| . Industrial Type | Land Demand (m$^2$ or unit) |
|---|---|
| (1) Metal Work | 64,050 |
| (2) Furniture and Room Unit | 18,700 |
| (3) Food and Beverages | 14,950 |
| (4) Garments | 7,500 |
| (5) Plastics and Chemicals | 8,100 |
| (6) Construction Materials | 41,000 |
| (7) Auto-Repair | 19,900 |
| (8) Trading | 7,900 |
| (9) Paper and Paper Products | 4,500 |
| Total | 186,600 |

Note: Table 3.34 was adjusted so that the total area became
to be 186,000 m$^2$ as determined in Chapter V.

This land demand can easily be translated into the unit in the same
manner as above.

1030    In the Section 9.2.2.2, the premium on (1) the water supply,
(2) telephone service and (3) common workshop services were estimated,
which are shown below:

| Item | Premium (JD/m$^2$/Yr) |
|---|---|
| Water Supply (Pw) | 1.2 |
| Telephone Service (Pt) | 2.4 |
| Common Workshop Services (Pcw) | 0.9 |

Let us think about the Group A factories. As a definition, they are
the factories willing to establish themselves even without IIE. It
means that the Group A factories can save their cost by the amount
equal to the premium estimated above when IIE is established. In other
words, those factories who want to receive the above services are
willing to pay the amount equal to premium if the above services are
available. There, some factories want water supply on one hand, and

some other factories want telephone services on the other hand. So, it is necessary to estimate the necessity of the above services by industrial type. The rough estimation is in Table 10.8.

Table 10.8    Factory in Need of Water, Telephone
or Common Workshop

|  | Land-Floor Demand (Unit) | Needs for | | |
|---|---|---|---|---|
|  |  | Water | Telephone | Common Workshop |
| Premium |  | JD $1.2/m^2/Yr$ | JD $2.4/m^2/Yr$ | JD $0.9/m^2/Yr$ |
| (1) Metal Works | 64,050 |  |  | o |
| (2) Furniture and Room Units | 18,700 |  |  |  |
| (3) Food and Beverages | 14,950 | o |  |  |
| (4) Garments | 7,500 |  |  |  |
| (5) Plastics and Chemicals | 8,100 |  |  |  |
| (6) Construction Materials | 41,000 |  | o |  |
| (7) Auto-Repair | 19,900 |  | o | o |
| (8) Trading | 7,900 |  | o |  |
| (9) Paper and Paper Products | 4,500 |  |  |  |
| Total | 186,600 |  |  |  |

Based on the Table, the demand schedule for industrial unit can be constructed as follows:

| Rent (JD/m²/Yr) | Demand (Unit) |
|---|---|
| 7.2 + 3.3 = 10.5 | 19,900 = 19,900 |
| 7.2 + 2.4 = 9.6 | 19,900 + 48,900 = 68,800 |
| 7.2 + 1.2 = 8.4 | 68,800 + 14,950 = 83,750 |
| 7.2 + 0.9 = 8.1 | 83,750 + 64,050 = 147,800 |
| 7.2 | 147,800 + 38,800 = 186,600 |

In order to simplify the demand curve, the following linear model is fitted to the above schedule:

$$D = a + b R$$

where,  $D$ = demand measured by 10,000 unit, and
$R$ = rent measured by JD/Unit/Yr.

The demand line is regressed to be:

$$D = 52.18 - 4.656R \qquad r^2 = 0.9066$$

## 10.3.4  Share of Group A and Estimation of Group A Benefit

1031    As being discussed, the industries in the group A have more willingness to pay than the proposed market rent of the IIE. This greater willingness to pay can be measured by the demand function estimated above. Now, it is necessary to estimate how many percent of the industrial land will be demanded by the Group A factories. As to the industries being planned to occupy the Standard Factory Buildings, they are small and not financially strong. So, only very small part of the industries in this category will find their new land without IIE. This can be verified by the fact that even at present there are 75 factories waiting for standard factory spaces in the existing industrial area. This means they cannot establish their new factories independent of IIE. Thus, for them, it is assumed that 10 percent of their demand will establish themselves even without IIE.

1032    As to the industries for Custom Built Factory, it is difficult to estimate. But taking account of the projection that GDP of Jordan will grow at 10 percent per annum in real term, industries in Irbid should at least grow at 10 percent per annum. To support this growth, reasonable amount of industrial land should be developed regardless of existence or non-existence of IIE. So, it is assumed that roughly 50 percent of the land demand for Custom Built Factory will be effectively actualized even without IIE.

1033    Combining the above share and the land demand by the factory type, the total land demand by the Group A can be calculated. The land demand by the factory type is already identified at the beginning of the Financial Analysis section. The computation is as follows:

|  | Land Demand (Unit) | Share of Group A | Group A Demand (Unit) |
|---|---|---|---|
| Standard Factory Type | 53,719 | 0.1 | 5,372 |
| Custom Built Factory Type | 132,834 | 0.5 | 66,417 |
| Total | 186,653 |  | 71,789 |

Thus, the demand of Group A is estimated to be 71,789 unit.

1034    If we assume that the demand of Group A represents all the demand that are willing to pay the highest part of rent on the demand line, their willingness to pay can be computed by the demand function estimated in the previous section. Their willingness to pay (RWTP) is:

$$RWTP = (52.18 - D)/4.656$$

$$= 9.665 \text{ JD/Unit/Yr.}$$

Thus, the benefit of Group A factories is JD 9.665/Unit/Yr.

10.3.5    Estimation of Reduced Traffic Disturbance

1035    In this section, the benefit of the reduced traffic disturbance is estimated. The traffic disturbance of the existing factories is mainly caused by their occupancy of their front road by their cars and materials. Let us assume that a factory occupies the front road by 2 meter and it has 4.5 meter frontage on the average. Then, the occupied land by a factory is 9 $m^2$ on the average. It is further assumed that the value of land on roads is the same as that of the private land facing the roads. All the factories in the Group I are scattered in the Irbid City and their average distance from the city center can be estimated to be about 400 meter. The land located around this distance was surveyed. The combined rent of land and building ranges from JD 5.8/$m^2$ to 18.8/$m^2$ and the land price ranged from JD 70,000/donum to 80,000/donum. Then, the best estimate for the land rent is JD 7.5/$m^2$/Yr. There are roughly 200 factories (34 factories from the general Survey, 101 from the Applicant Survey and 75 waiting factories relocating from the Irbid City). Thus, the benefit of reduced traffic disturbance (TD) is:

$$TD = 9 \ (m^2) \ x \ 7.5 \ (JD/m^2/Yr) \ x \ 200 \ (factories)$$

$$= 13,500 \ (JD/Yr)$$

## 10.3.6 Conversion Factor for Economic Benefit

1036    The rent of an industrial estate is defined to be the return
to the contribution made by its land-service complex to economic produc-
tion.  Thus, the rent of IIE represent one part of net economic produc-
tion increase by factories to be located in IIE.  The next question is
"What will they produce?".  According to our selected industries for
IIE based on our surveys, most of products will serve for increase in
domestic consumption, which can be converted into border JD by GCF.
Small part of products will serve for import substitution and export
increase in the field of consumption goods, which can be converted into
border JD by CGCF, if we assume that their ratio of import substitution
to export increase is similar to the ratio of national import to export
of consumption goods.  According to the General Survey, the factories
interested in IIE are exporting about 14 percent of their products to
foreign countries.  If we assume that import substitution and export
increase by the products from IIE grow at 3 percent per annum, roughly
20 percent of the products will serve for import substitution and export
increase on the average and the remaining 80 percent of the products
will serve for increase in domestic consumption.  Then, the conversion
factor for the economic benefit (CFEB) is:

$$CFEB = 0.2 \ x \ CGCF + 0.8 \ x \ GCF$$

$$= 0.889$$

## 10.3.7 Total Economic Benefit Stream

1037    Combining all the data above, the total economic benefit
stream is computed in Table 10.9.  They are expressed at 1980 prices in
terms of border JD.

## 10.4 Economic Feasibility of IIE

## 10.4.1 The Alternative Studied

1038    In economic analysis, Alternative 5-1 specified in the
Financial Analysis of this Study is studied since it is the best alter-
native in terms of financial analysis and since the economic analysis
will not alter the result of the financial analysis because the economic
analysis is based on the financial rent used in financial analysis as
a principle.

Table 10.9   Economic Benefit Stream of IIE Project

(Unit: Million JD at 1980 prices)

| Year | | Custom Built Factory | | | Domestic Market Price Standard Factory | | | Commercial Floor + Gas Station | Users' Charge | Reduced Traffic Distrubance | Sub-Total Annual Benefit | Economic Benefit (Million Border JD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Basic Benefit | Group A Benefit | Group B's Consumers' Surplus | Basic Benefit | Group A Benefit | Group B's Consumers' Surplus | | | | | |
| 1981 | 0 | | | | | | | | | | | |
| 82 | 1 | | | | | | | | | | | |
| 83 | 2 | | | | | | | | | | | |
| 84 | 3 | 0.072 | 0.016 | 0.008 | 0.086 | 0.003 | 0.015 | | 0.005 | 0.002 | 0.207 | 0.184 |
| 85 | 4 | 0.327 | 0.074 | 0.037 | 0.258 | 0.010 | 0.045 | 0.004 | 0.011 | 0.005 | 0.771 | 0.685 |
| 86 | 5 | 0.619 | 0.139 | 0.070 | 0.344 | 0.013 | 0.060 | 0.011 | 0.016 | 0.012 | 1.284 | 1.141 |
| 87 | 6 | 0.729 | 0.164 | 0.082 | " | " | " | 0.013 | " | 0.014 | 1.435 | 1.276 |
| 88 | 7 | " | " | " | " | " | " | " | " | " | " | " |
| 89 | 8 | 0.877 | 0.196 | 0.098 | 0.413 | 0.016 | 0.072 | 0.015 | " | " | 1.717 | 1.526 |
| 90 | 9 | " | " | " | " | " | " | " | " | " | " | " |
| 91 | 10 | " | " | " | " | " | " | " | " | " | " | " |
| 92 | 11 | " | " | " | " | " | " | " | " | " | " | " |
| 93 | 12 | 0.877 | 0.196 | 0.098 | 0.413 | 0.016 | 0.072 | 0.015 | " | " | 1.717 | 1.526 |
| 94 | 13 | 1.048 | 0.236 | 0.118 | 0.494 | 0.019 | 0.086 | 0.019 | " | " | 2.050 | 1.822 |
| 95 | 14 | " | " | " | " | " | " | " | " | " | " | " |
| 96 | 15 | " | " | " | " | " | " | " | " | " | " | " |
| 97 | 16 | " | " | " | " | " | " | " | " | " | " | " |
| 98 | 17 | 1.048 | 0.236 | 0.118 | 0.494 | 0.019 | 0.086 | 0.019 | " | " | 2.050 | 1.822 |
| 99 | 18 | 1.263 | 0.283 | 0.141 | 0.596 | 0.023 | 0.103 | 0.023 | " | " | 2.462 | 2.189 |
| 2000 | 19 | " | " | " | " | " | " | " | " | " | " | " |
| 2001 | 20 | " | " | " | " | " | " | " | " | " | " | " |
| 2002 | 21 | " | " | " | " | " | " | " | " | " | " | " |
| 2003 | 22 | 1.263 | 0.283 | 0.141 | 0.596 | 0.023 | 0.103 | 0.023 | " | " | 2.462 | 2.189 |
| 2004 | 23 | 1.514 | 0.339 | 0.170 | 0.713 | 0.027 | 0.124 | 0.027 | 0.016 | 0.014 | 2.944 | 2.617 |

Source:  Study Team.

Note:  This benefit stream was computed based on Alternative 5-1 recommended by the financial analysis.

## 10.4.2  Economic Cost of Capital

1039    Economic cost of capital (ECC) is defined to be the opportunity rate of return of capital, i.e., the rate of return foregone by an alternate investment opportunity.  Theoretically, it is the real rate of return of the marginal project which will use up the last capital.  The most practical way to estimate it is to estimate "marginal product of capital (q)" in the public sector by looking at rates of return in a range of recent projects.  Table 10.10 shows the rates of return on recent public projects in Jordan.  According to the Table, the marginal economic return on public project seems to be 9 percent.  Thus, 9 percent is the economic cost of capital for IIE.

1040    Since the data which show the ERR around 9 percent are not measured in terms of border price, it is necessary to convert this ERR measured by domestic market price into ERR measured by border price by applying the standard conversion factor.  Thus, the ERR in terms of border JD is at 8.2 percent or roughly at 8 percent.

Table 10.10    Economic Rate of Return of Public Projects

| Public Project | | ERR Best Estimate (%) | Source |
|---|---|---|---|
| Irbid Municipal Water Distribution | | 9.81 | Feasibility Report |
| Wastewater | | 9.80 | and Preliminary |
| Solid Waste | | 28.60 | Engineering Studies, |
| Storm Water | | 8.43 | Weston, 1980 |
| Zarqa-Rihab-Irbid | Alt. $C_1$ | 28.1 | F/S for Zarqa-Rihab- |
| Expressway and Rihab | Alt. $C_2$ | 25.1 | Irbid Expressway and |
| Syrian Border Connector | | | Rihab-Syrian Border |
| | | | Connector, Wilker |
| | | | Smith, 1979 |
| Amman Water Supply and Sewerage III | | 9.0 | Appraisal Report, WB, 1978 |
| Tourism Project | Petra | 16.9 | Appraisal Report, |
| | Jerash | 30.3 | WB, 1976 |
| Second Power Project | | 15.0 (FRR) | Appraisal Report, WB, 1975 |
| Northeast Ghor Irrigation and Rural Development Project | | 24.0 | Northeast Ghor Irrigation and Rural Development Project, WB, 1974 |

## 10.4.3 Economic Analysis

1041     Computation of economic rate of return (ERR) is in Table 10.11. The economic rate of return (ERR) of the IIE Project is estimated to be roughly 16.0 percent which is significantly higher than the opportunity cost of capital, i.e., 8.2 percent. And the net present value of this project is estimated to be JD 4.30 million. Thus, the project is reasonably feasible in terms of national economy and economically justifiable. So, the implementation of the project is recommended in terms of the economic analysis.

Table 10.11   Computation of Economic Rate of Return

(Unit:   Million JD at 1980 prices
in Terms of Border JD)

| | | Economic Cost | Economic Benefit |
|---|---|---|---|
| 1981 | 0 | 0.180 | |
| 82 | 1 | 0.445 | |
| 83 | 2 | 2.311 | |
| 84 | 3 | 3.279 | 0.184 |
| 85 | 4 | 0.157 | 0.685 |
| 86 | 5 | 0.201 | 1.141 |
| 87 | 6 | 0.245 | 1.276 |
| 88 | 7 | 0.264 | 1.276 |
| 89 | 8 | 0.299 | 1.526 |
| 90 | 9 | 0.334 | " |
| 91 | 10 | 0.368 | " |
| 92 | 11 | 0.403 | " |
| 93 | 12 | 0.437 | 1.526 |
| 94 | 13 | 0.439 | 1.822 |
| 95 | 14 | 0.440 | " |
| 96 | 15 | 0.441 | " |
| 97 | 16 | 0.443 | " |
| 98 | 17 | 0.444 | 1.822 |
| 99 | 18 | 0.446 | 2.189 |
| 2000 | 19 | 0.447 | " |
| 01 | 20 | 0.448 | " |
| 02 | 21 | 0.450 | " |
| 03 | 22 | 0.451 | 2.189 |
| 04 | 23 | 0.453 | 2.617 |

IRR = 15.66%[1]
NPV = 4.19 (million JD) at 8.2%[1]

[1] Computed by DCF of IBM.

Source:   Tables 10.7 and 10.9

## 10.5 Sensitivity Analysis

### 10.5.1 Cases to be Examined by Sensitivity Analysis

1042　　In order to see the economic feasibility under more or less favorable conditions and to reduce the uncertainty to the minimum in the decision making caused by uncertainty of conditions, the sensitivity analysis was undertaken.  Cases examined are:

　　　i)　Case 1:　economic development cost increase by 10 percent,
　　　ii)　Case 2:　economic land cost increase by 10 percent,
　　iii)　Case 3:　economic O/M cost increase by 10 percent,
　　　iv)　Case 4:　all of above,
　　　v)　Case 5:　occupancy delay by 2 years,
　　　vi)　Case 6:　all of above,
　　　vii)　Case 7:　economic benefit decrease by 10 percent, and
　viii)　Case 8:　all of above.

### 10.5.2 Result of the Sensitivity Analysis

1043　　Computation of economic feasibility indicators by cases is in Annex 10.4 to 10.11, and the results are in Table 10.12.  As shown in the table, (1) economic development cost increase by 1 percent will reduce the EIRR (economic internal rate of return) by 0.8 percent (not percentage point), (2) economic land cost increase by 1 percent will reduce the EIRR by 0.1 percent and (3) economic O/M (operation and maintenance) cost increased by 1 percent will reduce the EIRR by 0.2 percent.  In the case of all of above condition, i.e., the case of total cost increase by 1 percent, the EIRR will be reduced by 1.1 percent. In the case of economic benefit decrease by 1 percent, the EIRR will be reduced by 1.2 percent.

1044　　The occupancy delay has significant effect on the EIRR.  One year delay of the occupancy will reduce the EIRR by 5.7 percent.  If 2 years delay, the EIRR will be reduced down to 13.9 percent.

1045　　The worst case, i.e., the total cost increase by 10 percent plus the benefit decrease by 10 percent plus the two years occupation delay, will reduce the EIRR down to 10.7 percent.  Even in this worst case, the EIRR is reasonably higher than the economic opportunity cost of capital that is 8 percent.  Thus, the implementation of this project is recommended even after the economic sensitivity analysis.

Table 10.12    Result of Economic Sensitivity Analysis

| Case | | | EIRR | | NPV |
| | | | IRR (%) | Elasticity (E) or Ratio | (Mil. JD) at 8.2% |
| --- | --- | --- | --- | --- | --- |
| 0 | Return on Project Base Case | | 15.66 | | 4.19 |
| 1 | Eco. Development Cost 10% up | | 14.38 | E = 0.817 | 2.62 |
| 2 | Eco. Land Cost | 10% up | 15.55 | E = 0.070 | 4.11 |
| 3 | Eco. O/M Cost | 10% up | 15.30 | E = 0.230 | 3.99 |
| 4 | All of Above | | 13.93 | E = 1.105 | 3.42 |
| 5 | Occupancy | 2 Yrs Delay | 13.89 | 11.3%/2Yr=5.7%/Yr | 3.39 |
| 6 | All of Above | | 12.35 | 21.1%/all | 2.62 |
| 7 | Eco. Benefit | 10% down | 13.75 | E = 1.220 | 3.00 |
| 8 | All of Above | | 10.69 | 31.7%/all | 1.50 |

## 10.6   Other Economic Benefit

### a.   Employment Creation

1046        Although Jordan is in a labor scarce economy, the IIE will create extra employment opportunities.  In Section 5.2.5 of this report, employments by this IIE were estimated as follows:

| Sector | Employment |
| --- | --- |
| Employment by Standard-Factory Industries | 1,200 |
| Employment by Custom Built Factory Industries | 1,600 |
| Employment by Administrative and Supporting Facilities | 200 |
| Total | 3,000 |

Among these, there are employments relocated from the City Center. They are roughly 750 persons: 525 persons excluding part-time workers from General Survey and Applicant Survey plus 187 persons from Waiting Factories plus some from service activities who will occupy the administrative and supporting facilities. Thus, employment created by the expansion of existing factories and newly locating factories is roughly 2,250 or three fourth (75 percent) of the total employment. Out of these, there are employments created by industrial activities without IIE, i.e., the employment by the Group A factories. Following the same assumptions as those used in the Section 10.3.4, the employment by the Group A ($E_A$) can be computed as follows:

$$E_A = (\frac{F_{SF}}{F_T} \times R_{SF} + \frac{F_{CBF}}{F_T} \times R_{CBF}) \times E_T$$

where, $E_T$ = Total employment by IIE,

$F_{SF}$ = Floor area of the standard factory buildings (22,653 m$^2$)

$F_{CBF}$ = Floor area of the Custom Built Factory buildings (43,560 m$^2$)

$F_T$ = Total area of factory buildings (66,213 m$^2$)

$R_{SF}$ = Ratio of the floor demand by the Group A standard factories to the total standard factory floor demand (10% = 0.1), and

$R_{CBF}$ = Ratio of the floor demand by the Group A Custom Built Factories to the total Custom Built Factories floor demand (50% = 0.5).

Then,  $E_A$ = (0.342 x 0.1 + 0.658 x 0.5) x 3,000

= 1,090 (persons).

Thus, $E_A$ is 1,090 persons or roughly 36 percent of the total employment by the IIE.

1047     Then the net employment created by the IIE is roughly 1,400 persons (0.75 x (1-0.36) x 3,000 = 1,440 ≒ 1,400). Thus, by IIE, the extra employment opportunity of roughly 1,400 will be created.

b.  Industrialization Promotion and Linkage Effect

1048     As being estimated in the previous section, roughly 50 percent (1,400 persons) of the total employment will be newly created by IIE. It means that roughly 50 percent of the total industries (roughly 300 factories) of IIE is newly generated by the establishment of IIE. This roughly 150 factories are direct contribution of IIE to industrial promotion.

1049     The construction of IIE itself, particularly the construction of Custom Built Factories, will directly increase the demand for general construction works and construction materials. This will be great stimulus to contractors and material supplyers. The above mentioned newly created factories also will increase the demand for their input material and their operation. These demand will have further backward linkage effects towards the end supplyers contributing to the further industrialization of the Irbid region.

1050     At the same time, products of the newly generate factories will have forward linkage effects. Particularly the common workshop will serve for promotion of new industrial activities by providing new manufacturing implements and manufacturing technologies.

> c.  Other Benefits

1051     There are several other benefits as follows:

> i)  Agglomeration benefit such as transportation cost reduction among factories in IIE and cost reduction owing to cooperative purchasing of raw-materials and joint shipment of products;
>
> ii)  Accumulation of managerial and technological know-hows at factories;
>
> iii)  Up-grading of workers' skill;
>
> iv)  Better environment for factories and improved environment at the City Center; and
>
> v)  Health and safety effects on workers.

## 10.7  Conclusion

1052     This project has a high economic rate of return at roughly 16 percent which is significantly higher than the opportunity cost of capital at roughly 8 percent. And even in the worst case of sensitivity analysis, which is the case of 10 percent increase in economic cost plus 10 percent decrease in economic benefit plus 2 years delay in occupancy, this project shows the economic rate of return at roughly 11 percent which is reasonably higher than 8 percent. Moreover, there are several intangible benefits mentioned in the previous section. Thus, the implementation of this project is recommended in terms of national economic point of view.

# CHAPTER XI

# IMMEDIATE ACTIONS NEEDED

IMMEDIATE ACTIONS NEEDED

1101    The analysis undertaken in the previous Chapters indicates the proposed project is technically and financially feasible as well as economically beneficial.  This statement is based on the assumption that certain immediate actions will be taken in a timely manner as summarized in the following.

1102    Acquisition of the proposed 27.5 ha of land for IIE should be completed as soon as possible by IDA in order to avoid an increase of the development cost and to commence physical development of IIE as soon as possible.

1103    The Counterpart Committee of this Study, which is headed by the Ministry of Municipal, Rural and Environmental Affairs (MMREA) and consists of Industrial Development Bank (IDB) and Jordan Industrial Estate Corporation (JIEC), should be in charge of undertaking all the preparatory works including the establishment of IDA in early 1982. Major preparatory works are authorization of this project, land acquisition, loan negotiation, tender for detail design, and soil and topographic surveys.

1104    Except land acquisition mentioned previously, loan negotiation is the most important among the major preparatory works.  In order to cover the foreign portion of the development costs including the engineering fee for detail design, the Committee should make utmost effort as soon as possible secure a loan preferably from bilateral and/or international aid agencies at the authorization of and through National Planning Council.

1105    The Committee should also make necessary requests to the Central Government to be equity participants of IDA and to raise its required paid-in capital.

1106    The Committee should immediately start coordinations with concerned organizations or government agencies for the implementation and improvement of required outer utility facilities of IIE.  This should be successively handled by IDA, once it is established.

1107　　IDA should be the responsible organization in formulating tender for construction and in supervising the physical development of IIE, the initiation of which is scheduled at the beginning of 1983. Meanwhile, IDA should undertake all the preparatory and promotional works necessary for marketing so that occupancy can start at the beginning of 1984.