THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY
OF
IRBID
INDUSTRIAL ESTATE
FINAL REPORT

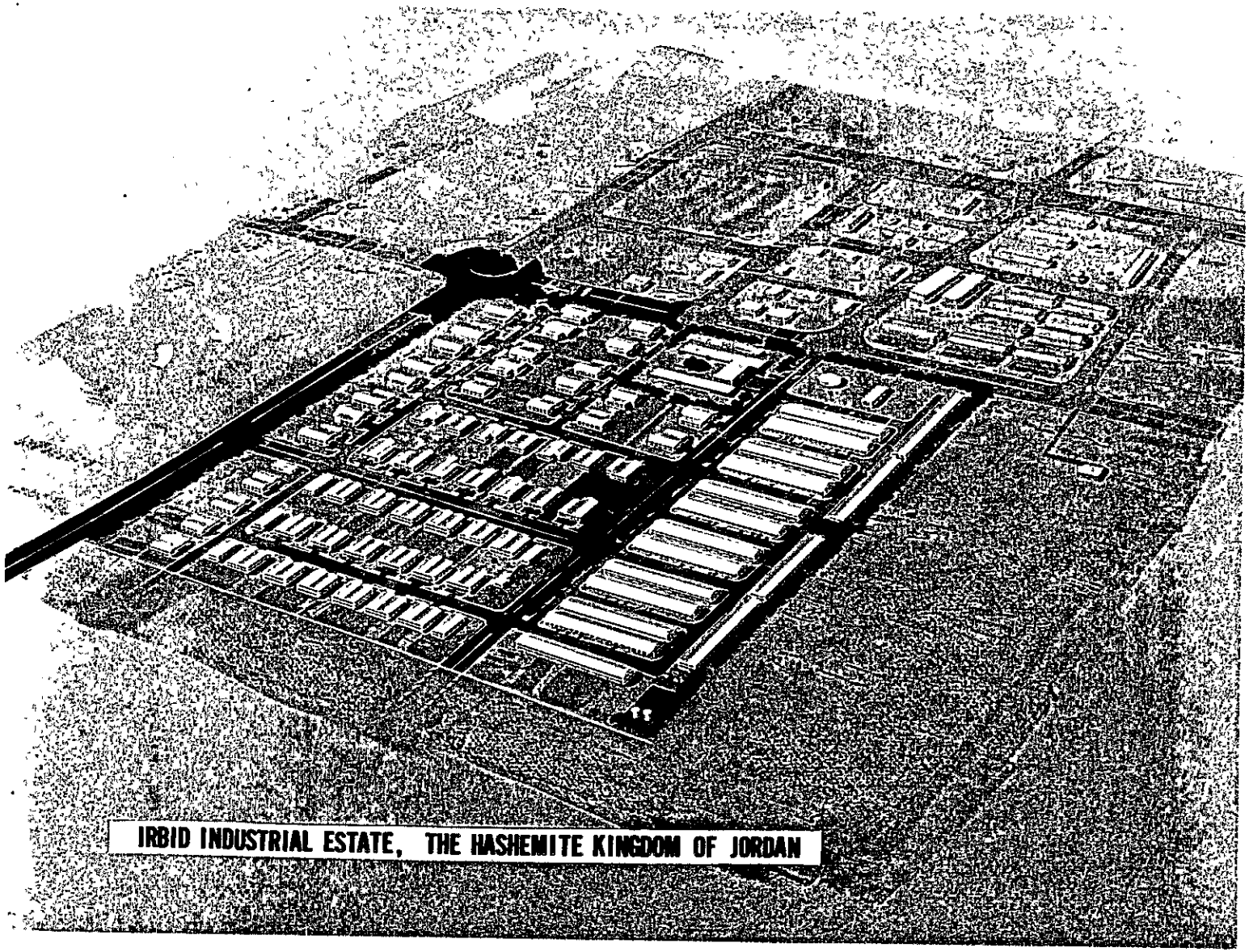
OCTOBER, 1981

JAPAN INTERNATIONAL
COOPERATION AGENCY

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY
OF
IRBID
INDUSTRIAL ESTATE
FINAL REPORT

OCTOBER, 1981

JAPAN INTERNATIONAL
COOPERATION AGENCY



IRBID INDUSTRIAL ESTATE, THE HASHEMITE KINGDOM OF JORDAN

P R E F A C E

In response to the request of the Government of the Hashemite Kingdom of Jordan, the Japanese Government decided to conduct a survey on the Irbid Industrial Estate Project and entrusted the survey to the Japan International Cooperation Agency (JICA).

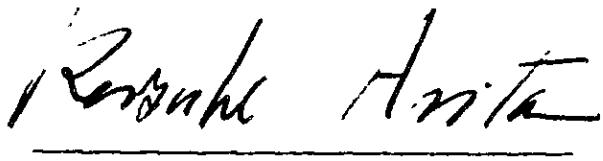
The JICA sent to Jordan a survey team headed by Mr. Kouichi Mera from November 30 to December 23, 1980.

The team exchanged views with the officials concerned of the Government of Jordan and conducted a field survey in Amman and Irbid area. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contrioute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Jordan for their close cooperation extended to the team.

October, 1981



Keisuke Arita

President

Japan International Cooperation Agency

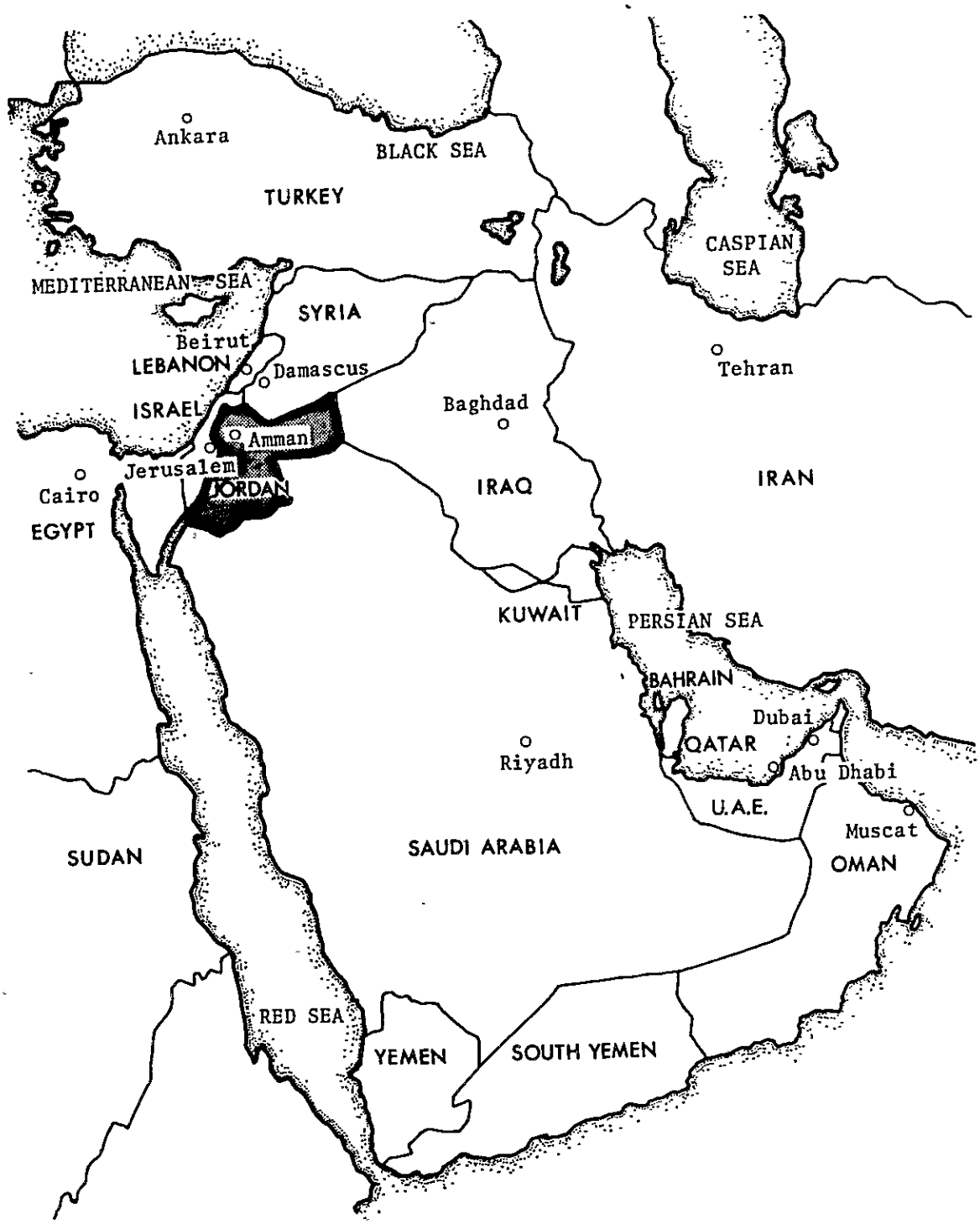
CURRENCY EQUIVALENTS

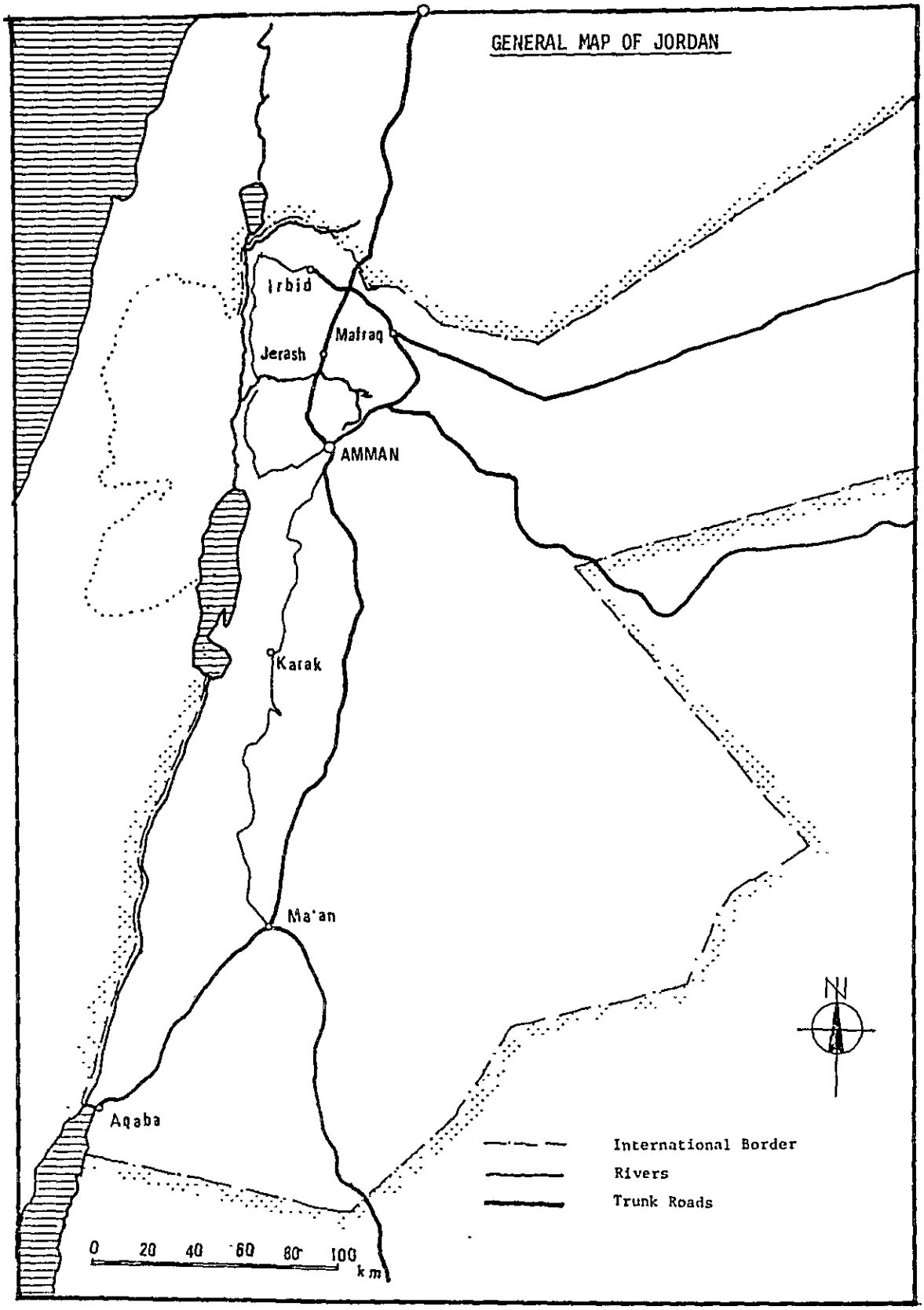
Jordan Dinar (JD)/US$ at December, 1980

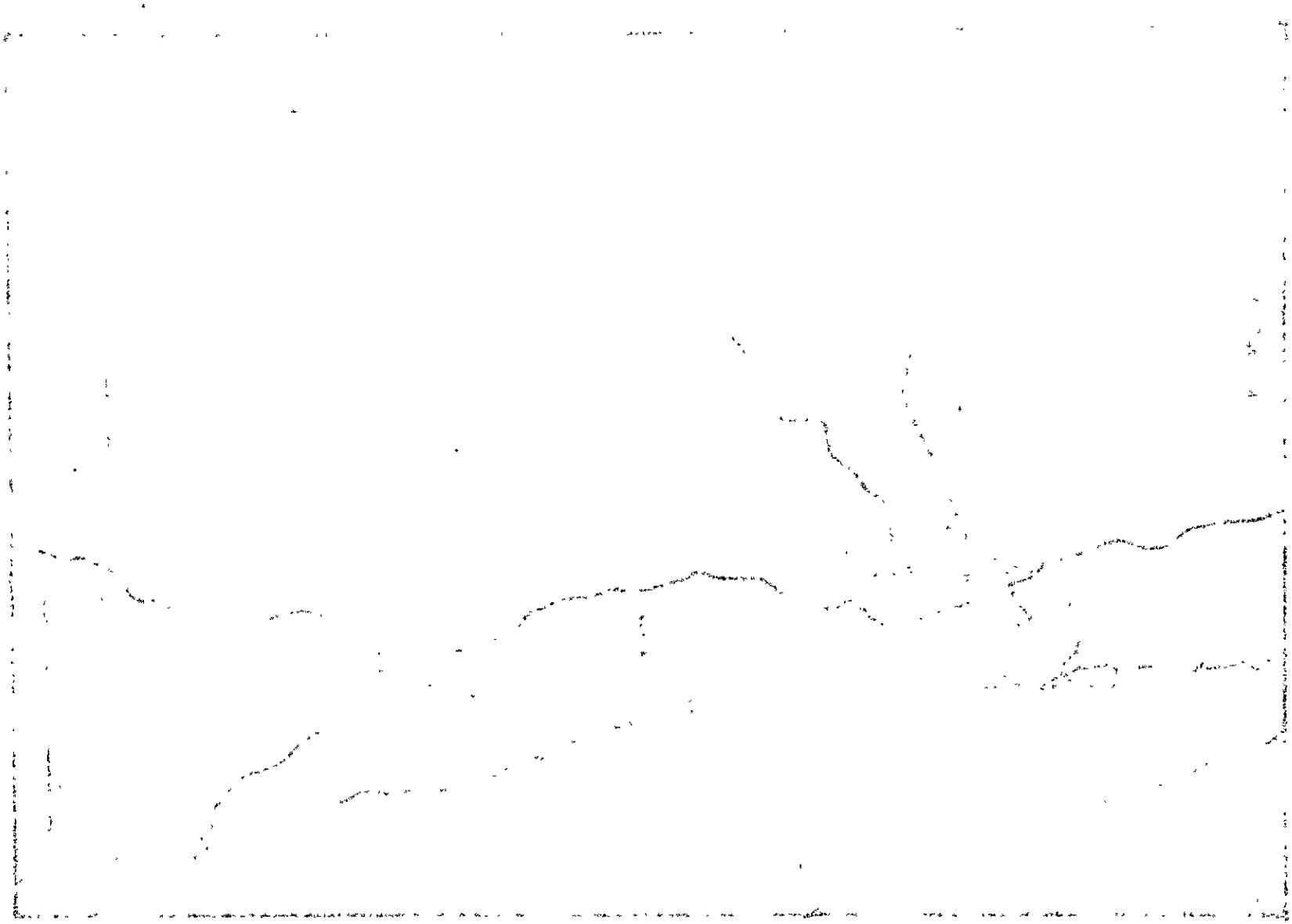
0.293 JD/US$1.00

Yen (¥)/US$ at December, 1980

¥220/US$1.00


Ankara
BLACK SEA
TURKEY
CASPIAN SEA
MEDITERRANEAN SEA
SYRIA
Beirut
LEBANON
Damascus
Tehran
ISRAEL
Baghdad
Amman
Jerusalem
JORDAN
Cairo
EGYPT
IRAQ
IRAN
KUWAIT
PERSIAN SEA
BAHRAIN
Dubai
QATAR
Riyadh
Abu Dhabi
U.A.E.
Muscat
OMAN
SUDAN
SAUDI ARABIA
RED SEA
YEMEN
SOUTH YEMEN


GENERAL MAP OF JORDAN
Irbid
Mafraq
Jerash
AMMAN
Karak
Ma'an
Aqaba
N
International Border
Rivers
Trunk Roads
0 20 40 60 80 100
km



CONTENTS

SUMMARY AND CONCLUSIONS

I. Outline of the Project S-1
II. Conclusion S-2
III. Background and Objective of the Irbid Industrial Estate Project S-2
IV. Investment Environments and Demand Projection S-4
V. Scale of Development and Types of Industry to be Introduced S-6
VI. Site Selection and Outer Utility Facilities S-9
VII. Land Use Plan of Irbid Industrial Estate S-11
VIII. Preliminary Engineering Design S-13
IX. Estimation of Development Cost and Implementation Schedule S-14
X. Organization and Management S-14
XI. Financial and Economic Analysis S-17
XII. Immediate Actions Needed S-18

CHAPTER I. INTRODUCTION AND BACKGROUND

1.1 Background of the Study I-1
1.2 Objective and Scope of the Study I-2
1.2.1 Objectives of IIE Project I-2
1.2.2 Scope of the Study I-4
1.3 Definition of the Project I-5
1.4 Format of the Report I-5

CHAPTER II. PROSPECTS OF INDUSTRIAL DEVELOPMENT IN JORDAN WITH PARTICULAR REFERENCE TO THE NORTHERN REGION

2.1 Trend of Macro Economic Conditions II-1
2.1.1 Trend of Macro Economic Conditions II-1
2.1.2 Economic Conditions of the Northern Region II-6
2.2 Investment Environments II-8
2.2.1 Conditions of Labour Market II-8
2.2.2 Incentive System for Investment II-13
2.2.3 Financial Institutions and Conditions II-15
2.2.4 Marketing and Transportation Conditions II-21
2.3 Demand Projection of Selected Industries II-23
2.3.1 Objective of Demand Projection II-23
2.3.2 Future Market Demand Anticipated by Entrepreneurs in Irbid and Amman II-24
2.3.3 Method of Domestic Demand Projection and Assumptions II-27

2.3.4 Method of Export Demand Projection and Assumptions II-29
2.3.5 Results of Demand Projection II-30

CHAPTER III. SCALE OF DEVELOPMENT AND TYPES OF INDUSTRY TO BE DEVELOPED

3.1 Introduction III-1
3.2 Factory Interview Surveys III-1
3.2.1 Factory Interview Surveys in Irbid III-1
3.2.2 Overall Results of Factory Surveys in Irbid ... III-2
3.2.3 Factory Interview Survey in Amman and Zarga ... III-4
3.3 Industrial Land Demand for IIE III-5
3.3.1 Introduction III-5
3.3.2 Industrial Land Demand for Relocation, Expansion and Waiting Factories III-5
3.3.3 Industrial Land Demand by New Investors up to 1986 and 1990 ..... III-13
3.3.4 Projected Industrial Land Demand for IIE III-23
3.4 Review of Industries Proposed by Previous Studies III-24
3.4.1 Industries Proposed by the Prefeasibility Study of IIE III-24
3.4.2 Industries Proposed by the Industrial Programming Study III-25
3.4.3 Industries Proposed by the Master Plan of Amman Industrial Estate III-29
3.5 Industries to be Developed in IIE III-34
3.5.1 Comprehensive List of Industries for Screening III-34
3.5.2 The Criteria for Screening Industries III-37
3.5.3 Screening of Candidate Industries III-38
3.5.4 Suggested Industries and Products for the Development of IIE III-50
3.5.5 Comments on Suggested Industries and Products III-53
3.5.6 Outlines of Common Metal Workshop and Comprehensive Automobile Repair Shop III-54
3.6 Determination of Scale of Newly Developed Industries III-55
3.7 Industrial Land Composition of IIE III-59

CHAPTER IV. SITE SELECTION AND OUTER UTILITY FACILITIES

4.1 Site Selection of the Proposed Irbid Industrial Estate IV-1
4.2 Outer Utility Facilities: Present Conditions and Development Schedule IV-4
4.3 Water Supply System IV-4
4.3.1 Existing Water Supply System in Irbid IV-4

4.3.2 Water Distribution Master Plan of Irbid IV-7
4.4 Power Supply System IV-8
4.4.1 Existing Power Supply System in Irbid IV-8
4.4.2 Master Plan of Power Supply System in Irbid ... IV-11
4.5 Telecommunication System IV-11
4.6 Road Infrastructure and Public Transportation IV-12
4.6.1 Existing Road Network in Irbid IV-12
4.6.2 The Proposed Ring Roads Project in Irbid IV-17
4.6.3 Public Transportation in Irbid IV-19
4.7 Sewerage System IV-19
4.7.1 Existing Sewerage System in Irbid IV-19
4.7.2 Sewerage System Master Plan in Irbid IV-20
4.8 Storm Water Drainage System IV-23
4.9 Solid Waste Disposal System IV-23

CHAPTER V. LAND USE PLAN OF IRBID INDUSTRIAL ESTATE

5.1 Basic Approach for Land Use Planning V-1
5.2 Planning Premises V-2
5.2.1 Introduction V-2
5.2.2 Plan of Custom Built Factory V-2
5.2.3 Plan of Standard Factory Buildings V-3
5.2.4 Planning Target of Land Subdivision of IIE V-6
5.2.5 Estimation of Employment in IIE V-6
5.2.6 Administrative and Supporting Facilities V-12
5.3 Conditions of the Selected Site V-17
5.3.1 Location of the Selected Site of IIE V-17
5.3.2 Present Conditions of the Site of IIE V-17
5.4 Formulation of Land Use Plan of IIE V-22
5.4.1 Alternative Land Use Plans V-22
5.4.2 Formulation of Land Use Plan of IIE V-29
5.4.3 Proposed Land Use Composition of IIE V-31

CHAPTER VI. PRELIMINARY ENGINEERING DESIGN

6.1 Land Preparation VI-1
6.2 Road Network in IIE VI-1
6.2.1 Generated Traffic Volume VI-1
6.2.2 Road Network in IIE VI-8
6.3 Water Supply System VI-11
6.3.1 Estimation of Water Demand of IIE VI-11
6.3.2 Water Distribution System in IIE VI-13
6.4 Stormwater Drainage System in IIE VI-13
6.5 Sewerage Disposal System in IIE VI-14
6.6 Electrical Power Supply System in IIE VI-14
6.6.1 Electrical Power Demand of IIE VI-14
6.6.2 Electricity Distribution and Supply System VI-22
6.7 Telecommunication System in IIE VI-22
6.7.1 Estimation of Telephone Demand VI-22
6.7.2 Telephone System in IIE VI-23

6.8 Solid Waste Disposal of IIE VI-23
6.8.1 Estimation of Generated Solid Waste of IIE VI-23
6.8.2 Disposal of Solid Waste Generated by IIE VI-24

CHAPTER VII. ESTIMATION OF DEVELOPMENT COST AND INPLEMENTATION SCHEDULE

7.1 Development Costs of IIE VII-1
7.1.1 Share of Development Cost VII-1
7.1.2 Unit Cost of Construction VII-1
7.1.3 Estimation of Development Cost VII-5
7.2 Implementation Schedule VII-5

CHAPTER VIII. ORGANIZATION AND MANAGEMENT

8.1 Review of the Candidate Existing Organization VIII-1
8.1.1 Introduction VIII-1
8.1.2 Irbid Municipality VIII-1
8.1.3 Government Agencies VIII-2
8.1.4 Other Public Organizations VIII-3
8.2 Necessity of Creation of IDA and Its Profile VIII-5
8.2.1 Need for a New Local Organization VIII-5
8.2.2 IDA's Future Role and Its Relation with JIEC .. VIII-5
8.2.3 Strong Financial Supports Needed VIII-5
8.2.4 Profile of IDA VIII-6
8.3 Recommended Management Policies and Incentives to be Introduced VIII-8
8.3.1 Introduction VIII-8
8.3.2 Management Policies VIII-8
8.3.3 Incentives VIII-9
8.4 Organizational Structure and Staffing Needs of IDA VIII-10
8.4.1 Introduction VIII-10
8.4.2 Structure and Staffing VIII-12

CHAPTER IX. FINANCIAL ANALYSIS

9.1 Introduction IX-1
9.2 Revenue Projection IX-1
9.2.1 Sources of Revenue IX-1
9.2.2 Pricing Policy IX-2
9.2.3 Land and Floor Lease Schedule IX-15
9.3 Operation and Maintenance Costs Estimate IX-16
9.4 Financial Analysis IX-18
9.4.1 Specification of Alternatives IX-18
9.4.2 Financial Cost of Capital IX-20
9.4.3 Financial Analysis IX-20
9.4.4 Betterment of Recommended Policy IX-22
9.4.5 Financial Feasibility and Financial Arrangement IX-24

9.4.6 Local Borrowing Finance and Building Cost Reduction IX-25
9.4.7 Financial Analysis Based on 1983 Prices IX-27
9.4.8 Cash Flow Analysis IX-29
9.4.9 Financial Sensitivity Analysis IX-32
9.4.10 Conclusion of Financial Analysis IX-33

CHAPTER X. ECONOMIC ANALYSIS

10.1 Introduction and Analysis Method X-1
10.2 Economic Cost X-3
10.2.1 Type of Economic Cost X-3
10.2.2 Economic Cost of Land X-3
10.2.3 Economic Cost of Foreign Machines and Materials X-9
10.2.4 Economic Cost of IIE Development X-9
10.2.5 Economic Cost of Operation and Maintenance X-9
10.2.6 Total Economic Cost X-9
10.3 Economic Benefit X-14
10.3.1 Type of Economic Benefit X-14
10.3.2 Identification of Economic Benefit of Land-Factory-Service Complex X-15
10.3.3 Demand Curve Specification X-16
10.3.4 Share of Group A and Estimation of Group A Benefit X-19
10.3.5 Estimation of Reduced Traffic Disturbance X-20
10.3.6 Conversion Factor for Economic Benefit X-21
10.3.7 Total Economic Benefit Stream X-21
10.4 Economic Feasibility of IIE X-21
10.4.1 The Alternative Studied X-21
10.4.2 Economic Cost of Capital X-23
10.4.3 Economic Analysis X-24
10.5 Sensitivity Analysis X-25
10.5.1 Cases to be Examined by Sensitivity Analysis .. X-25
10.5.2 Result of the Sensitivity Analysis X-25
10.6 Other Economic Benefit X-26
10.7 Conclusion X-28

CHAPTER XI. IMMEDIATE ACTIONS NEEDED

ANNEX 1.1	Scope of Work for the Feasibility Study of Irbid Industrial Estate	A-1
1.2	Interim Report of the Feasibility Study of Irbid Industrial Estate	A-21
1.3	Official Comments of the Counterpart Committee on the Interim Report of the Feasibility Study of Irbid Industrial Estate	A-65
1.4	Official Comments of the Counterpart Committee on the Draft Final Report of the Feasibility Study of Irbid Industrial Estate	A-67
1.5	Answers to the Comments on the Draft Final Report of the Feasibility Study of Irbid Industrial Estate	A-73
1.6	UN's Definitions of Industrial Zone, Area and Estate	A-78
ANNEX 2.1	Indexes of External Trade Statistics on the Selected Industries and Products	A-79
2.2	Composition of Private Consumption Expenditure During 1970-1978	A-80
2.3	Price Index of Jordan (1975=100)	A-81
2.4	Wholesale Price Index (1975=100)	A-82
2.5	Statistical Back Data of Demand Projection of Selected Industries Vegetable Oil, Fruit Oil (and Animal Fats)	A-83
2.5	Statistical Back Data of Demand Projection of Selected Industries Bakery	A-84
2.5	Statistical Back Data of Demand Projection of Selected Industries Animal Feeds	A-85
2.5	Statistical Back Data of Demand Projection of Selected Industries Leather Products	A-86
2.5	Statistical Back Data of Demand Projection of Selected Industries Leather Footwear	A-87
2.5	Statistical Back Data of Demand Projection of Selected Industries Wood Products	A-88
2.5	Statistical Back Data of Demand Projection of Selected Industries Furniture and Fixtures	A-89
2.5	Statistical Back Data of Demand Projection of Selected Industries Paper Boxes and Containers	A-90
2.5	Statistical Back Data of Demand Projection of Selected Industries Fertilizer	A-91
2.5	Statistical Back Data of Demand Projection of Selected Industries Plastic Products	A-92
2.5	Statistical Back Data of Demand Projection of Selected Industries Ceramic Products	A-93
2.5	Statistical Back Data of Demand Projection of Selected Industries Glass Products	A-94
2.5	Statistical Back Data of Demand Projection of Selected Industries Structural Clay Products ..	A-95

ANNEX 2.5	Statistical Back Data of Demand Projection of Selected Industries Cement	A-96
2.5	Statistical Back Data of Demand Projection of Selected Industries Non-metalic Mineral Products	A-97
2.5	Statistical Back Data of Demand Projection of Selected Industries Metal	A-98
2.5	Statistical Back Data of Demand Projection of Selected Industries Agricultural Machinery and Equipment	A-99
2.5	Statistical Back Data of Demand Projection of Selected Industries Chicken	A-100
2.5	Statistical Back Data of Demand Projection of Selected Industries Fruit and Vegetable	A-101
2.5	Statistical Back Data of Demand Projection of Selected Industries Bottling (Beverages)	A-102
2.5	Statistical Back Data of Demand Projection of Selected Industries Printing and Publishing ...	A-103
ANNEX 3.1	Industrial Survey Questionnaire	A-104
3.2.1	Overall Results of Factory Interview Survey: Factories Having Investment Plan in the General Survey in Irbid, December, 1980	A-111
3.2.2	Overall Results of Factory Interview Survey: Applicant Survey in Irbid, December, 1980	A-113
3.2.3	Overall Results of Factory Interview Survey: Amman Interview Survey, December, 1980	A-117
3.3	Land and Floor Area Estimate for 101 Factories in the Applicant Survey	A-118
3.4	Result of the Survey of Small Scale Factories in Amman and Zarga Region which Have Wished to Move into AIE: Industrial Development Bank ...	A-121
3.5	Distribution of Agricultural Production by Governorate	A-123
3.6	Provisional Composition of Common Metal Workshop	A-126
3.7	A Scope of Automobile Service Shop	A-130
3.8	Provisional Composition of Comprehensive Automobile Service Shop	A-131
ANNEX 4.1	Water Quality at the Sources of Supply	A-133
4.2	Projected Water Demand for Commercial and Industrial Use	A-134
4.3	Excerpt of Electricity Tariffs, 1980	A-136
ANNEX 7.1	Unit Cost by Work Item	A-140
7.2	Reduced Unit Cost of Buildings	A-148

ANNEX 8.1	Financial and Organizational Profile of the Municipality of Irbid	A-153
ANNEX 9.1	Rent Paid by Industrialists Leasing 0.5 Donum or More in Irbid, 1980	A-154
9.2	Rent Paid by Industrialists Leasing 0.5 Donum or More in Amman, 1980	A-155
9.3	Rents Paid by Entrepreneurs in Irbid, 1980	A-156
9.4	Rent Paid by Industrialists Leasing Less than 0.5 Donum in Irbid	A-157
9.5	Rent Paid by Industrialists Leasing Less than 0.5 Donum in Amman, 1980	A-158
9.6	Financial Analysis of Alternative 1	A-159
9.7	Financial Analysis of Alternative 2	A-160
9.8	Financial Analysis of Alternative 3	A-161
9.9.1	Financial Analysis of Alternative 4	A-162
9.9.2	Financial Analysis of Alternative 5	A-163
9.9.3	Financial Analysis of Alternative 1-a	A-164
9.9.4	Financial Analysis of Alternative 2-a	A-165
9.9.5	Financial Analysis of Alternative 3-a	A-166
9.9.6	Financial Analysis of Alternative 4-a	A-167
9.9.7	Financial Analysis of Alternative 5-a	A-168
9.9.8	Financial Analysis of Alternative 5-1-a	A-169
9.10	Financial Sensitivity Analysis, Case 1: Cost Increase by 10%	A-170
9.11	Financial Sensitivity Analysis, Case 2: Revenue Reduction by 10%	A-171
9.12	Financial Sensitivity Analysis, Case 3: Occupancy Delay by 2 Years	A-172
9.13	Financial Sensitivity Analysis, Case 4: All of Cases 1 to 3	A-173
9.14	Financial Sensitivity Analysis, Case 5: No Land Cost	A-174
9.15	Financial Sensitivity Analysis, Case 6: Land Cost Increase by 100%	A-175
ANNEX 10.1	Computation of Standard Conversion Factor	A-176
10.2	Computation of Consumption Goods Conversion Factor	A-177
10.3	Population Projection Revised	A-178
10.4	Economic Sensitivity Analysis, Case 1: Economic Development Cost Increase by 10 Percent	A-179
10.5	Economic Sensitivity Analysis, Case 2: Economic Land Cost Increase by 10 Percent	A-180
10.6	Economic Sensitivity Analysis, Case 3: Economic O/M Cost Increase by 10 Percent	A-181
10.7	Economic Sensitivity Analysis, Case 4: Combined Case of Cases 1, 2 and 3	A-182

ANNEX 10.8 Economic Sensitivity Analysis, Case 5: Occupancy Delay by 2 Years A-183
10.9 Economic Sensitivity Analysis, Case 6: Combined Case of Cases 1, 2, 3 and 5 ..... A-184
10.10 Economic Sensitivity Analysis, Case 7: Economic Benefit Decrease by 10 Percent A-185
10.11 Economic Sensitivity Analysis, Case 8: Combined Case of Cases 1, 2, 3, 5 and 7 ..... A-186

DRAWING

No. 5.1 Custom Built Factory Type I, Ground Floor Plan, Elevation, Section A-187
5.2 Custom Built Factory Type I, Second Floor Plan A-189
5.3 Custom Built Factory Type I, Sectional Detail A-191
5.4 Custom Built Factory Type II, Ground Floor Plan, Elevation, Section A-193
5.5 Custom Built Factory Type II, Second Floor Plan A-195
5.6 Custom Built Factory Type II, Sectional Detail A-197
5.7 Standard Factory Building Type A, Floor Plan, Elevation, Section A-199
5.8 Standard Factory Building Type A, Sectional Detail A-201
5.9 Standard Factory Building Type B, Floor Plan, Elevation, Section A-203
5.10 Standard Factory Building Type B, Sectional Detail A-205
5.11 Center Building, Elevation A-207
5.12 Center Building, Ground Floor Plans A-209
5.13 Center Building, 2nd & 3rd Floor Plans A-211
5.14 Center Building, Section A-213
5.15 Center Building, Sectional Detail A-215

LIST OF TABLES

Table	S.1	Investment Schedule	S-15
Table	2.1	Gross Domestic Product at Factor Cost by Sectors in the East Bank during 1973 through 1979 at 1975 Constant Price	II-2
	2.2	Performance of GDP Growth by Major Economic Sectors	II-3
	2.3	The Index Number of Industrial Production	II-4
	2.4	Planned GDP Growth Rate by Sectors for the Second Five-Year Plan (1981-1985)	II-5
	2.5	GRDP by Governorate, East Bank, 1977	II-6
	2.6	Labour Productivity by Sector, Irbid Governorate, 1977	II-7
	2.7	Annual Capital Investment by Selected Manufacturing Establishments in Irbid during 1975 through 1980	II-7
	2.8	Sectoral Distribution of the Labour Force in East BAnk and Irbid Governorate, 1975	II-8
	2.9	Distribution of Labour Force by Economic Activity and Region Census of 1975	II-10
	2.10	Number of Foreign Workers in the Irbid Governorate during 1975 through 1980	II-11
	2.11	Distribution of Foreign Workers in the Irbid Governorate by Economic Activity (November, 1980)	II-11
	2.12	Wage Comparison of Employees between Amman and Irbid	II-13
	2.13	IDB Approved Loan by Industry	II-16
	2.14	Approved Loans and Their Average Amount	II-17
	2.15	Approved Loans Classified by Purpose (in thousands JD)	II-17
	2.16	Approved Loans and Their Average Amount for Small Scale and Handicraft Industries	II-17
	2.17	Approved Loans Classified by Type of Activity ..	II-18
	2.18	The Regional Distribution of Approved Loans and Amount in 1979	II-18
	2.19	Credit Facilities of Commercial Bank by Sector	II-19
	2.20	Activities of Amman Financial Market	II-21
	2.21	Estimated International Goods Movement by Roads in 1985	II-22
	2.22	Anticipated Growth Rate of Market Demand by Factories Surveyed by Factory Interview Survey .	II-25
	2.23	Market Demand Anticipated by Local Entrepreneurs in Irbid in 1980's	II-26
	2.24	Results of Demand Projection (at constant 1975 prices)	II-32
	2.25	Classification of Selected Industries by the Range of Projected Growth Rate	II-34

Table	3.1	Overall Results of Factory Surveys in Irbid	III-3
	3.2	Preference of "Buying" or "Leasing"	III-4
	3.3	Distribution of Willingness to Move into IIE by Type of Industry	III-7
	3.4	Land Demand by Types of Industries in the General Survey	III-8
	3.5	Land and Floor Area Demand by 18 Firms in the Applicant Survey	III-9
	3.6	Land and Floor Demand of Applicants by Types of Industries	III-10
	3.7	Land Demand of 75 Waiting Factories by Types of Industry	III-11
	3.8	Distribution of Land Demand for Re-location, Expansion and Waiting Factories by Types of Industries	III-12
	3.9	Size Distribution of Land Demand for Re-location, Expantion and Waiting Factories	III-13
	3.10	Projected Number of Newly Established Firms between 1981 and 1990 by Linear and Quadratic Regressions	III-14
	3.11	Year of Establishment of 95 Firms in the General and Applicant Survey	III-15
	3.12	Adjusted Number of Firms Established in Each Year and Moving Average	III-16
	3.13	Projected Number of Newly Established Firms between 1981 and 1990 by Logistic Curve	III-18
	3.14	Modified Size Distribution of Industrial Land Demand for the Projection of Industrial Land in 1986	III-20
	3.15	Projected Industrial Land Demand up to 1986	III-21
	3.16	Modified Size Distribution of Industrial Land Demand for the Projection of Industrial Land up to 1990	III-22
	3.17	The Projected Industrial Land Demand up to 1990	III-22
	3.18	Industrial Land Demand for IIE in 1986	III-23
	3.19	Industries and Products Proposed by the Prefeasibility Study of IIE	III-26
	3.20	Industries Proposed by the Industrial Programming Study of Jordan	III-27
	3.21	Comparison of Industries Proposed by the Prefeasibility Study of IIE and Industrial Programming Study	III-28
	3.22	Industries Proposed for Amman Industrial Estate	III-30
	3.23	Industrial Composition Derived from the Survey Conducted by IDB	III-33
	3.24	A List of Candidate Industries for Screening ...	III-34
	3.25	Data for Evaluation of Intermediate Technology	III-39
	3.26	Evaluation of Candidate Industries	III-44
	3.27	Candidate Industries Ordered by Total Score	III-47

	3.28	Evaluation of Comparative Advantages of Candidate Industries and Products	III-50
	3.29	List of Suggested Industries for IIE	III-51
	3.30	Aggregation of Suggested Industries and Products to Nine Types of Industry	III-56
	3.31	Suggested Number of Establishments in Nine Types of Industry	III-57
	3.32	Size Distribution of Suggested Number of Establishments	III-58
	3.33	Development Scale for Suggested Establishments	III-59
	3.34	Industrial Land Composition of IIE	III-60
Table	4.1	Existing Water Supply Quality	IV-6
Table	5.1	Planning Standards of Custom Built Factory	V-3
	5.2	Planning Target of Land Subdivision of IIE	V-7
	5.3	Number of Required Workers per Custom Built Factory by Industries	V-11
	5.4	Administrative and Supporting Facilities	V-13
	5.5	Proposed Land Use Composition of IIE	V-32
Table	6.1	Estimation of the Amount of Generated Goods in IIE	VI-2
	6.2	Design Standards of In-site Roads	VI-9
	6.3	Factory and Other Building Floor Space	VI-21
	6.4	Solid Waste Disposal per Worker by Types of Industries	VI-23
Table	7.1	Cost Bearer of Utility Facilities in IIE	VII-2
	7.2	Material Cost	VII-3
	7.3	Labor Cost	VII-3
	7.4	Projected Development Cost of IIE at 1980 Prices	VII-4
	7.5	Project Development Cost of IIE at 1983 Prices	VII-7
	7.6	Investment Schedule	VII-8
Table	9.1	Present Value of Total Cost	IX-3
	9.2	Shares of Industrial Land and Factory Building in the Capital Investment	IX-4
	9.3	Annual Rent per Industrial Land and per Factory Building Floor	IX-5
	9.4	Land Price, Irbid, 1980	IX-7
	9.5	Rent in Existing Industrial Area	IX-10
	9.6	Prices Proposed for Amman Industrial Estate	IX-11
	9.7	Rent Comparison of AIE and IIE	IX-12
	9.8	O/M Cost of the Common Workshop	IX-13
	9.9	O/M Cost of Convention Rooms	IX-14
	9.10	Summary of Market Rent for IIE	IX-14
	9.11	Land and Floor Lease Schedule	IX-15
	9.12	Occupancy Rate of Factory Land	IX-16
	9.13	Proposed Salary Scale of IDA	IX-17

Table	9.14	Operation and Maintenance Cost	IX-19
	9.15	Facility Maintenance Expenses	IX-19
	9.16	Specification of Alternatives	IX-21
	9.17	Financial Analysis of Alternative 5-1	IX-23
	9.17.a	Investment Schedule of Project with 20 percent Reduction in All Building Cost	IX-26
	9.18	Financial Arrangement	IX-27
	9.19	Financial Analysis of Alternative 5-1-a, Base Case	IX-28
	9.20	Income Statement and Funds Flow Statements	IX-30
	9.21	Internal Rate of Return on Equity Capital	IX-32
	9.22	Sensitivity Analysis of Cost Increase and Revenue Reduction Cases	IX-33
Talbe	10.1	Rent of Comparable Agricultural Land, 1980	X-7
	10.2	Net Wheat Production on Land between the Proposed Boundary and Outer Ring Roads, Recent Average at 1980 Prices	X-7
	10.3	Economic Cost of Land	X-8
	10.4	Economic Cost of IIE Development	X-10
	10.5	Conversion Factor for Operation and Maintenance Cost	X-11
	10.6	Economic Cost of IIE Operation and Maintenance Cost	X-12
	10.7	Economic Cost Stream of IIE Project	X-13
	10.8	Factory in Need of Water, Telephone or Common Workshop	X-18
	10.9	Economic Benefit Stream of IIE Project	X-22
	10.10	Economic Rate of Return of Public Projects	X-23
	10.11	Computation of Economic Rate of Return	X-24
	10.12	Result of Economic Sensitivity Analysis	X-26

LIST OF FIGURES

Figure	S.1	Implementation Schedule	S-16
Figure	1.1	Flow Chart of Study	I-4
Figure	3.1	Flow Chart of Land Demand Projection	III-6
	3.2	Number of Established Firms in the Irbid Region	III-17
	3.3	Projections of New Establishment in the Irbid Region	III-19
Figure	4.1	Proposed Sites of Irbid Industrial Estate	IV-2
	4.2	Existing Water Supply System to the Municipality of Irbid	IV-5
	4.3	Proposed Water Distribution Pipes around IIE ..	IV-9
	4.4	Proposed Electricity Network and Locations of Packaged Substations around IIE	IV-13
	4.5	Existing and Proposed Road Network	IV-15
	4.6	Typical Cross-Sections of the Proposed Boundary Ring Roads	IV-18
	4.7	Propsoed Sewerage Collection System around IIE	IV-21
Figure	5.1	Model Layout of Custom Built Factory Type I ...	V-4
	5.2	Model Layout of Custom Built Factory Type II ..	V-5
	5.3	Model Layout of Standard Factory Building Type A	V-8
	5.4	Model Layout of Standard Factory Building Type B	V-9
	5.5	Topography of the Site of IIE	V-18
	5.6	Geological Map of the Irbid Area	V-19
	5.7	Present Land Use Pattern of the Site of IIE ...	V-20
	5.8	Land Holdings of the Site of IIE	V-21
	5.9	Alternative Site Plans of IIE	V-23
	5.10	Land Use Plan for Alternative A	V-25
	5.11	Land Use Plan for Alternative B	V-27
	5.12	Proposed Road Network in IIE	V-33
	5.13	Proposed Land Use Plan of IIE	V-35
	5.14	Proposed Layout of Factory Buildings	V-37
	5.15	Plan for Physical Distribution of Industries ..	V-39
	5.16	Planned Location of Utility Facilities	V-41
Figure	6.1A	Land Reclaimed Plan of IIE	VI-3
	6.1B	Earth Work of IIE	VI-5
	6.2	Design Standards of In-site Roads	VI-10
	6.3	Road Pavement Composition	VI-11
	6.4	Proposed Water Distribution System in IIE	VI-15
	6.5	Proposed Stormwater Drainage System in IIE	VI-17
	6.6	Proposed Sewerage Collection System in IIE	VI-19

Figure 7.1 Implementation Schedule VII-6

Figure 8.1 Proposed Organizational Structure and Staffing Needs of IDA VIII-11

MEMBERS OF THE JAPANESE STUDY TEAM

Name	Speciality
Koichi Mera	Team Leader
Hiroshi Ueno	Financial/Economic Analyst
Takashi Shirasu	Land Use Planner
Hideo Ueki	Market Specialist
Masaru Kaneko	Industrial Specialist
Eiji Nishita	Organization Specialist
Masamichi Nakamura	Engineer

Japan International Cooperation Agency

P.O.Box No. 126
48th Floor, Shinjuku Mitusi Bldg.
No.1, 2-chome, Nishi-Shinjuku
Shinjuku-ku, Tokyo, Japan

Tel : Tokyo (03) 341-5287 ∿ 9
Calbe : JICAHDQ
Telex : J22271 JICAHDQ J

SCHEDULE OF THE FEASIBILITY STUDY TEAM

I. Main Mission (November 30, 1980 ∿ December 23, 1980)

Nov. 30	Sun.		Movement Tokyo Lv. 11:30 (JL461) Bangkok Ar. 16:05
Dec. 1	Mon.		Movement Bangkok Lv. 14:00 (RJ181) Amman Ar. 19:30
2	Tue.	Amman	Embassy of Japan for courtesy call National Planning Council (NPC) for courtesy call Ministry of Municipal, Rural and Environmental Affairs (MMREA) for the discussion of the study schedule Amman Chamber of Industry (ACI) for factory survey
3	Wed.	Amman	NPC, MMREA for discussion of Scope of Work Minister of MMREA for courtesy call
4	Thu.	Irbid	Mayor of Irbid for courtesy call Visit to the existing industrial estate of Irbid
5	Fri.	Amman (A) Irbid (B)	Preparation of factory survey Visit to Yarmouk University
6	Sat.	Amman (A)	Visit to Jordan Industrial Estate Corporation (JIEC) Visit to Jordan Telecommunication Corporation (JTC)
		Irbid (B)	Visit to Irbid Chamber of Commerce (ICC) Visit to the existing industrial estate of Irbid
7	Sun.	Amman (A)	Visit to Ministry of Public Works (MPW) Visit to Water Supply Corporaiton (WSC) Visit to NPC
		Irbid (B)	Preparation of factory survey at Irbid
8	Mon.	Ammna (A) Irbid (B)	Visit to ACI and WSC Factory survey at Irbid
9	Tue.	Amman (A)	Visit to Ministry of Industry and Trade (MIT) Visit to Amman Industrial Estate (AIE)
		Irbid (B)	Factory survey at Irbid

10	Wed.	Amman (A)	Visit to Khair Architecture Office Factory survey at Amman
		Irbid (B)	Factory survey at Irbid
11	Thu.	Amman (A)	Visit to Housing Bank (HB) Factory survey at Amman
		Irbid (B)	Factory survey at Irbid
12	Fri.	Amman (A)	Study team meeting
		Irbid (B)	Study team meeting
13	Sat.	Amman (B)	Visit to Ministry of Agriculture (MOA) Visit to Natural Resources Authority (NRA) Factory survey at Amman
		Irbid (A)	Visit to ICC and Customs Office at Ramtha Factory survey at Irbid
14	Sun.	Amman (B)	Visit to Industrial Development Bank (IDB) Visit to Cities and Villages Development Bank (CVDB)
		Irbid (A)	Visit to Labour Department of Irbid Visit to Irbid District Electric Company (IDECO)
15	Mon.	Amman	Visit to Jordan Valley Authority (JVA) Visit to Ministry of Transportation (MOT)
16	Tue.	Amman	Visit to Amman Development Authority (ADA)
17	Wed.	Amman	Interim Report preparation
18	Thu.	Amman	Visit to NPC for the exchange of Scope of Wrok
19	Fri.	Amman	Interim Report preparation
20	Sat.	Amman	Presentation of Interim Report Visit to Embassy of Japan for courtesy call
21	Sun.		Movement Amman Lv. 19:30 (RJ606) Baharain Ar. 21:00
22	Mon.		Movement Baharain Lv. 21:00 (GF150) Hongkong Ar. 12:00 Hongkong Lv. 14:30 (JL002) Tokyo Ar. 19:00

II. Final Mission (May 12, 1981 ∿ May 19, 1981)

May 12	Tue.		Movement Tokyo Lv. 13:00 (KL862) Bangkok Ar. 19:25
13	Wed.	Bangkok	Movement Bangkok Lv. 13:30 (RJ181) Amman Ar. 18:15
14	Thu.	Amman	Embassy of Japan for courtesy call MMREA and Counterpart Committee for discussion of the schedule Minister of MMREA for courtesy call
15	Fri.	Amman	Study team meeting
16	Sat.	Amman	MMREA for presentation of Draft Final Report and discussion of minutes
17	Sun.	Amman	MMREA for the exchange of minutes Embassy of Japan for courtesy call Movement Amman Lv. 20:15 (RJ180)
18	Mon.	Bangkok	Bangkok Ar. 11:15
19	Tue.		Movement Bangkok Lv. 11:00 (JL718) Tokyo Ar. 20:30

GLOSSARY OF ACRONYMS

ADA	Amman Development Authority
AIE	Amman Industrial Estate
CVDB	Cities and Villages Development Bank
IDA	Irbid Development Authority
IDB	Industrial Development Bank
IDECO	Irbid District Electric Company
IIE	Irbid Industrial Estate
JEA	Jordan Electric Authority
JICA	Japan International Cooperation Agency
JIEC	Jordan Industrial Estate Corporation
JIM	Jordan Institute of Management
JTC	Jordan Telecommunication Corporation
JVA	Jordan Valley Authority
KfW	Kreditanstalt für Wiederaufbau
MIT	Ministry of Industry and Trade
MMREA	Ministry of Municipal, Rural and Environmental Affairs
MVLF	Municipal and Villages Loan Fund
NPC	National Planning Council
NRA	Natural Resources Authority
VTC	Vocational Training Corporation
WSC	Water Supply Corporation

ABBREVIATIONS

%	percent
A	ampere
°C	centigrade
CGCF	Consumption Good Conversion Factor
CIF	Cost Insurance and Freight
cm	centimeter
donum	1,000 m^2
ECC	Economic Cost of Capital
e.g.	for instance,
EIRR	Economic Internal Rate of Return
Fig.	figure
FIRR	Financial Internal Rate of Return
FOB	Free on Board
GDP	Gross Domestic Product
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
ha	hectare (10,000 m^2)
i.e.	that is
ISIC	International Standard of Industrial Classification
JD	Jordan Dinar
JSIC	Japanese Standard of Industrial Classification
kg	kilogram
km	kilometer
kV	kilovolt

kVA	kilovolt-ampere
kW	kilowatt
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mm	millimeter
Min.	minimum
MW	megawatt
NPV	Net Present Value
SCF	Standard Conversion Factor
SWR	Shadow Wage Rate
t	metric ton
US$	United States dollars
V	volt
WTP	Willingness to Pay

SUMMARY AND CONCLUSIONS

I. OUTLINE OF THE PROJECT

1.	PROJECT NAME:	Irbid Industrial Estate Project (IIE)
2.	ORGANIZATION:	Irbid Development Authority (IDA) to be established.
3.	TYPE:	A. Objective - Promotion of small and medium scale industry in the Irbid area, and dispersal of industrial activities from the Amman area B. Location - Urban Fringe C. Industrial Activities - Composite
4.	SCALE OF DEVELOPMENT:	Industrial Estate 274,950 m^2 Land for Factory Use 186,553 m^2
5.	LOCATION:	The Municipality of Irbid has easy access to Amman and Syria by R-11 and to Iraq by R-16
6.	TYPE OF THE POTENTIAL INDUSTRIES:	A. Metal Works B. Furniture and Room Units C. Food and Beverages D. Garments and Clothes E. Plastics and Chemicals F. Construction Materials G. Auto-Repair Shops H. Trading I. Paper and Paper Products
7.	EXPECTED EMPLOYMENT:	Direct Workers - 3,000
8.	REQUIRED WATER SUPPLY:	750 m^3/day
9.	REQUIRED ELECTRICITY:	5,000 kVA
10.	TELEPHONE:	500 circuits
11.	WASTE WATER TREATMENT:	Use of Public Waste Water Treatment Plant
12.	CONSTRUCTION PERIOD:	Approximately 2 years
13.	DATE OF FULL COMPLETION:	1985
14.	TOTAL DEVELOPMENT COST:	JD 8.98 million (US$ 30.65 million) at 1980 prices Exchange cost; Domestic cost JD 5.22 million Foreign cost JD 3.76 million
15.	FINANCIAL ANALYSIS:	Project FIRR 12.8% (Alternative 1-a)
16.	ECONOMIC ANALYSIS:	EIRR 16.0%

II. CONCLUSION

S01 The IIE project is one of the projects that was indentified in the process of formulating an "Integrated Regional Development Study of Northern Region," and it aims at promoting industrialization of Northern Region of Jordan, hence, improve its inter-regional income distribution in the Kingdom by lessing the excessive concentration of industry and population in Amman, Jordan's capital.

S02 The Municipality of Irbid where this project will be located boasts the second largest population agglomeration in Jordan and enjoys a locational advantage in terms of access to the neighboring Arab nations in the north and the east. Various infrastructures in the Municipality are also being developed and improved at a fast pace lately. All in all, the city has no equal, except Amman, insofar as potentials for developing small and medium scale industries are concerned, and both the central government and the Irbid Municipality are manifesting extraordinary interest in promoting this project.

S03 This Study has proved the IIE project to be of significance for the economic and social development of the nation, particularly for regional development, and also justifiable as a business undertaking both technically and financially. It is recommended that the necessary steps be taken as soon as possible so that this project may implemented in accordance with the recommendations contained in this Study. Specifically, the project should be targeted for completion in 1985.

III. BACKGROUND AND OBJECTIVE OF THE IRBID INDUSTRIAL ESTATE PROJECT

S04 The Jordanian economy has achieved significant growth during the past few years. Under the First Five-Year Development Plan which began in 1976, it has already achieved its initial growth target during the first four years up to 1979 by recording an average annual GDP growth rate of 9.7 percent in real term. However, when viewed in terms of industrial structure, the tertiary sector accounted for as much as 64 percent of 1979 GDP whereas the mining and manufacturing sector contributed a mere 27.4 percent. The import and export statistics also show that whereas imports totalled JD 450 million in 1977, exports during the same year were a mere JD 80 million, and the large deficit in the trade balance was largely covered by remittance from Jordanians residing overseas, income from tourism and economic aids from foreign governments. It was in order to improve an economic strucuture as described above that the First Five-Year Development Plan was formulated with its primary objective of promoting the development of the mining and manufacturing sector.

S05 The share of the mining and manufacturing sector in GDP which was 21 percent in 1973 increased yearly and reached 27.4 percent in 1979. Meanwhile, the share of capital goods in total import also increased from 14.8 percent in 1971 to 32.8 percent by 1979, indicating an active investment mood to increase the output of the mining and manufacturing sector. However, most of this sector is concentrated in Amman, and should this trend of industrial concentration in Amman continue, the inter-regional disparity in development will be accentuated in the future. This is contradictions to the statement of the objectives made in the Five-Year Development Plan.

S06 The Irbid Municipality has the second largest population agglomeration of being 120,000, next only to the capital city of Amman. The northern region, including the Municipality of Irbid, accounts for about 30 percent of the total domestic population and 21 percent of GDP. Notwithstanding the above, the mining and manufacturing output of the region merely accounts for 1.4 percent that of the national total. The main industry is agriculture, being supported by the region's relatively abundant precipitation, but in terms of land productivity, the disparity between agriculture and manufacturing is tremendous, for 1 ha used as industrial land is estimated to equal 600 ha used for farming in terms of the value added.

S07 Despite the very minute share of the northern region's mining and manufacturing production in the nation's total industrial output, the growth of investment in the manufacturing sector in the Irbid Municipality since 1975 is impressive. However, as most of the investments are in relatively small scale industries catering to the local market, it is necessary to induce and develop intermediate scale industries to meet not only domestic demands but those of the neighboring Arab countries by capitalizing on its locational advantage. The IIE project which capitalizes on the existing agglomeration in the Municipality of Irbid is therefore regarded as an urgent and crucial task also for the sake of correcting the current imbalance of industrial structure and inter-regional income disparity. What is worthy of note is the fact that it is not only the central government that is taking a progressive policy to promote industrial development in the region, but also the local community is just as involved in taking a positive attitude to accommodate the incoming industries, and this should be evaluated highly.

S08 The northern region has several on-going regional development projects such as the construction of the Yarmouk Dam, Yarmouk University, Polytechnique Center, vocational training center and the Zarqa-Irbid trunk road. Besides these, infrastructure development and improvement projects, such as the expansion of waterworks and sewege, road, electricity and telecommunication networks are rapidly advancing in the Irbid Municipality. The Irbid Municipality is thus attributed with all of the favorable conditions conducive to the promotion of industrial development.

S09 The objectives for developing the Irbid Industrial Estate against such a background can be summarized as follows.

i) IIE should accelerate industrial development in the Irbid Municipality, and consequently, in the Irbid Governorate, in order to reduce its income disparity as compared with other Governorates;

ii) IIE should support and enhance the urban development of Irbid in order to reduce population outmigration from the Irbid Governorate to the Amman Municipality, through provision of employment opportunities;

iii) At the same time, IIE is expected to help reduce the congestion problem at the city center of Irbid, by relocating industries existing in the city center;

iv) IIE should be designed so that merits of industrial integration and agglomeration could be fully exploited;

v) Necessary facilities including land plots, roads, water supply and sewerage, electricity, telephone, and access to housing should be fully secured for incoming industries; and

vi) IIE should fully exploit the resource potentialities of the Irbid Governorate such as the relatively abundant and inexpensive manpower, relatively rich agricultural production and good access to the international transportation network.

IIE shall be the second full-fledged industrial estate ever to be developed within Jordan and the first industrial estate to be developed outside of the Governorate of Amman. IIE, in other words, is expected to play a pioneering role in the regional development of Jordan.

IV. INVESTMENT ENVIRONMENTS AND DEMAND PROJECTION

S10 In order to clarify the investment environments in Irbid region, the present conditions were examined on such factors as labor market, investment incentives, financial system, marketing and distribution system of raw materials and products, and transportation conditions. Besides, demand projections for candidate industries were undertaken for 1985 and 1990. The results of demand projections were utilized as a reference for the screening of appropriate industries at the Irbid Industrial Estate. These are summarized below.

S11 The share of labor force in the secondary sector of the Irbid region remained at extremely low level, i.e., 2.8 percent in 1975. However, the employment opportunity in the region has been

increased gradually in accordance with the progress of industrialization and on-going projects, for which rapid increase of foreign workers has been identified since 1975. And the female labor force participation ratio is likely to increase in the wake of the establishment of new industries. The wage level of industries in Irbid is also identified to be relatively advantageous for both skilled and unskilled workers compared to that of Amman. Besides, 600 skilled workers are scheduled to be supplied annually by Vocational Training Center at Hakama from 1982, which will be able to meet the demand for skilled workers at IIE.

S12 As for the incentives for investment, the existing "Encouragement of Investment Law No. 53 of 1972" provides a number of tax holidays for industrial promotion, particularly for those industries located outside of the Amman Governorate. Besides, an additional 2 years of tax exemption is available in case of an "Industrial Estates". Foreign capital investment is guaranteed equal treatment as domestic capital, and the transfer of profits and interest outside the Kingdom can be facilitated upon approval. For the promotion of industrial location in Irbid region by the prospective investors, it is recommended as indispensable incentives to arrange the provision of fully-serviced industrial plots readily available to those investors with simplified procedures and easy access to licensing and financing, in addition to the tax holidays aforementioned.

S13 Industrial Development Bank is a main financial institution for industrial development of Jordan and its interest rate as well as terms of loans are more favorable than those of commercial banks. In addition, in cases of (1) industries located outisde of Amman and Aqaba region and (2) small scale and handicraft industries, interest rate is kept to be 7 percent per annum compared to 9 percent in other cases. These incentives provided by IDB is, therefore, readily available to entrepreneurs who shall locate their factories in IIE.

S14 The Irbid Municipality has relative locational advantages compared to Amman for the import of raw materials and export of finished products due to the proximity not only to neighboring Arab countries such as Iraq and Syria but also to Europe. Nevertheless, the function of Customs Office at Ramza is not enough as yet so that the locational advantages of Irbid are not always realized. Therefore, it is a prerequisite for the healthy operation of IIE that the function and delegated authority of the Ramza Customs Office are to be strengthened.

S15 As for the marketing and distribution system of raw materials and finished products, it is not developed yet in Jordan as a whole, and especially in Irbid it is still underdeveloped. In fact, most of industries have customarily done their direct marketing of purchasing raw materials and selling products as identified by our industrial survey. Therefore, as a means to improve these insufficient distribution channels and bottleneck of transportation, some of small and medium enterprises have interest in the establishment of medium scale distribution center at Irbid Municipality. Hence, if the

physical distribution center with such functions as common storage of raw materials and products in addition to the common transportation is established nearby the Irbid Industrial Estate, it could be helpful to improve those constraints of distribution and transportation for local small and medium enterprises.

S16 The highlights of projected demand by industries are summarized as follows. Future demand of domestic consumption is estimated to grow at a high growth rate as a whole, which is forecasted under the hypothesis that the GDP will grow at a net annual growth rate of 10 percent during 1980 and 1990, and computed from the income elasticity of demand to GDP (net growth during 1973 and 1979) for those selected industries and products in the Pre-feasibility Study. On the other hand, future demand of export is estimated to grow at a moderate or lower growth rate than that of domestic demand in the majority of industries, which is projected by the simple linear extrapolation method based on the past trend (during 1970 and 1979). Nevertheless, the following industries are estimated to grow at a net annual growth rate of more than 10 percent: Those are cement, wood products, fertilizers, furniture and fixtures, structural clay products, and plastic products. From the results of demand forecasting aforementioned, total value of demand (domestic consumption plus export) for 21 industries and 4 products becomes to be JD 930 million in 1985 and JD 2,657 million in 1990 respectively. Accordingly, net average growth rate of those industries over 10 years (from 1980 to 1990) becomes 21.5 percent.

S17 The result of these overall demand forecast is to be utilized as one of criteria for the screening of appropriate industries and for determining development scale of industries.

V. SCALE OF DEVELOPMENT AND TYPES OF INDUSTRY TO BE INTRODUCED

S18 In determining the types of industry to be introduced and their scale, the following surveys were conducted:

(1) General Interview Survey in Irbid
(2) General Interview Survey in Amman
(3) Application Interview Survey in Irbid

S19 The highlight of this Study is the Factory Interview Surveys conducted in Irbid and Amman. Two different surveys conducted in Irbid, i.e., General Interview Survey and Applicant Interview Survey, are outlined as below.

i) As to the General Survey, 234 factories registered at the Chamber of Commerce, Irbid, plus 9 factories which are major factories outisde of Irbid Municipality but with large size and close to the Municipality plus 3 factories which recently obtained industrial license from the Ministry of Industry and Trade were listed up as a comprehensive list of industries in Irbid. Out of these 246, 68 registered factories plus 9 outside-of-Irbid plus 3 licensed-factories totaling 80 were surveyed. Out of 80, effective data were collected from 64 factories, of which 34 factories have wishes to move into IIE.

ii) As to the Applicant Survey, there were 110 applicants to the Municipality office, and out of them 2 were excluded from the Survey because they were already covered by the General Survey. As a result, effective data were collected from 108 present and prospective industrialists, none of which is overlapping with the factories covered by the General Survey. Out of the 108 applicants, 101 expressed wishes to move into IIE.

iii) In addition to the above two Surveys, there is a list of factories waiting for moving into the existing industrial estate. On the list, 81 are registered as waiting factories, out of which 6 were covered by the Applicant Survey, and there is no overlapping factory between the General Survey and those in the waiting list. Consequently, 75 factories independent to those covered by the two Surveys are waiting for moving into the existing industrial area which is now fully occupied and has no space for them. Consequently, these 75 factories should be accommodated by the new IIE.

iv) Accordingly, altogether 210 enterprises in the Irbid area, including the potential entrepreneurs, were found to be willing to move into IIE.

S20 In estimating the scale of development, i) the demand aggregation method and ii) the regression model using time series data were employed based on the foregoing survey findings.

i) The demand aggregation method: In the demand aggregation method, the size of land area desired as of 1980 by each factories covered by the General Survey and the Applicant Survey as well as factories on the waiting list were added up. As a result, it turned out that altogether 15.5 ha of land is demanded for industrial sites.

ii) In estimating the demand for industrial land after 1980, the time series data on the number of new establishments since 1950 were obtained from the General and Applicant

Surveys, and these were utilized to develop regression models by which the number of new businesses to be established and the demand for industrial land in each year between 1981 and 1990 were estimated. As a result, the net incremental demand for industrial land to be generated was estimated to be 12.5 ha for the 1981-1986 period and 16.2 ha for the 1987-1990 period.

iii) Summarizing the above, the cumulative demand for additional industrial land up to 1986 becomes (15.5 ha + 12.5 ha) = 28.0 ha. However, it is likely that some enterprises shall acquire their own sites outisde IIE through their own efforts before IIE is ready to accommodate them. If such cases are assumed to be about 35 percent of the total, then the net industrial land requirement for IIE will presumably be 18.3 ha in 1986.

S21 Selection of the types of industry to be introduced and estimation of their development scale were conducted with due respect to the following two points.

i) As the type of industry of each enterprise which desires to either relocate or expand its business was identified from the General Survey, and that of each potential entrepreneur in Irbid as of 1980 from the Applicant Survey, all were classified into 9 different types of industry, and the required land area was estimated for each.

ii) However, these types of industry do not necessarily conform with the types of indsutry for which the government intends to put priority based on its macroscopic industrial development policy for Jordan as a whole, or in view of building a sound industrial base in the Irbid Area. Therefore, a strategy to determine which of the industries should be encouraged to move in for development in 1980 and thereafter was formulated in consideration of 1) types of industry recommended in the Pre-feasibility Study, 2) Industrial Programming Study of Jordan, 3) types of industry that were recommended for the Amman Industrial Estate, and 4) domestic consumption and export demand for each type of industry estimated in Chapter II of this report. During this process, special consideration was also given to the relative locational advantage of each industry.

S22 Based on these considerations, industrial composition to be developed in IIE was suggested as follows:

Type of Industry	Land Composition (%)
1. Metal Works	34.2
2. Furniture & Room Units	9.9
3. Food & Beverages	7.8
4. Garments	3.7
5. Plastics & Chemicals	4.1
6. Construction Materials	21.9
7. Auto-repairs	12.0
8. Trading	4.0
9. Paper & Paper Products	2.4
Total	100.0

VI. SITE SELECTION AND OUTER UTILITY FACILITIES

S23 In the Pre-feasibility Study, the area adjacent in the east to the existing municipal industrial area was recommended. The present study reconfirms this site selection.

S24 This site has advantage over or equal advantage as alternative sites in the following criteria:

i) presently not urbanized,

ii) the availability of a sufficiently large area,

iii) minimal slope of the land surface,

iv) wind direction,

v) the availability of the necessary utilities in the present and the future,

vi) compatibility with the present pattern of land use,

vii) the price of land, and

viii) the relative ease of land acquisition.

S25 In particular, the relatively cheap price of land and its proximity to the presently existing municipal industrial area are important assets of this site. Inter-linkage among the various kinds of industries and common use of infrastructure are important factors for selecting this proposed site. The question of access will be solved by constructing the proposed ring roads: Boundary Ring Road and Outer Ring Road.

S26 Existence of outer utility facilities are also indispensable for operating an industrial estate. The Study Team examined the existing conditions and development schedules of external utility facilities which surrounded the selected site of IIE such as water supply, electricity, telecommunication, road, sewerage and drainage and disposal of solid wastes, and has found that improvement plans are scheduled for every one of them up to 1985 with construction works for some of them having already started for target completion in 1982. If these development and/or improvement plans are implemented as scheduled, it is considered that IIE can be operated on a sound basis. The gists of each program are given below.

S27 As for the development schedule of water supply for the Irbid Municipality, the master plan aims for its completion in A.D. 2000. Its first stage work which will lay a distributing pipe of 15 cm in diamter as far as the boundary of IIE has already been started for scheduled completion in 1982. The master plan estimates the 1985 requirements for commercial and industrial water to be 6,000 m^3/day which shall be quite adequate to cover the industrial water requirements of IIE.

S28 As for electricity supply for the Irbid Municipality, an overall review of the supply situation was made in 1979, and as a result, the power feeding network within the Municipality is now in the process of being converted from 6.6 kV to 11 kV high tension transmission. This new high tension transmission system is planned to be expanded to cover the area which includes IIE. Accordingly, power supply to IIE shall be met the demand from IIE.

S29 As for telephone circuits in the Irbid Municipality, the master plan plans to increase the capacity from the present 9,000 circuits to 13,554 circuits by 1985. A 600 circuit cable has already been installed in the existing industrial area, but it is recommended that this master plan be reviewed to cope with the demand for telephone lines that will be generated at IIE.

S30 As for road conditions for the Irbid Municipality, a feasibility study of Ring Roads Project is scheduled to be made in 1981. When these roads are completed, they will undoubtedly provide good accesss to IIE. With regard to public transportation, establishment of a bus corporation was recommended in Phase I Study of Integrated Regional Development Study of Northern Jordan. Since the proposed site of IIE is located about 3 km northeast from the center of the Municipality, it is recommended that, when a public bus service system starts, IIE should be designated as an important part of the service system.

S31 As for the drainage facilities of sanitary sewage in the Irbid Municipality, a municipal treatment plant is scheduled for completion in 1985. A pumping station will also be built north of the proposed site from where a sewage drain pipe will be extended as far as the treatment plant. Accordingly, effluent from IIE will presumably be discharged into the public sewage by using this pumping station.

S32 As for the drainage of rainwater, it will have to resort to natural infiltration into the surrounding farmland for the time being, but when the Outer Ring Road is completed, it will be flown into the public sewage which will be installed along that road.

S33 As for solid wastes, a municipal waste disposal plant will be completed within 1981 and IIE shall be able to utilize this plant.

VII. LAND USE PLAN OF IRBID INDUSTRIAL ESTATE

S34 In formulating the land use plan, adequate consideration was given to reducing the construction cost, providing various services which will be made possible as a result of agglomeration, effective utilization of external infrastructural facilities, improving business efficiency by grouped layout of the same type of industry and other economic benefits, as well as offering a comfortable working environment to the people working on IIE and also to making the IIE as pleasant and harmonious in appearance with the surrounding area.

S35 Assumptions employed for the land use plan are as follows.

i) Scale of Development: 274,950 m^2 (of which factory land is 186,553 m^2)

ii) Expected employment: Direct Workers - 3,000

iii) Required Water Supply : 750 m^3/day

iv) Required Electricity: 5,000 kVA

v) Traffic Volume: Daily generated traffic about 1,960 vehicles/day

S36 Alternatives of land use plan A and its revised version B were studied in the light of various factors such as land readjustment plan of the Irbid Municipality, relations to the existing industrial area and outer utility facilities, availability of spare lands for future expansions of industrial activities and handling of the two buildings that exist on the selected site, and the alternative land use plan A was eventually adopted for its more effective utilization of land. The gists of plan A are given below.

i) IIE will be palnned along the Boundary Ring Road to receive the benefit of agglomeration by being adjacent to the existing industrial area.

ii) Common facilities will be arranged on the west side of IIE along the Boundary Ring Road, which means that the common facilities will be located right in between

the existing industrial area and IIE and therefore readily accessible from all relevant points.

iii) The plots for Custom Built Factories will be arranged along the road which connects the Boundary Ring Road and Outer Ring Road, while those of Standard Factory Buildings will be arranged on the northern side within the estate. By this arrangement, a close linkage will be generated between the activities at IIE and the existing industrial area.

iv) A buffer green zone will be provided along the northern boundary of IIE for scenic effect.

v) The treatment plant and water storage reservoir will be installed on the northeast corner of IIE along the Boundary Ring Road in consideration of the development and improvement plans for the external infrastructures.

vi) The primary access road to IIE will be placed to the Boundary Ring Road and other access roads to individual factory land are connected to the primary access road. In planning these roads, due considerations were given to the land space reserved for future expansion.

vii) The land subdivision system consists of two types of the standard plots for Standard Factory Building and two types of plots for Custom Built Factory, and these 4 types of plots will be arranged in consideration of various factors such as the nature of public pollution, conditions of work, landscape and appearance of the factory per each type of industry to be introduced.

S37 Proposed land use composition becomes as follows:

Land Use Plan of IIE

Land Use	Land Area	
	m^2	%
(1) Factory Land Area		
1) Standard Factory	53,719	19.5
2) Custom Built Factory	132,834	48.3
Sub-total	186,553	67.8
(2) Administrative and Supporting Facilities	15,855	5.8
(3) Roads	43,728	15.9
(4) Utilities	7,493	2.7

Land Use	Land Area	
(5) Parks	2,486	0.9
(6) Buffer Greens and Others	18,835	6.9
(7) Total	274,950	100.0

VIII. PRELIMINARY ENGINEERING DESIGN

S38 In preparing the land for IIE, efforts were made to utilize the surrounding utility facilities with the least possible earthwork by making best use of the natural terrain of the existing topography.

S39 The generated traffic volume to and from IIE is estimated to be about 1,960 vehicles a day. To handle this traffic volume, asphalt paved roads of 20 m, 12 m and 8 m widths were planned within the estate. Traffic from the center of the Municipality to IIE will be made via the road which passes through the existing industrial area, and long distance traffice via the Boundary Ring Road.

S40 Demand of water at IIE is estimated to be 750 m^3/day. A storage reservoir with a capacity of 1,500 m^3, which is equivalent to two days of water consumption at IIE, will be built within the estate, and distribution to each user will be made by a pressurized feeding system.

S41 Because of the topographical constraints, rainwater will be drained by the storm sewer along the Outer Ring Road.

S42 For draining sanitary sewage, a booster pump station will be installed at the northeastern corner of IIE to discharge the effluent into the public sewerage.

S43 The electric power requirements of IIE is estimated to be 5,000 kVA. A high tension substation (11 kV/0.4 kV) will be installed within IIE from which a 400 V distribution network is planned.

S44 The demand for telephone lines at IIE is estimated to be 500 circuits. Although the cable which has been extended as far as the existing industrial area has a reserve capacity of about 300 circuits now, it is not enough to cope with the estimated demand at IIE. A new main cable will probably have to be extended from the telephone exchange in the central part of the Municipality.

S45 It is estimated that IIE will generate 100,000 tons of industrial wastes a year. Because disposal of these wastes in the estate is considered undesirable from the viewpoint of preventing public pollution, it is assumed that the wastes will be hauled by each

enterprise to the designated dumping ground within the estate and that the Irbid Municipality will collect and transport them from there on.

IX. ESTIMATION OF DEVELOPMENT COST AND IMPLEMENTATION SCHEDULE

S46 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).

S47 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.

S48 Total development cost of IIE amounts to JD 8,984,000 at 1980 prices 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.

S49 Implementation schedule of IIE was formulated upon the consultation with the Counterpart Committee. Land acquisition shall be started in 1981 and construction works shall be initiated in January, 1983. Physical development shall be completed in two years and occupancy of factories shall be started in 1984.

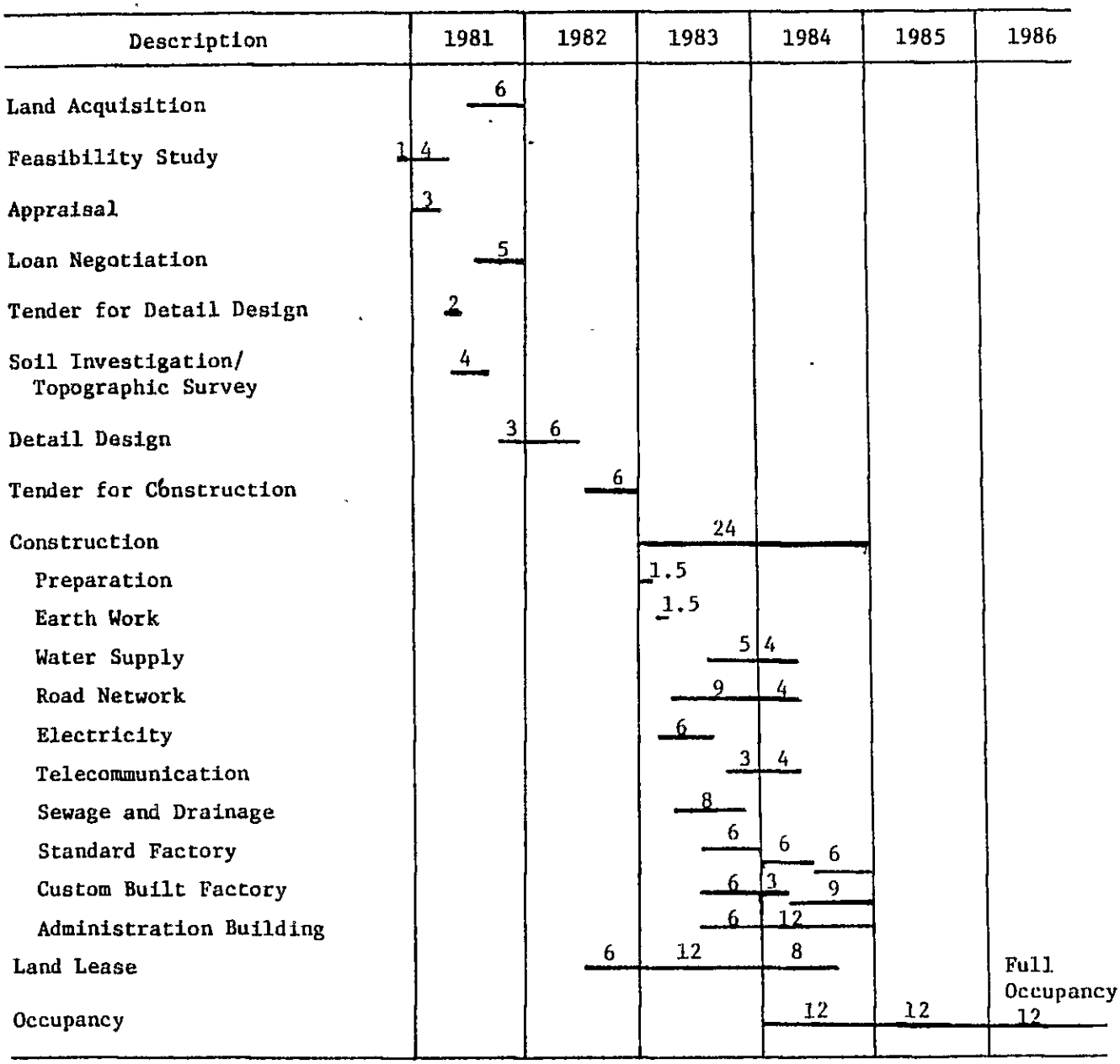
X. ORGANIZATION AND MANAGEMENT

S50 Reexamination was made on the existing concerned agencies of the Government of Jordan as well as the public organizations as to their legal, technical and financial capabilities to develop and manage the proposed IIE. However, the finding is that none can meet fully the requirements for the managing body of IIE.

S51 Therefore, it is recommended to create a new organization tentatively called "Irbid Development Authority (IDA)" empowered with the necessary authorities to carry out its responsibilities. IDA shall neither erode the business concession of JIEC nor deprive of technical, financial and administrative potentials of JIEC.

S52 Primary objective of IDA is to develop the local industrial entrepreneurs, enhance economic base of the Municipality and meet other developmental needs within the Municipality. Accordingly, IDA will be in complementary situation to JIEC in line with the promotion

Figure S.1 Implementation Schedule



Source: Study Team.

Note: Numbers in figure are months.

Table S-1 Investment Schedule

(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/	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.

of industrial development in Jordan. Its future activities will be directed to such projects as redevelopment of the city center area.

S53 Strong financial supports to IDA by the Government of Jordan are needed by way of leasing land and arranging equity participation as well as finance. Also it is necessary to give a special consideration to allow the Municipality hold the biggest share at IDA so that it may function as an immediate authority of the Municipality. To assure successful operation of IDA, it further requires to assign a representative of each concerned agency as the board member.

S54 It is recommended that IDA should take the marketing policy of leasing industrial building instead of industrial bare plot to facilitate location of the small enterprises who are expected to be major occupants. This also follows the policy of JIEC and will not give unnecessary confusion to the prospective investor and at the same time will allow IDA have more control over IIE. The rent should be subjected to change at every five (5) year when renewal is made.

S55 IIE should be given the same incentives as Amman Industrial Estate of JIEC on top of that given for the less developed regions under the Law No. 53.

S56 It is recommended that IDA should be established shortly before commencement of physical development of IIE to reduce the required preoperating expenses and all the preparatory works should be handled by the Counterpart Committee organized for this Study. Also, IDA's organizational structure should be kept compact to function efficiently.

XI. FINANCIAL AND ECONOMIC ANALYSIS

S57 This project will achieve roughly 10.1 percent FIRR in the Base Case and 9 percent FIRR even in the worst case assumed. From the financial point of view, the implementation of this project is recommended.

S58 At 1980 prices, the total project cost is estimated to be JD 8.984 million. Within this cost, JD 4.942 million or 50 percent of the project cost is recommended for the equity share by the Central Government and public financial organizations and the rest is for loan capital.

S59 In case that the financial arrangement specified above is not available to the project, Alternative 1-a in which FIRR is 12.8 percent is recommended. The land for IIE should be purchased by IDA and Custom Built Factory land and floor should be sold in this Alternative. Since the cost of local borrowing is 12 percent, the project will be commercially feasible.

S60 Total project cost of Alternative 5-1-a or 1-a is estimated to be JC 11.997 million at 1983 prices. In addition to this, JC 0.910 million of commercial bank's medium term loan is required to finace 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.

S61 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 two yeasr delay in occupancy, this project shows the economic rate of return at roughly 11 percent which is reasonably higher than 8 percent. Moreover, several intangible benefits will be generated by implementing this project. Thus, the implementation of this project is recommended in terms of national economic point of view.

XII. IMMEDIATE ACTIONS NEEDED

S62 The analysis undertaken in this Study 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.

S63 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.

S64 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.

S65 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 to secure a loan preferably from bilateral and/or international aid agencies at the authorization of and through National Planning Council.

S66 The Committee should also make necessary request to the Central Government to be equity participants of IDA and to raise its required paid-in capital.

S67 The Committee should immediately start coordination 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.

S68 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.

CHAPTER I

INTRODUCTION AND BACKGROUND

CHAPTER I

INTRODUCTION AND BACKGROUND

1.1 Background of the Study

101 In the Hashemite Kingdom of Jordan, the Five Year Development Plan (1976-1980) is being carried out. In order to accomplish dynamic economic and social development through this plan, a comprehensive regional development plan entitled Integrated Regional Development Study of Northern Jordan was formulated by the Ministry of Municipal, Rural and Environmental Affairs and a series of study teams commissioned from JICA in 1978 and 1979. The study was composed of two phases, i.e., Phase I and Phase II. In Phase I of that study, overall development objectives for the Northern Jordan were generated in accordance with the national development objectives and, accordingly, a comprehensive development strategy was formulated toward year 2000. Within the framework of the development strategy, identification of high priority projects and programs was made by the Government of Jordan. These were the Irbid Industrial Estate, the Ring Roads of Irbid, and the tourism development plan of the Northern Jordan. In Phase II, the pre-feasibility studies of the above-mentioned two projects and the plan making of tourism development were carried out.

102 The outputs of the Phase II Study with regard to each of the Irbid Industrial Estate and the Ring Roads of Irbid were:

i) Preliminary design of an appropriately selected project based on comparison of alternatives,
ii) A cost estimate of the above designed project,
iii) Financial and economic evaluation, and
iv) Recommendations for actions leading to implementation.

The outputs of the tourism development plan were:

i) An appropriately phased long-term tourism plan up to year 2000,
ii) Detailed plans for development cores, and
iii) List of projects to be implemented, their cost estimates, and investment schedule.

103 Based on the outputs of Phase I and Phase II studies, the Government of the Hashemite Kingdom of Jordan requested the Government of Japan to undertake a feasibility study of Irbid Industrial Estate. In response to the request, the Government of Japan has agreed to extend technical assistance to conduct the Feasibility Study of Irbid Industrial Estate (hereinafter referred to as IIE).

104 Based on the document entitled "Scope fo Work for the Feasibility Study of Irbid Industrial Estate (for details, see Annex 1.1)" approved by the Government of the Hashemite Kingdom of Jordan and the Government of Japan, the Study Team for the Feasibility Study stayed in Jordan from December 2 through December 23, 1980. The Study Team commissioned by the Japan International Cooperation Agency (hereinafter referred to as JICA) performed intensive field investigations in Amman and Irbid, and produced the Interim Report (for details, see Annex 1.2) which was presented to those representatives from the concerned governmental agencies of Jordan on December 22, 1980.

105 A committee consisting of representatives from Ministry of Municipal, Rural and Environmental Affairs (hereinafter referred to as MMREA), Jordan Industrial Estate Corporation (hereinafter referred to as JIEC) and Industrial Development Bank fo Jordan (hereinafter referred to as IDB) was established based on the Scope of Work for this Study as the counterpart agency of the Feasibility Study. The Counterpart Committee made the formal comments on the Interim Report dated January 11, 1981 (for details, see Annex 1.3). Based on the comments the Team compiled "Draft Final Report of the Feasibility Study of Irbid Industrial Estate," the presentation of which was made on May 16, 1981. In response to the presentation, the Committee sent the formal comments on the Draft Final Report dated on July 29, 1981 (for details, see Annex 1.4). The Team prepared answers to the comments (for details, see Annex 1.5). Accordingly, necessary corrections and revisions were made on the Draft Final Report and the Final Report was compiled as presented hereafter.

1.2 Objective and Scope of the Study

1.2.1 Objectives of IIE Project

106 There are a number of national and regional objectives with regard to industrial development, in general, and to an undertaking of industrial estate development such as:

i) National Objectives:

1) Promotion of economic growth;
2) Reducing an external trade deficit; and
3) Increasing employment and improvement of productivity.

ii) Regional Objectives:

1) Promotion of economic growth;
2) Increasing employment;
3) Utilization and further processing of local resources;
4) Modernization or rationalization of local industries;
5) Nurturing entrepreneurship;
6) Progress of labor skill, technology and management;
7) Rationalization of land use and/or city (town) planning;
8) Protection of the living environment; and
9) Promotion of other industries related to established industries.

107 Based on these national and regional objectives as well as the development strategy of the Northern Region of Jordan, specific objectives of developing IIE were identified in the Pre-feasibility Study of IIE as follows:

i) IIE should accelerate industrial development in the Irbid Municipality, and consequently, in the Irbid Governorate, in order to reduce its income disparity as compared with the other Governorates;

ii) IIE should support and enhance the urban development of Irbid in order to reduce population outmigration from the Irbid Governorate to the Amman Municipality, through provision of employment opportunities;

iii) At the same time, IIE is expected to help reduce the congestion problem at the city center of Irbid, by relocating industries existing in the city center;

iv) IIE should be designed so that merits of industrial integration and agglomeration could be fully exploited;

v) Necessary facilities including land plots, roads, water supply and sewerage, electricity, telephones, and access to housing should be fully secured for incoming industries; and

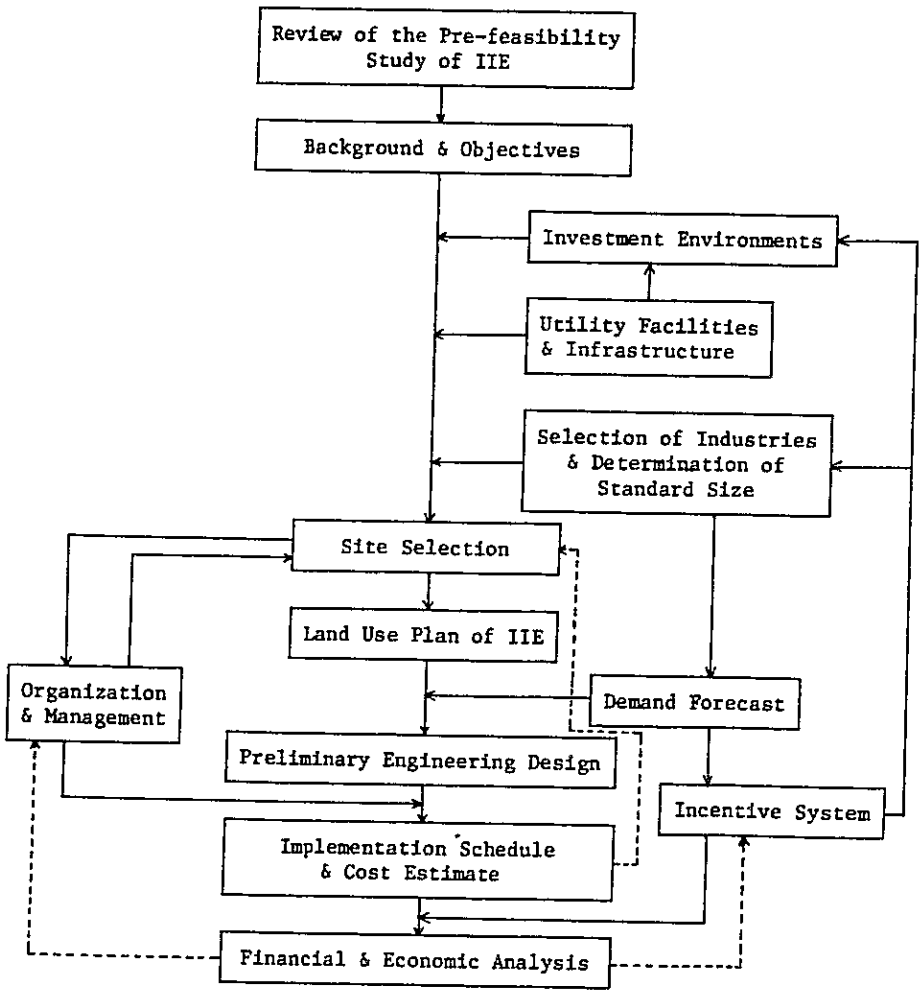
vi) IIE should fully exploit the resource potentialities of the Irbid Governorate such as the relatively abundant and inexpensive manpower, relatively rich agricultural production and good access to the international transportation network.

This Study closely follows these objectives and sets, in addition, specific target on fostering small and medium scale industries in IIE which was implicitly stated in the Pre-feasibility Study.

1.2.2 Scope of the Study

108 In order to attain the stated objective, the Study was carried out within the framework formulated in the Phase II Study, supplement necessary information which was not covered in the Phase I Study and the Pre-feasibility Study of IIE, and made in-depth analyses of technical, institutional, financial and economic aspects which are necessary to confirm the feasibility of Irbid Industrial Estate within suitably limited parameters. Figure 1.1 indicates the methodological approach of this Study.

Figure 1.1 Flow Chart of Study



1.3 Definition of the Project

109 The term, industrial estate, is widely used without any specific definition on it. Besides, it is quite often used interchangeably with the terms, industrial zone and/or industrial area. In the Pre-feasibility Study, the UN's "Guidelines for the Establishment of Industrial Estates in the Developing Countries" was cited in order to define them (for detail, see Annex 1.6).

110 After the examination of UN definitions and institutional framework in Jordan, the Pre-feasibility Study adopted the terms, Industrial Estate of Irbid (IEI) and/or Irbid Municipality Industrial Park, to designate this project.

111 In order to avoid unnecessary confusion, this Feasibility Study calls the project as "Irbid Industrial Estate (IIE)" instead of "Industrial Estate of Irbid (IEI)", and IIE should be distinguished from the existing municipality owned industrial area which is called as "the existing industrial area" in this Study. In addition, the term, "the industrial zone", is always used to designate the triangle shaped area just to the west of the existing industrial area (see Figure 4.1).

1.4 Format of the Report

112 Following to this Chapter, macro economic conditions of Jordan and the Northern Region and investment environments are examined in Chapter II. Demand projection of the selected industries are also undertaken in Chapter II which provides general framework of potential for future industrial development. Chapter III deals with the selection of industries and determines the size of industries to be introduced to the proposed IIE. The analyses of the Factory Interview Surveys conducted in Irbid and Amman are the highlights of this Chapter. The site of IIE is selected, and the existing conditions and development schedule of external utility facilities and infrastructure are intensively examined in Chapter IV. In Chapter V, land use plan of IIE is formulated and, subsequently, preliminary engineering design of IIE is carried out in Chapter VI. Implementation schedule of IIE and costs estimation are presented in Chapter VII. Chapter VIII deals with the most sensitive aspects of this Study, namely, the organization and management of IIE. Financial and economic analyses are undertaken in Chapters IX and X, respectively, and immediate action plan required to carry this project forward is presented in the final part, Chapter XI.

CHAPTER II

PROSPECTS OF INDUSTRIAL DEVELOPMENT IN JORDAN WITH PARTICULAR REFERENCE TO THE NORTHERN REGION

CHAPTER II

PROSPECTS OF INDUSTRIAL DEVELOPMENT IN JORDAN WITH PARTICULAR REFERENCE TO THE NORTHERN REGION

2.1 Trend of Macro Economic Conditions

2.1.1 Trend of Macro Economic Conditions

201 Jordan has a total land area of 97,740 km^2, and approximately 2.2 million population in the East Bank. Available statistics indicate that 64.4 percent of GDP at factor cost in 1979 was accounted for by the service-and-tertiary sector which surpassed the mining and manufacturing sector (27.4 percent), and agricultural sector (8.2 percent). Nevertheless, the ratio of the productive sectors to GDP from 1973 to 1979 has gradually increased year by year as shown in Table 2.1. As far as the mining and manufacturing sector including construction, electricity and water supply is concerned, its share in GDP rose from 21 percent in 1973 to 27.4 percent in 1979 for the following main reasons:

i) A two-fold price increase of phosphates in 1974, and

ii) Other increasing production induced by investment made by both the public and private sectors.

202 With regard to the increase of GNP, it has grown at an average annual rate of 6.4 percent in real term from 1970 to 1979. This growth was largely brought about by the increase in Jordanian worker's remittances from abroad, exports and tourism income, in addition to the gradual rise of capital formation and external public debt.

203 Preliminary estimates of Jordan's First Five-Year Plan (1976-1980) indicate that an average GDP growth rate of 9.7 percent in real terms is likely to be achieved over the Plan period. The achievement of GDP growth by major economic sectors in terms of the plan target is shown in Table 2.2.

Table 2.1 Gross Domestic Product at Factor Cost by Sectors in the East Bank during 1973 through 1979 at 1975 Constant Prices [1/]

(Unit: Million JD)

	1973	Share (%)	1974	Share (%)	1975	Share (%)	1976	Share (%)	1977	Share (%)	1978[2/]	Share (%)	1979[2/]	Share (%)
1. Industries														
1.1 Agriculture, Forestry and Fishing	23.5	(9.4)	33.9	(12.5)	26.0	(9.7)	33.5	(10.4)	32.7	(10.4)	37.3	(10.5)	30.8	(8.2)
1.2 Mining and Quarrying	5.3		12.0		16.3		16.0		15.6		16.8		19.7	
1.3 Manufacturing	23.0	(21.0)	33.3	(24.9)	30.5	(24.5)	49.1	(27.7)	51.0	(28.8)	44.9	(25.5)	51.0	(27.4)
1.4 Electricity and Water Supply	3.7		3.4		3.1		3.2		3.2		3.8		5.0	
1.5 Construction	20.3		18.8		16.1		20.9		21.1		25.6		27.6	
1.6 Wholesale and Retail Trade, Restaurants and Hotels	50.9		47.4		46.3		58.2		51.9		63.7		67.3	
1.7 Transport and Communication	23.9		25.5		24.9		29.1		28.1		49.3		50.6	
1.8 Financing, Real Estate and Business Services	30.0		28.2		29.7		30.0		34.1		38.9		42.9	
1.9 Community, Social and Personal Services	5.2	(69.6)	4.8	(62.6)	8.5	(65.8)	5.5	(61.9)	6.9	(60.8)	7.5	(64.0)	9.6	(64.4)
1.10 Less: Imputed Bank Services Charge	-4.8		-3.0		-2.9		-2.7		-2.7		-9.0		-8.8	
2. Producers of Government Services	62.4		60.8		65.2		73.3		66.1		69.5		71.8	
3. Non-Profit Institutions	5.3		5.5		5.0		4.9		7.1		7.7		8.5	
4. Domestic Services to Households	0.8		0.8		0.7		0.6		0.6		0.7		1.0	
Total GDP at Factor Cost	249.5	(100.0)	271.4	(100.0)	269.4	(100.0)	321.6	(100.0)	315.7	(100.0)	356.7	(100.0)	377.0	(100.0)

Source: Jordan Department of Statistics.
Notes: 1/ As a deflator, Cost of Living Index (1975=100) is used.
2/ Preliminary Estiamtes.

Table 2.2 Performance of GDP Growth by Major Economic Sectors

	Annual Average Rate of Growth		
		Actual Performance (1975-1979)	
	1975-80 Plan Target	1975 Constant Prices	Current Prices
1. Agriculture	7.0	12.2	14.7
2. Mining & Manufacturing	26.2	15.8	21.5
3. Construction	4.1	11.6	28.0
4. Electricity	17.1	17.7	20.2
Total Productive Sectors	17.0	14.2	21.0
5. Transport	10.6	11.2	32.0
6. Trade	7.2	11.2	19.4
7. Public Admin & Defence	7.0	4.5	12.7
8. Others	10.0	2.7	14.5
Total Services Sectors	8.6	7.0	10.1
TOTAL G D P	11.9	9.7	19.1

Source: NPC, Five Year Plan and unpublished materials.

204 The First Five-Year Plan laid emphasis on accelerating the growth of productive sectors (Agriculture, Mining and Manufacturing, Construction and Electricity). The productive sectors did not achieve the Plan's target as a whole, but grew at a high rate as shown in Table 2.2. If big projects such as potash, cement, and fertilizers are fully implemented in accordance with currently revised new investment plan by NPC, then they would be reflected significantly in this sector's contribution to GDP early in the next Plan period.

205 According to the index of industrial production during 1975 and 1979, overall industrial production has grown at an average annual rate of 17.1 percent in real term as shown in Table 2.3. Especially, the growth rate of such industries as chemicals, foods and drinks, phosphate, petroleum refining, paper and cardboard surpassed the overall growth rate during the same period.

Table 2.3 The Index Number of Industrial Production

(1975=100)

Industry	Year				Change 1979/78 (%)	Average Annual Growth 1975/79 (%)
	1976	1977	1978	1979		
Foods, Drinks and Tobacco	111.8	133.5	141.8	186.4	31.5	16.8
Food Items	135.8	119.3	126.2	198.2	57.0	18.7
Soft Drinks	107.8	157.2	171.7	231.2	34.7	23.3
Alcoholic Drinks	112.2	105.5	101.7	127.4	25.3	6.2
Tobacco and Cigarettes	120.9	134.3	143.4	183.8	28.2	16.4
Textiles and Clothes	96.1	91.3	119.8	148.7	24.1	10.4
Construction Materials	112.8	111.5	114.2	137.5	25.4	8.3
Iron	119.6	122.3	125.1	155.2	24.1	11.6
Cement	101.8	94.0	96.6	108.9	12.7	2.2
Chemicals	173.5	175.6	275.3	266.9	-3.0	27.8
Pharmaceuticals	123.3	101.6	139.5	161.3	15.6	12.7
Paints	221.1	330.0	383.9	491.0	27.9	48.9
Plastic	169.6	265.6	541.4	341.8	-36.9	36.0
Detergents and Soaps	131.9	134.7	193.2	290.3	50.2	30.5
Petroelum Refining	139.9	143.0	172.9	197.6	14.3	18.6
Phosphate	126.2	131.2	172.1	209.9	22.0	20.4
Electricity and Batteries	103.1	122.8	141.7	177.8	25.5	15.5
Electricity	103.7	124.5	152.6	200.0	31.1	18.9
Batteries	100.4	115.3	93.6	97.6	4.3	-0.1
Fodder	122.8	101.3	124.9	124.6	-0.2	5.7
Paper and Cardboard	128.1	124.9	110.3	170.1	54.2	14.2
Leather	78.1	84.0	94.7	79.3	-16.3	-5.6
Overall Index	125.0	129.7	159.2	188.0	18.1	17.1
Change in Index	25.0	4.7	29.5	28.8	-	

Source: Central Bank of Jordan.

206 In the preliminary draft of the next Five-Year Plan (1981-1985) by NPC, an investment plan of JD 2,270 million is proposed, which is about 83 percent increase over the last Plan of JD 1,240 million. In the proposed investment allocations in the next Plan, heavy emphasis is placed on the promotion of productive sectors. Accordingly, a budgetary share of productive sectors accounts for about 56 percent of the total investment. The overall annual GDP growth target is set at 11.3 percent in real term for the next Plan period, comprising the sectoral targets as shown in Table 2.4.

Table 2.4 Planned GDP Growth Rate by Sectors for the Second Five-Year Plan (1981-1985)

Sector	Average Annual Growth Rate
1. Agriculture	7.0 (%)
2. Mining & Manufacturing	17.9
3. Electricity	16.5
4. Construction	9.3
Total Productive Sectors	14.4
5. Trade & Transport	10.5
6. Government Services	11.8
7. Others	3.5
Total Services Sectors	11.2
TOTAL G D P	11.3

Source: NPC preliminary draft.

207 Jordan has been importing goods several times more than she has been exporting in reflection of the growing number of industrial development projects. In addition, the traditional service oriented structure of national economy has contributed to these trade deficits. Foreign trade statistics of Jordan indicate that the import of capital goods was about JD 194 million in 1979, which was one third of total imports, and it accounted for almost 2.3 times more import of capital goods compared to that of 1975. Meanwhile she has exported capital goods of JD 11 million which is equivalent to 13 percent of her total domestic exports in 1979 and 4.3 times larger than that of 1975.

There seems to be much room left for further import substitution as well as domestic export promotion of those capital goods. In the next Plan, annual growth rate of exports of all commodities is set to be 19.6 percent, whereas growth rate of imports is set to be 10.3 percent.

2.1.2 Economic Conditions of the Northern Region

208 The Irbid Governorate is the second largest urban region in Jordan. In the Integrated Regional Development Study of Northern Jordan, its Gross Regional Domestic Product (GRDP) at market prices in 1977 was estimated to be JD 99 million which accounted for 21 percent of the national GDP and occupied the second position in the whole country after the Amman Governorate. However, the per capital GRDP was the lowest level as shown in Table 2.5 because of the low productivity in agriculture, limited natural resources, and underdevelopment of manufacturing sectores.

Table 2.5 GRDP by Governorate, East Bank, 1977

Indicator	Unit	East Bank	Irbid	Amman	Balqa	Karak	Ma'an
GRDP at Market Prices	Million JD (percent)	471 (100)	99 (21)	299 (64)	24 (6)	31 (7)	12 (2)
Population	Thousand persons	2,127	600	1,219	138	114	56
Per Capita GRDP at Market Prices	JD	221	165	245	174	272	214

Source: The Pre-feasibility Study Report of Irbid Industrial Estate, JICA, 1980.

209 With regard to the economic structure of the Irbid Governorate, the economy is heavily oriented to agricultural production and services sectors in terms of value-added. The share of value-added in the mining and manufacturing sector was only 1.4 percent in 1977 and far behind the agricultural sector, that became severe constraint to the development of the region. Table 2.6 shows sectoral distribution of labour productivity, employment and value-added in the Irbid Governorate.

Table 2.6 Labour Productivity by Sector, Irbid Governorate, 1977

	Value-Added		Employment		Labour Productivity	
					Irbid Governorate	The Whole Country
	(1,000 JD)	(%)	(1,000 persons)	(%)	(JD)	(JD)
Agriculture	18,200	19.7	72.6	76.9	251	313
Mining & Manufacturing	1,300	1.4	1.4	1.5	963	2,929
Construction	7,900	8.6	1.4	1.5	5,643	3,034
Electricity, Water & Gas	500	0.5	0.3	0.3	1,667	1,864
Transportation	9,200	10.0	2.5	2.7	3,680	2,838
Wholesale & Retail	14,400	15.6	4.8	5.1	3,000	2,363
Banking & Insurance	1,100	1.2	0.2	0.2	5,500	2,121
Public Administration	20,100	21.8	11.1	11.8	2,973	2,496
Other Services	12,900	14.0				
GDP at Factor Cost	92,200	100.0	88.9 1/	100.0	1,037	1,470

Source: Integrated Regional Development Study of Northern Jordan, Volume 5, page III-25.
Note: 1/ Excluded from this figure are the Armed Forces, Public Security, and Civil Defense.

210 However, manufacturing establishments in and around the Municipality of Irbid has grown rapidly in the last few years. Results of Factory Interview Surveys in Irbid (for details, see section 3.2) indicate that capital investment has been increased by almost 7 times during 1977 through 1980 as shown in Table 2.7.

Table 2.7 Annual Capital Investment by Selected Manufacturing Establishments in Irbid during 1975 through 1980 1/

(Unit: 1,000 JD)

	1975	1976	1977	1978	1979	1980
Number of Establishments	7	7	9	3	9	10
Total Capital Investment	52	338	200	108	710	1,382

Source: Study Team.
Notes: 1/ This table is compiled based on factories which provide relevant information and does not represent the total amount of investment in Irbid region.

211 The growth of industrial investment in the Municipality of Irbid has been partly induced by the establishment of the Municipality owned industrial area. Construction of the existing Yarmouk University has also contributed to the development of related construction activities. Besides, new industrial investments and housing construction have been induced by those Jordanians who saved money and came back from Gulf countries. There are also several additional encouraging signs for future industrial development in the Irbid region. They are:

i) The construction boom to be created by the construction of new Yarmouk University, and

ii) Agricultural development in Jordan Valley for increasing supply of agricultural materials for processing.

Besides, proximity of the area to Syria and Iraq makes this location further attractive for those export oriented industries as it will be discussed in section 2.2.4.

2.2 Investment Environments

2.2.1 Conditions of Labour Market

212 The labour force in Jordan was estimated to be 19.2 percent of the total population, whilst that of Irbid Governorate was 18.9 percent. The share of labour force in secondary sector remained at extremely low level, i.e., 8.8 percent for East Bank and 2.8 percent for Irbid Governorate in 1975. Table 2.8 shows the sectoral distribution of the labour force in East Bank and the Irbid Governorate.

Table 2.8 Sectoral Distribution of the Labour Force in East Bank and Irbid Governorate, 1975

(Unit: 1,000 persons)

	Population	Employment	Primary	Secondary	Tertiary	Others[1/]
East Bank	1,952 (100)	374(100) (19.2)	125(33.4)	33(8.8)	42(11.2)	174(46.6)
Irbid Gov.	564 (100)	107(100) (18.9)	68(63.6)	3(2.8)	7(6.5)	29(27.1)

Sources: Labour Force Census, 1975 and Part II.

Notes: ( ): Percent

1/ In this classification, "others" means public administration, community services, armed forces, public security and civil defense.

213 The grow rate of the labour force in Jordan seems to be at 4 to 6 percent per annum during the period between 1975 and 1979 according to the following two estimates. The census of labour recorded that in 1975 there were 128,232 employees at 49,202 total establishments in Jordan, from which agriculture, armed force, public security and civil defence were excluded. About 36 percent of the total employees were employed by establishments with less than 10 persons which accounted for about 60 percent of the total number of establishments. According to the most recent labour statistics by the Ministry of Labour, the number of labour force in the establishments with more than 5 employees was 111,203 in 1979. Thus, if the establishments with less than 5 employees are included, then the total number of labour force is estimated to be about 151 thousand in 1979, assuming the proportion of employees by establishments with less than 5 employees remain the same. Accordingly, the annual average growth rate of labour force in Jordan during 1975 through 1979 becomes to be 4.2 percent.

214 According to the same statistics, 25,711 employees or about 23 percent of total employees in organized establishments with more than 5 persons were employed by the productive sectors in 1979, while the number of employees in the productive sectors in 1975 was 20,336, accounting for 16 percent of the total. This means that the number of employees for the productive sectors has increased by 26 percent, i.e., average annual growth rate of 6 percent during the period between 1975 and 1979. These indicators seem to reflect the current healthy growth of the productive sectors in Jordan.

215 The regional distribution of labour force by economic activities based on the labour census of 1975 indicates that the Amman Governorate comprises about 71 percent of both total employees and total establishments, whereas the Irbid Governorate comprises 16 percent of total employees and 19 percent of total establishments respectively. The distribution of labour force by economic activities and by region is shown in Table 2.9.

216 As to the participation of female labour force, it remains still low due to tradition and lack of appropriate job opportunities for female. According to the labour force census of 1975, however, participation ratio of female labour force was 13.9 percent at national level, whereas the ratio in Irbid Governorate was 19 percent. Thus, Irbid region had and will have a higher ratio of female participation. If appropriate measures for female participation are arranged, this ratio will become larger, and we can expect the relatively high availability of female labour force in Irbid region.

217 Due to emigration of about 300 thousand Jordanians for other Arab nations as mostly technical workers, there is scarcity of skilled labour in Jordan. Meanwhile, foreign skilled and non-skilled workers have increased rapidly in recent years in order to fulfill the labour demand of Jordan's industries seeking cheaper labour force. The number of foreign workers registered at the Ministry of Labour was 26,450 in 1979, which was more than three times larger than that of 1975. About 70 percent of these foreign workers came from Arab countries (mostly Egypt), and 25 percent came from Asian countries.

Table 2.9 Distribution of Labour Force by Economic Activity and Region Census of 1975

	Number of Employees			Number of Establishments		
	Amman	Irbid	Jordan Total	Amman	Irbid	Jordan Total
1. Metal Works	3,367	230	4,459	914	132	1,088
2. Wood and Wood Products	1,876	152	2,074	964	107	1,111
3. Food, Manufacturing Beverage & Tobacco	2,739	356	3,225	806	220	1,122
4. Textile, Wearing & Leather Industries	5,997[1)]	458	6,616[1)]	3,123	406	3,670
5. Chemicals, Petroleum & Plastic Products	2,198	8	2,389	8	1	91
6. Construction	6,636	1,286	8,247	5,054	850	6,318
7. Other Industries	62	-	62	7	-	7
8. Trading	14,665	4,032	20,808	10,635	3,568	16,129
9. Paper & Paper Products	747	8	758	122	5	130
Others	52,256	13,874	79,594	13,202	4,010	19,536
Total[2)]	90,543	20,404	128,232	34,835	9,299	49,202
Share (%) per Jordan Total	70.6	15.9	100.0	70.8	18.9	100.0

Source: Jordan Department of Statistics, Results of the Labour Force Census 1975.

Notes: 1) Leather and Leather Products included.
2) Excluded from the total are the Armed Forces, Public Security, Civil Defence, and Agriculture.

218 In the Irbid Governorate, the number of foreign workers has increased rapidly from 34 in 1975 to 4,283 in 1980 as shown in Table 2.10. This rapid increase of foreign workers has been brought partly due to the emigration of about 500 - 550 skilled workers from the Irbid Governorate, and partly due to the recent investments boom in the

region as described in paragraph 210. Majority of foreign workers are engaged in industries such as food production, agriculture, and construction as shown in Table 2.11.

Table 2.10 Number of Foreign Workers in the Irbid Governorate during 1975 through 1980

Year	1975	1976	1977	1978	1979	1980
Number of Foreign Workers	34	98	231	634	1,182	4,283

Source: Department of Labour, Irbid Governorate, November, 1980.

Table 2.11 Distribution of Foreign Workers in the Irbid Governorate by Economic Activity (November 1980)

Economic Activity	Foreign Workers	%
1. Construction	1,261	29.4
2. Black Smith	40	0.9
3. Food Industry + Agriculture	2,053	47.9
4. Furniture + Carpenter	75	1.8
5. Health Service	19	0.4
6. Transportation + Oil Station	110	2.6
7. Insurance + Accountancy + Commerce	275	6.4
8. Service Industry (Hair Cut)	98	2.3
9. Tyle and Glass Makes + Mosaic	70	1.6
10. Mechanics + Leathry	34	0.8
11. Electric + Electronics	26	0.6
12. Stone Cutting + Quarring	143	3.3
13. Petroquemica	12	0.3
14. Plastics + Leather	2	0.1
15. Education Service	15	0.4
16. Tailer	50	1.2
Total	4,283	100.0

Source: Department of Labour, Irbid Governorate, November 1980.

219 In order to improve the quality of labour force, Jordan has recently established the following vocational and industrial training institutions:

i) Technical and Engineering Institutes;

ii) Secondry Technology Schools;

iii) Trade and Training Centers;

iv) Apprenticeship Centers;

v) Vocational Adult Education Centers; and

vi) Labour Up-grading Centers.

Of these training institutions, Apprenticeship Center and Technical & Engineering Institute have not been established yet in the Irbid region. However, the latter is scheduled to be established in the Engineering Department of Yarmouk University. At present, Irbid Secondary Technology School offers 10 technical specialization courses and has 600 graduates annually, in addition to the existing program of on-the-job training at the local enterprises. Besides, Vocational Training Center at Hakama/Irbid with Soviet aid, which is scheduled to start its operation from 1982 by the management of Vocational Training Corporation, will have 600 skilled graduates annually. The courses to be provided at the Hakama Center are as follows:

i) Metal fabrication,

ii) Industrial electricity,

iii) Central heating and plumbing,

iv) Auto-motive repairs,

v) Woodwork, and

vi) Carpentry.

Thus, these courses will be helpful to fulfill the additional demand for skilled workers by the industries at the proposed IIE.

220. With regard to the wage difference between Amman and Irbid, the results of the Factory Interview Surveys conducted by the Study Team indicate that average wage rate in Irbid is about 9 percent lower for skilled workers and about 14 percent lower for non-skilled workers than those comparable work force in Amman. However, the wage rate for the skilled workers at the establishments with less than 10 employees in Irbid is slightly higher than the comparable wage rate in Amman due to the shortage of the skilled workers as shown in Table 2.12.

Table 2.12 Wage Comparison of Employees between Amman and Irbid

(Unit: JD/day)

	Amman			Irbid		
	Size of Establishment		Total	Size of Establishment		Total
	1-9 Workers	More than 10 Workers		1-9 Workers	More than 10 Workers	
Average Wages for Skilled Workers	4.1	5.1	4.9	4.4	5.0	4.5
Average Wages for Non-skilled Workers	2.7	2.5	2.5	2.1	2.4	2.4

Source: Study Team.

2.2.2 Incentive System for Investment

221 The existing "Encouragement of Investment Law No.53 of 1972" provides a number of incentives for industrial promotion, particularly for those industries located outside of the Amman Governorate. Under the existing law in case of establishment outside the Capital Governorate or owned by a public shareholding limited company, the following tax holidays are given.

i) Exemption of net profits from income tax and social service tax shall be extended up to 9 years.

ii) Additional exemption of net profit from income tax and social service tax following expansion of a project for a period of 4 years from the date of the implementation of the expansion.

iii) Exemption of buildings and lands owned by a project from building and land taxes for a period of 7 years from the date of the declaration of such a project to be an approved economic project in the Official Gazette.

Besides, in case of industrial estates, an additional 2 years of tax exemption is available. The Government of Jordan is currently reviewing this law for possible amendment so that a longer period of tax exemption can be given in general.

222 For the approved economic project,[1/] the following exemptions shall be granted by the Council of Ministers.

i) Exemption of fixed assets imported for creation of a project from customs duties on imports, import fees and all other additional charges.

ii) Exemption of fixed assets imported for expansion, development or improvement of a project from customs duties on imports, import fees and all other additional charges.

As the results of 410 cases of application for the economic projects, 210 cases were approved as economic projects from 1972 until November 1980, consequently enjoining the tax exemptions mentioned above.

223 Regarding the incentives for foreign capital investment, the Encouragement of Investment Law guarantees treatment of Arab, foreign and domestic capital equally. The said law also facilities for transfer of profits and interest as well as transfer of Arab and foreign capital outside the Kingdom. Besides, transfer of salaries and compensation of non-Jordanian employees outside the Kingdom is possible up to 70 percent of their salaries and compensation for termination of service.

224 From the industrial investor's point of view, whether he is a national or foreigner, those incentives aforementioned 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.

1/ Economic project shall fulfill the following conditions:

a. Is identified with the goals of the general plan of economic development, and approved by the government.
b. Contributes to the increase of national production, and its gross value added not less than 20 percent of its cost.
c. Contributes to the support of the trade balance or the balance of payments. Besides, approved economic project shall fulfill the following conditions;
d. Is an economic project within the sectors of industry, tourism, housing, land reclamation or sea transport and approved by the authority.
e. Is the case of an industrial project, the value of its machinery, tools and equipment shall be not less than JD 5,000.
f. Is the case of a housing or a land reclamation project, its cost shall be not less than JD 25,000, cost of land excluded.
g. Is approved by the Council of Ministers.

2.2.3 Financial Institutions and Conditions

225 There are several kinds of financial institutions in Jordan such as (1) Industrial Development Bank, (2) Commercial Bank, (3) Housing Bank, (4) Amman Financial Market and (5) Other Specialized Types of Credit Institutions (Municipalities and Villages Loan Fund, Agricultural Credit Corporation, Jordan Cooperation Organization). Among them, the first three are most relevant in view of the financing to industries, hence they are mentioned below:

a. Industrial Development Bank

226 Roughly 90 percent of industrial projects in Jordan excluding such big project as potash or phosphate is financed by Industrial Development Bank (IDB) according to IDB officials. The services of IDB are available to any privately owned company, partnership, association, cooperative or individual engaged in manufacturing or processing of industrial or consumer goods. They are also available to small scale and handicraft industries. Loans granted to this sector vary between JD 200 and LD 2,000. The main terms and conditions of loans are as follows:

i) The rate of interest is 7 percent plus a service charge of 1 percent. That is, a total of 8 percent per annum are charged on loans in a case that industries are located in backward regions. Whereas 9 percent plus a service charge of 1 percent are charged in a case of location at advanced urban regions like Amman and Aqaba under the prerequisit conditions such as pioneer projects, export oriented industries or utilizing local raw materials. Meanwhile, the rate of interest charged on loans granted to small scale and handicraft industries is fixed at 7 percent plus a service charge of 1 percent per annum.

ii) The repayment period may not exceed 15 years, and repayment is made in equal quarterly installments including capital and interest.

iii) Every project is given a grace period which covers the construction and initial operation period, though no grace period is allowed on interest payment.

iv) IDB keeps continuous consulting contact with its clients by paying regular visits to their projects and analyzing their performance.

227 During 1979, IDB approved 47 loans, totaling JD 3,796 thousand, of which 92 percent were extended to 41 industrial projects and 8 percent to 6 tourism projects as shown in Table 2.13. The approved loans and their average amounts during 1965 through 1979 are shown in Table 2.14. Table 2.15 shows that 66.6 percent of amounts approved during 1965 through 1979 were for the purchase of machinery, while 11.6 percent were for factory construction.

228 With regard to the small scale industries and handicrafts fund, IDB increased the ceiling of a single loan available from the fund from JD 3,000 to JD 4,000, of which JD 1,000 may be allocated for the purchase of raw materials. The approved loans and their average amounts during 1975 and 1979 are shown in Table 2.16. The amount of approved loans in 1979 was 14.2 percent higher than those in 1978 and the average value per loan of 1979 was 35.2 percent higher than that in 1978. Out of 109 loans, 68 loans or 63.5 percent of the amounts approved during 1979 were for metal working, carpentry and building materials projects and 10 loans or 8 percent of approved amount were for food products projects as shown in Table 2.17. Thus, IDB loans are major financing facilities for the handicraft and small scale industries which will be badly required in Jordan.

229 The regional distribution of approved loans and amount for those handicraft and small scale industries in 1979 as shown in Table 2.18 indicates that the amount of IDB approved loans for Irbid City was only about 10 percent of the total. Therefore, in order to diversify the loan services for Irbid region whose industries are rapidly growing, hence, badly require the loans, it is recommended that IDB should establish regional office in Irbid.

Table 2.13 IDB Approved Loan by Industry

Industry	No. of Loan	Amount (1,000 JD)
Chemical and Plastic	9	1,130
Food and Beverages	10	963
Metal Products	1	500
Paper Products	9	355
Non-metalic Products	2	230
Fabricated Metal Products	3	175
Wood and Wooden Products	3	67
Textile & Leather and Footwear	3	66
Others	1	10
Total	41	3,496
Tourism	6	300
Grand Total	47	3,796

Source: IDB, Annual Report, 1979.

Table 2.14 Approved Loans and Their Average Amount

Year	No. of Loans	Amount/JD	Average/JD
65-74	244	7,892,980	32,348
1975	41	2,436,600	59,429
1976	74	2,523,000	47,608
1977	61	4,701,800	77,079
1978	54	5,147,500	95,324
1979	47	3,796,000	80,766

Source: IDB, Ibid.

Table 2.15 Approved Loans Classified by Purpose
(in thousands JD)

Purpose/Year	65-75	1976	1977	1978	1979	Total	Share (%)
1. Industrial Projects							
Construction	1,097.7	298.5	831.5	705.0	253.5	3,186.2	11.6
Machinery	6,489.7	2,316.5	3,095.3	3,173.5	3,242.5	18,317.5	66.6
Raw Materials	1,173.8	-	-	-	-	1,173.8	4.3
Total	8,761,2	2,615.0	3,926.8	3,878.5	3,496.0	22,677.5	
2. Tourism Projects	1,568.4	908.0	775.0	1,269.0	300.0	4,820.4	17.5
Grand Total	10,329.6	3,523.0	4,701.8	5,147.5	3,796.0	27,497.9	100.0

Source: IDB, Ibid.

Table 2.16 Approved Loans and Their Average Amount for Small Scale and Handicraft Industries

Year	No. of Loans	Amount/JD	Average/JD
1975	52	72,205	1,388
1976	110	169,425	1,540
1977	100	169,200	1,692
1978	129	236,700	1,835
1979	109	270,450	2,481

Source: IDB, Ibid.

Table 2.17 Approved Loans Classified by Type of Activity

Trade	No. of Loans	Amount/JD	%
Metal Working	28	66,900	24.7
Carpentry	24	61,050	22.6
Building Materials (Tiles, Bricks, Stone Cutting and Quarrying)	16	43,900	16.2
Maintenance	12	33,700	12.5
Food Products (Confectionary, Bakeries, Flour Mills, etc.)	10	21,600	8.0
Garments and Knitting	9	18,100	6.7
Leather Products	4	9,300	3.4
Printing, Photography	3	12,000	4.4
Tourism and Others	3	3,900	1.5
Total	109	270,450	100.0

Source: IDB, Ibid.

Table 2.18 The Regional Distribution of Approved Loans and Amount in 1979

City	No. of Loans	%	Amount/JD	%
Amman	48	44.0	124,350	46.0
Irbid	12	11.0	27,700	10.2
Others	49	45.0	118,400	43.8
Total	109	100.0	270,450	100.0

Source: IDB, Ibid.

b. Commercial Banks

230 At the end of 1975, there were 12 commercial banks with 104 offices and branches inside Jordan. These banks can be classified in terms of country of incorporation into 4 Jordanian banks, 4 Arab banks and 4 foreign banks. Credit facilities provided by commercial banks totalled JD 383.6 millions in 1979, that is an increase of JD 112 million or 41 percent during 1978 through 1979. The shares of mining and manufacturing sector and construction sector were 15.8 percent and 22.7 percent respectively as shown in Table 2.19. Thus, loans are available to any qualified private industries at a competitive interest rate of around 12 to 13 percent.

Table 2.19 Credit Facilities of Commercial Bank by Sector

Sector	Average 72-76	1977	1978	1979	Change 79/78 %	Share in 1979 %
Agriculture	3.08	8.31	12.71	17.36	36.6	4.5
Industry & Mining	11.72	26.83	38.29	60.52	58.1	15.8
Construction	20.22	33.83	56.91	86.92	52.7	22.7
Transportation	4.27	11.08	8.38	13.04	55.6	3.4
Trade	41.96	81.43	100.53	134.24	33.5	35.0
Financial Institutions	0.51	0.58	1.19	4.76	300.0	1.2
Municipalities & Public Corporations	5.52	6.92	6.49	10.35	59.5	2.7
Tourism, Hotels & Restaurants	1.63	3.42	6.61	9.66	46.1	2.5
Professional & Private Individuals	6.54	13.07	21.21	29.66	39.8	7.7
Other	4.86	15.62	19.32	17.08	-11.6	4.5
Total	100.31	201.09	271.64	383.58	41.2	100.0

Source: Central Bank of Jordan, Sixteenth Annual Report, 1979.

c. Other Types of Financial Institutions

231 Other financial institutions related to our proposed industries are the Housing Bank and Amman Financial Market. The Housing Bank's objects are to promote construction and development activities, thereby to realize the following goals:

i) Promoting the erection, completion or expansion of residential houses as well as commercial buildings,

ii) Encouraging savings for housing by all possible ways and means,

iii) Encouraging the establishment and formation of housing cooperative societies, housing funds and savings and loans societies for housing purposes,

iv) Encouragement of the adoption of model standard specifications and measurements for buildings and building materials with a view to creating an industry for the manufacture of standard prefabricated building materials, and to the reduction of building costs, and

v) Promoting the establishment of factories and plants for manufacturing building materials.

Main activities of the Bank include establishing companies for the production or marketing of building materials and requisites, in addition to offering banking services to housing cooperative societies, housing funds, savings and loan societies for housing purposes and other investors in housing from the public or private sectors.

232 The Housing Bank approved 2,856 loans worth JD 22.7 million in 1979 to finance 4,999 housing units. In the same year, about 80 percent of the Bank's loans were used to finance the construction and completion or enlargement of housing units. In terms of geographical distribution of the Bank's loans made during 1974 through 1980, 10.4 percent (total amount JD 125.3 million) and 14.6 percent (total units 30,287) were accounted for by the Irbid Governorate. A breakdown of borrowers indicates that individual borrowers, either directly or via housing societies and cooperatives, accounted for 54.2 percent of the Bank's total loans in 1979, whereas commercial housing accouted for 44 percent in the same year. Thus, financing facilities by the Housing Bank will be helpful to promote the establishment of factories and plants for manufacturing building materials at the proposed Irbid Industrial Estate.

233 The Amman Financial Market has been established as a governmental institution in 1976. The objective of the Market shall include the promotion of saving through encouragement of investment in financial instruments and direction of savings toward the service of the national economy. Activities of Amman Financial Market are shown in Table 2.20. The volume of trading increased near 3 times during 1978 through 1979. Hence, the enlargement of the Amman Financial Market seems to foster the industrial development in Jordan.

Table 2.20 Activities of Amman Financial Market

Sector	Volume of Trading (in Million JD)			Number of Companies		
	1978	1979	Change 79/78 %	1978	1979	Change 79/78 %
Industry	2.89	6.76	133.9	26	32	23.1
Banking	1.91	6.84	258.1	10	13	30.0
Services	0.61	1.31	114.8	10	11	10.0
Insurance	0.21	0.93	342.8	11	14	27.3
Total	5.62	15.84	181.8	57	70	22.8

Source: Central Bank of Jordan, Ibid.

234 As a new source of financing, Jordan Investment House with JD 5 million fund will be operated from March 1981, the organization of which was jointly established by Jordanian industrial entrepreneurs and the investment bank of Luxemburg created by business circles of Qatar, Kuwait and Saudi Arabia. This means that local entrepreneurship is going to grow up in the field of industrial sectors.

2.2.4 Marketing and Transportation Conditions

235 The Irbid Governorate has the second largest market in Jordan, though its size is about half of that of Amman. Nevertheless, those industries which are going to be located in Irbid will have an easy access to both domestic and export markets.

236 As a locational preference, marketing and transportation factors are vital concerns to the industrial entrepreneurs. In fact, the results of the Factory Interview Surveys in Amman and Irbid indicate that the great number of industrial entrepreneurs point out such constraints as narrowness of domestic market size, handling of customs inspection; and delay of transportation, etc. Out of 172 companies surveyed in Irbid, 126 or 73 percent of the sample indicated the need for closeness to market, and 114 or 66 percent of the sample indicated the need for access roads and transportation as locational preferences.

237 The international goods movement for 1976 and the projection for 1985 made by applying the past trends to the simple linear regression equations indicate that the goods movement on Rute 15 at Syrian Border and Rute 30 at Iraq Border will be increased by 64 percent and 56 percent respectively during 1976 through 1985 as shown in Table 2.21. This implies

Table 2.21 Estimated International Goods Movement by Roads in 1985

(Unit: t/day)

Point of Entry/Exist and Mode	Imports		Exports		Transient		Total		Increase of 1985/76
	1976	1985	1976	1985	1976	1985	1976	1985	
Roads									
Route 15 at Syrian Border	647	906	344	406	1,595	2,935	2,586	4,247	1.64
Route 30 at Iraqi Border	27	38	773	912	1,091	2,007	1,891	2,957	1.56
Route 50 at Saudi Border	55	77	336	396	2,037	3,748	2,428	4,221	1.74
Route 36 at Jordan River	369	517	-	-	-	-	369	517	1.40
Route 48 at Jordan River	334	239	-	-	-	-			0.72
Route 53 at Saudi Border	15	21	214	253	27	50	256	324	1.26
Route 15 at Saudi Border	-	-	274	323	2,154	3,963	2,428	4,286	1.76
Sub-total	1,447	1,798	1,941	2,290	6,904	12,703	10,292	16,552	1.61
Inland Transport by Road from/to Port of Aqaba	2,708	3,504	3,287	4,200	686	1,262	6,681	8,966	1.34

Source: Integrated Development Study of Northern Jordan.

that the access of the industries in Irbid to major export markets such as Syria, Lebanon and Iraq will be more advantageous than competing industries in Amman, simply because of the former's geographical proximity to those markets.

238 According to the Factory Interview Surveys in Irbid, major transportation mode is trucks. That is, 80 percent of interviewed establishments use trucks for transportation of their products, and 75 percent also use trucks for transportation of their raw materials. Besides, 21 percent of interviewed establishments export their products to the neighboring Arab countries, while 44 percent of interviewed establishments import their raw materials from Arab and European countries through international goods transportation by trucks. Since the transportation tariff by trucks from Amman to Irbid is JD 1.1 per ton in accordance with the car licence, industries in Irbid have comparative advantage over those in Amman so far as the transportation cost and access to the export markets and imports of raw materials from north and east countries such as Syria, Iraq, Kuwait or Europe are concerned, if customs handling at Ramtha office is substantially expanded so that importing and exporting from and to Syria, Lebanon and the north and Iraq may not require to go to Amman to have the documents processed and pay duties.

239 Regarding the marketing system, majority of industries have customarily done their direct marketing in Jordan. The results of the Factory Interview Surveys also confirm this general tendency. Comparative breakdown between Amman and Irbid indicates that 7 factories or 10 percent of the sample in Amman use agents or indirect marketing channels, whereas only one factory of the sample in Irbid uses agents. Most of those companies with agents or indirect marketing channels are classified into the establishmens with more than 10 employees. Besides, a number of small establishments with less than 10 employees in Irbid have reported that insufficient network of distribution, lack of materials, and uneasy access to road and transportation are severe constraints on marketing their products. Hence, physical distribution center, which has such functions as common storage of raw materials and distribution of products to destinated markets, will be helpful not only to the industries of the proposed IIE but also to other local industries of Irbid region in order to improve the bottleneck of their physical distribution and transportation facilities, if it is established nearby the site of IIE.

2.3 Demand Projection of Selected Industries

2.3.1 Objective of Demand Projection

240 In the Pre-feasibility Study of IIE, 23 industries were selected as candidate industries for IIE. As an initial step for further investigation of industrial selection, this section deals with demand projection of these 23 industries and some additional candidate products with target years of being 1985 and 1990. Projections are made for both domestic and export demands and the level of industrial

classification for majority of industries is at four-digit ISIC code. The objectives of demand projection are two-folds:

i) to give a framework for the detail examination of each candidate industry in the next Chapter, and

ii) to provide overall view of the candidate industries in the national framework with respect to the absolute size of demand and their relative size compositions in 1985 and 1990.

Before carrying out the demand projection, the results of the Factory Interview Surveys with respect to future market demand anticipated by entrepreneurs in Irbid and Amman are reviewed in the next section.

2.3.2 Future Market Demand Anticipated by Entrepreneurs in Irbid and Amman

241 As to the future prospect of market demand for the relevant local industries, the results of the Factory Interview Surveys conducted by the Study Team are indicated in Table 2.22 and they are summarized as follows:

i) During 1980 through 1985, 53 establishments or 36 percent of interviewed factories are anticipating very high annual growth rate at more than 50 percent, whereas 27 establishments or 19 percent of interviewed factories are anticipating low annual growth rate. As a whole, about 81 percent of interviewed factories are anticipating moderate and/or high annual growth rate at more than 10 percent.

ii) During 1985 through 1990, 41 establishments or 40 percent of interviewed factories are anticipating very high annual growth rate at more than 50 percent, whereas only 10 establishments are anticipating low annual growth rate. As a whole, about 90 percent of interviewed factories are anticipating moderate and/or high annual growth rate at more than 10 percent.

242 According to the results of the Factory Interview Surveys in Irbid, 129 factories or 76 percent of the sample have bright prospects for their future domestic market demand in the 1980's, answering as good and/or excellent. On the contrary, 55 factories or 77 percent of the sample have discouraged prospects for their future export market demand in the 1980's, answering as fair and/or bad. Table 2.23 indicates prospected market demand by 9 types of industries. As a whole, the following industries in Irbid are clastered as a prospective high growth group (I): metal works, construction materials, and auto repairs and car parts. A moderate growth group (II) is as follows: furniture and room units, food and beverages, and trading. A lower growth group (III)

Table 2.22 Anticipated Growth Rate of Market Demand by Factories Surveyed by Factory Interview Survey 1/

(Unit: Number of Factories)

Year	Anticipated Annual Growth Rate of Market Demand						Total
	1-9%	10-19%	20-29%	30-39%	40-49%	50%-	
Irbid							
Period:1980-85	23	19	13	5	3	33	96
Share (%)	(24.0)	(19.8)	(13.5)	(5.2)	(3.1)	(34.4)	(100.0)
1985-90	8	15	15	7	4	30	79
Share (%)	(10.1)	(19.0)	(19.0)	(8.9)	(5.0)	(38.0)	(100.0)
Amman							
Period:1980-85	4	13	7	4	1	20	49
Share (%)	(8.2)	(26.5)	(14.3)	(8.2)	(2.0)	(40.8)	(100.0)
1985-90	3	6	5			11	25
Share (%)	(12.0)	(24.0)	(20.0)			(44.0)	(100.0)
Total							
Period:1980-85	27	32	20	9	4	53	145
Share (%)	(18.6)	(22.1)	(13.8)	(6.2)	(2.8)	(36.5)	(100.0)
1985-90	10	21	20	7	4	41	103
Share (%)	(9.7)	(20.4)	(19.4)	(6.8)	(3.9)	(39.8)	(100.0)

Source: Study Team.
Note: 1/ This table is compiled based on factories which provided relevant information in the Factory Interview Surveys.

Table 2.23 Market Demand Anticipated by Local Entrepreneurs in Irbid in 1980's[1/]

(Unit: Number of Factories)

Industry	Anticipated Market Demand Conditions								Anticipated Growth Rate of Demand (%)							
	Excellent		Good		Fair		Bad		Year	1-9	10-19	20-29	30-39	40-49	50-	Total
	Domestic (D)	Export (E)	D	E	D	E	D	E								
(1) Metal Works (Includ. Aluminum)	5	2	25	2	5	9	6	5	1980-85	5	3	4	2	1	7	22
									1985-90	1	2	2	3	1	8	17
(2) Furniture and Room Units	2		18	2	8		4	8	1980-85	5	1	1	1		5	13
									1985-90	3	1		2		4	10
(3) Food and Beverage			6	1	3	1		1	1980-85	2	4		1	2	1	8
									1985-90	1	3	1		2	1	8
(4) Garments	1		2	2	2	2			1980-85	1	3				1	5
									1985-90	1	2					3
(5) Construction Materials (Storne, Block, Tile)	7	1	18	4	2	6		4	1980-85	3	3	3	1		5	15
									1985-90	1	2	3	2		5	13
(6) Auto Repairs (Car Parts)	7		32	2	5	7	2	11	1980-85	5	4	3		2	13	27
									1985-90	1	3	7		1	11	23
(7) Trading	1		4		1		1		1980-85		1	2			1	4
									1985-90		1	2			1	4
(8) Paper and Paper Products (Includ. Printing & Publishing)			1		1			1	1980-85	2						2
									1985-90		1	1				2
Total	23	3	106	13	27	25	13	30								
Share (%) Domestic (N=169)	(13.6)		(62.7)		(16.0)		(7.7)									
Export (N=71)		(4.2)		(18.3)		(35.2)		(42.3)								

Source: Study Team.
Note: 1/ Based on factories which provided relevant information.

is as follows: garments, and paper and paper products. These prospects by local entrepreneurs may represent local industrial growth in Irbid in the 1980's to some extent, however, in order to quantify objective market demand, theoretical demand projection of selected industries must be undertaken.

2.3.3 Method of Domestic Demand Projection and Assumptions

a. Method Used for Demand Projection

243 A simplest way to make domestic demand projection of industries may be to extrapolate the past trend into the future. This projection method, however, is solely based on the past trend of a particular industry and fails to reflect anticipated movement of major economic indicators such as gross domestic product. On the other hand, more sophisticated methods are available for demand projection of industries, but these methods require various kinds of economic data as well as enormous amount of resources. Hence, a compromise is made in the light of availability of data and resources at hand.

244 After the scrutiny of all the relevant data sources, the Study Team decides to undertake the projection of domestic demand by using income elasticity of demand which is given in the following formula:

$$E_i = \frac{\frac{D_{i,t2} - D_{i,t1}}{D_{i,t1}}}{\frac{GDP_{t2} - GDP_{t1}}{GDP_{t1}}}$$

Where E_i = income elasticity of demand of industry i,

$D_{i,t2}$ = demand of industry i at year t2,

$D_{i,t1}$ = demand of industry i at year t1,

GDP_{t2} = gross domestic product in constant price at year t2,

GDP_{t1} = gross domestic product in constant price at year t1.

By assuming the elasticity of industry to be constant over time, future demand at year t_3 can be computed from the following formula:

$$D_{i,t3} = E_i \times \frac{GDP_{t3} - GDP_{t2}}{GDP_{t2}} \times D_{i,t2} + D_{i,t2}$$

Where GDP_{t3} = projected gross domestic product at year t_3, and

$G_{i,t3}$ = projected demand of industry i at year t_3.

b. Assumptions for Domestic Demand Projection

245 Several assumption in addition to the constancy assumption of elasticity should be made for the domestic demand projection of those candidate industries and products. These are summarized in the followings. The first assumption is concerning to the growth performance of gross domestic product. During the first Five-Year Plan (1976-1980), GDP at factor cost in constant price grew at an annual average rate of 9.7 percent from the end of 1975 to 1979 as mentioned in Paragraph 203. Based on this performance, the target of annual growth rate of GDP during the next Five-Year Plan (1981-85) is set at 11.3 percent in a preliminary draft by the National Planning Council. After the discussion with government officials, annual GDP growth rate during the projection period, i.e., 1980 and 1990, is assumed to be 10 percent for the present purpose.

246 As to the demand of industry i, it is represented by domestic consumption assuming that the portion used for investment of stocks is to be negligible. Moreover, data which indicates domestic consumption at the required level of industrial classification, i.e., majority of industries used in this projection are at the level of four-digit ISIC classification, are not available. Therefore, domestic consumption of industry i is calculated by the following simple formula:

Domestic Consumption of i = Production of i
+ Import of i
- Export of i

247 Due to the limitation of available data on production and consumption for the candidate industries and products, consumption of some of household consumer goods is calculated on the basis of composed amounts of national private expenditure (from 1970 to 1978 as shown in Annex 2.2) in conjunction with relative share of each category in the household expenditures (the base year 1975 = 100 percent). These items and their relative shares in the base year 1975 are shown as follows:

Bread = 5.2%
Olive Oil and Vegetable Ghee = 3.98%
Furniture and Appliance = 0.9%
Chickens = 2.05%
Beverages = 2.0%

248 Domestic consumptions derived from the formula mentioned above are expressed in the form of current prices. Since price deflators at this level of industrial classification are not available, either consumer price index or wholesale price index at the higher level of industrial classification is used to convert current prices to constant prices. Price indexes used in the demand projection are shown in Annex 2.3 and 2.4.

249 In order to corrobotate projected demands in value terms, demand projection on the basis of volume terms is also undertaken by using elasticity method to the extent possible within the data constraints.

2.3.4 Method of Export Demand Projection and Assumptions

250 For the purpose of export demand projection, the simple linear extrapolation method is employed since the elasticity method, if used for export projections, requires a projected value of world-wide future income, or at least, future income of import countries from Jordan.

251 Since large fluctuations are observed in the values of exports in many cases, the original data are modified by the moving average before applying the linear extrapolation. The moving average employed in this projection is presented by the following formula:

$$MX_{i,t3} = \frac{X_{i,t1} + X_{i,t2} + X_{i,t3}}{3}$$

Where $MX_{i,t3}$ = modified export of industry i at year t3,

$X_{i,t1}$ = actual export of industry i at year t1,

$X_{i,t2}$ = actual export of industry i at year t2,

$X_{i,t3}$ = actual export of industry i at year t3.

The actual export values are also deflated by using either wholesale or retail price index before taking the moving average.

252 The level of industrial classification used for export demand projection is the same to those for domestic demand projection. In addition to the export demand projection in value term, export demand projection in volume term is also attempted by using the linear extraplocation method for modified data by the moving average.

2.3.5 Results of Demand Projection

253 The projected total demand, i.e., domestic consumption plus export demand, of the 21 industries and 4 products becomes to be JD 930 million in 1985 and JD 2,657 million in 1990 at constant 1975 prices. Consequently, its annual growth rate during 1980 and 1990 becomes to be 21.5 percent which is much higher than the assumed growth rate of GDP during the same period, i.e., 10 percent. The projected demands of individual industries are summarized in Table 2.24 together with elasticities and projected growth rate. Details of the demand projection are compiled in Annex 2.5.

254 Out of the 25 industries and products, 11 industries are projected to grow at relatively high annual rate of more than 22 percent, while 5 industries are projected to have relatively low growth rate of less than 10 percent. Projected growth rates of the remaining 9 industries range between 10 and 22 percent. The overall classification of these industries by the range of projected growth rates is shown in Table 2.25. The highest projected growth rate reached 44.8 percent in case of bottling industries, followed by plastic products of 41 percent and structural clay products of 40.6 percent. The lowest projected growth rate is found to be 5.9 percent of non-metalic mineral products.

255 From the breakdown of projected demand it is found that domestic demand of these selected industries during 1980 through 1990 will increase at a higher growth rate than the growth trend of past decade, whereas the growth of export demand of these industries will be remained to be almost same trend as past decade with moderate or low growth rates of less than 10 percent except 7 high growth industries with over 10 percent growth rates such as cement, fertilizer, wood products, furniture and fixtures, structural clay products, metal, and plastic products. (See Table 2.24 and Annex 2.5.)

256 With regard to the relative share of each industry, 8 industries and products show declining tendency in their relative shares over time, while 9 industries will increase their relative shares over time. The remaining 8 industries will have the constant share over time. The largest share in 1985 will be held by fertilizer (18.9 percent), followed by fruit and vegetable (13.3 percent), bakery (10.4 percent), plastic products (8.7 percent) and metal (8.7 percent). The combined share of these 5 industries reach 60 percent of the total projected demand of the 25 industries and products in 1985.

257 The projected value and relative shares of these selected industries and products will be used as a frame of reference in selecting appropriate industries and in determining development scale of each industry in the next Chapter. However, it should be noted that there is an inherent limitation in interpreting the projected value in 1990 due to the projection method used and the availability

of data. Especially this consideration must be taken into account in case of industries with high elasticity coefficients to GDP such as plastic products, bottling, structual clay products, ceramic products, paper box and containers, agricultural machinery and equipment, and bakery.

Table 2.24 Results of Demand Projection (at constant 1975 prices)

(Unit: Volume; ton, Value; 1,000 JD)

Code	ISIC	Industry Name		Elasticity	Domestic Demand 1980	Domestic Demand 1985	Domestic Demand 1990	Export Demand 1980	Export Demand 1985	Export Demand 1990	Total (Domestic + Export) 1980	Total (Domestic + Export) 1985	Total (Domestic + Export) 1990	Annual Growth Rate (1980-90) (%)	Relative Share (%) 1980	Relative Share (%) 1985	Relative Share (%) 1990
1	3115	Vegetable and Fruit Oil	Volume	-	-	-	-	1,630	2,000	2,500	-	-	-				
			Value	0.724	16,797	23,780	33,665	500	600	700	17,297	24,380	34,365	7.1	4.6	2.6	1.3
2	3117	Bakery	Volume	-	-	-	-	250	376	502	-	-	-				
			Value	2.449	32,275	96,542	288,776	72	118	165	32,347	96,660	288,941	24.5	8.5	10.4	10.9
3	3122	Animal Feeds	Volume	0.864	80,190	121,135	182,986	21,000	32,000	43,000	101,190	153,135	225,986	8.4			
			Value	0.614	7,070	9,506	12,781	1,820	3,100	4,360	8,890	12,606	17,141	6.8	2.3	1.3	0.7
4	3233	Leather Products	Volume	-	-	-	-	42	70	100	-	-	-				
			Value	2.203	2,683	7,251	19,598	60	104	147	2,743	7,355	19,745	21.8	0.7	0.8	0.7
5	3240	Leather Footwear	Volume	-	-	-	-	1,440	2,160	2,880	-	-	-				
			Value	1.377	1,273	2,430	4,637	520	920	1,320	1,793	3,350	5,957	12.8	0.5	0.4	0.2
6 7 8	3311 3312 3319	Wood Products	Volume	-	-	-	-	13,400	29,700	46,000	-	-	-				
			Value	2.068	18,043	46,222	118,408	5,300	12,300	19,300	23,343	58,522	137,708	19.4	6.2	5.9	5.2
9	3320	Furniture and Fixtures	Volume	-	-	-	-	2,750	6,500	10,000	-	-	-				
			Value	2.159	9,254	24,604	60,229	1,350	2,980	4,600	10,604	27,584	64,829	19.8	2.8	3.0	2.4
10	3412	Paper Box and Containers	Volume	3.739	26,233	128,464	629,094	5,700	8,200	10,700	31,933	136,664	639,794	35.0			
			Value	2.986	2,332	8,625	31,902	1,020	1,540	2,070	3,352	10,165	33,972	26.1	0.9	1.1	1.3
11	3512	Ferrilizer	Volume	3.855	50,500	555,800	60,600	156,200	240,900	495,200	206,700	796,700	555,800	13.2[4/]			
			Value	(5.072)	78,775[4/]	122,903	66,669	34,560	53,280	109,514	113,335	176,183	176,183	5.7[4/]	30.0	18.9	6.6
12	3560	Plastic Products (Egg Trays, Boxes, Containers)	Volume	6.636	46,308	117,906	235,812	4,400	9,000	13,600	50,708	126,906	249,412	17.3			
			Value	4.216	13,571	78,629	455,567	1,150	2,100	3,050	14,721	80,729	458,617	41.0	3.9	8.7	17.3
13	3610	Ceramic Products	Volume	3.841	33,011	167,625	851,179	4,500	5,100	5,700	37,511	172,725	856,879	36.7			
			Value	3.511	5,864	26,392	118,781	262	444	626	6,126	26,830	119,407	34.5	1.6	2.9	4.5
14	3620	Glass Products	Volume	-	-	-	-	420	650	890	-	-	-				
			Value	2.432	4,729	14,032	41,637	100	164	228	4,829	14,196	41,865	24.1	1.3	1.6	1.6

Industry				Domestic Demand			Export Demand			Total (Domestic + Export)			Annual Growth Rate	Relative Share (%)		
Code	ISIC	Name	Elasticity	1980	1985	1990	1980	1985	1990	1980	1985	1990	(1980-90) (%)	1980	1985	1990
15	3691	Structural Clay Products	Volume –	–	–	–	6,600	11,000	15,300	–	–	–				
			Value 4.171	3,983	22,754	129,990	380	825	1,270	4,363	23,579	131,260	40.6	1.2	2.5	4.9
16	3692	Cement	Volume[1/] 2.290	1,337	3,749	10,512	–	–	–	–	–	–				
			Value 2.044	20,669	52,294	132,308	230	12,240	13,195	20,899	64,534	145,503	21.4	5.5	6.9	5.5
17	3699	Non-metallic Mineral Products (Tiles + Others)	Volume[1/] –	–	–	–	–	–	–	–	–	–				
			Value 0.290	3,916	4,518	5,212	4,750	7,430	10,130	8,666	11,948	15,342	5.9	2.3	1.3	0.6
18	3811	Cutlery, Hand Tools and General Handware of Metal														
19	3813	Metal Products	Volume –	–	–	–	420	750	1,100	–	–	–				
20	3819	Fabricated Metal Products (Locks, Springs, etc.)	Value 2.522	26,187	80,557	247,815	135	265	395	26,322	80,822	248,210	25.2	7.0	8.7	9.3
21	3822	Agricultural Machinery and Equipment	Volume[2/] –	–	–	–	–	–	–	–	–	–				
			Value 2.870	2,129	7,517	26,544	–	–	–	2,129	7,517	26,544	28.7	0.6	0.8	1.0
22	–	Chicken	Volume –	–	–	–	114	190	265	–	–	–				
			Value 1.377	9,888	18,872	36,019	182	252	332	10,070	19,124	36,351	13.7	2.7	2.1	1.4
23	–	Fruit and Vegetable	Volume –	–	–	–	–	–	–	–	–	–				
			Value 1.783	53,538	121,447	275,495	1,456	2,120	2,780	54,994	123,567	278,275	17.6	14.5	13.3	10.5
24	–	Bottling (Beverages)	Volume[3/] 3.203	12,466	49,957	200,201	2,100	3,400	4,700	14,566	53,357	204,901	30.3			
			Value 4.536	8,814	57,279	372,234	410	660	910	9,224	57,939	373,144	44.8	2.4	6.2	14.0
25	–	Printing and Publishing	Volume –	–	–	–	142	220	300	–	–	–				
			Value 0.623	1,802	2,434	3,289	143	244	345	1,945	2,678	3,634	6.5	0.5	0.3	0.1
Total			Value	323,592	828,588	2,481,556	54,400	101,686	175,437	377,992	930,274	2,656,993	21.5	100.0	100.0	100.0

Source: Annex 2.5

Notes: 1/ 1,000 tons
2/ Number of tractors
3/ 1,000 liters
4/ Year, 1982

Table 2.25 Classification of Selected Industries by the Range of Projected Growth Rate

Projected Average Annual Growth Rate (1980 - 1990)	(Index Code)	Selected Industries and Products	
I. High Growth (more than 22%)	(24) :	Bottling (beverages)	
	(12) :	Plastic products (egg trays, boxes, containers)	
	(15) :	Structural clay products	
	(13) :	Ceramic products	
	(10) :	Paper box and containers	
	(21) :	Agricultural machinery and equipment	
	(18) :	Cutlery, Hand tools and General handware of metal	Metal
	(19) :	Metal products	Metal
	(20) :	Fabricated metal products (locks, springs, etc.)	Metal
	(2) :	Bakery	
	(14) :	Glass products	
II. Moderate Growth (10 - 22%)	(4) :	Leather products	
	(16) :	Cement	
	(9) :	Furniture and fixtures	
	(6) :	Sawmill	Wooden products
	(7) :	Wooden cases, boxes, containers and cabinets	Wooden products
	(8) :	Other wooden products	Wooden products
	(23) :	Fruit and vegetable	
	(22) :	Chicken	
	(5) :	Leather footwear	
III. Low Growth (less than 10%)	(1) :	Vegetable and fruit oil	
	(3) :	Animal feeds	
	(25) :	Printing and publishing	
	(11) :	Fertilizer	
	(17) :	Non-metalic mineral products (tiles and others)	

Source: Study Team.

CHAPTER III

SCALE OF DEVELOPMENT AND TYPES OF INDUSTRY TO BE DEVELOPED

CHAPTER III

SCALE OF DEVELOPMENT AND TYPES OF INDUSTRY TO BE DEVELOPED

3.1 Introduction

301 This Chapter deals with development scale of IIE and types of industry to be developed in IIE. Factory Interview Surveys conducted by the Study Team will be examined in section 3.2 in which the industrial land demand generated by the existing and prospective entrepreneures in Irbid and the sorrounding region will be derived and size distribution of factory land as well as industrial composition will be examined. These data derived from Factory Interview Surveys will be extensively used in section 3.3 in which the projection of industrial land demand for IIE in 1986 and 1990 will be undertaken. Section 3.4 will be devoted for the examination of industries proposed by various studies including the Prefeasibility Study of IIE. The result of section 3.4 will be used for the development of comprehensive list of industries, and screening of these industries for IIE will be carried out in section 3.5 in which several criteria for screening will be introduced. Introduction of common workshop into IIE will be also suggested and outlined in the final part of section 3.5. Scale of newly developed industries in IIE will be suggested in section 3.6 and the industrial land composition will be suggested in the final section 3.7.

3.2 Factory Interview Surveys

3.2.1 Factory Interview Surveys in Irbid

302 In order to identify industrial land demand for IIE by the existing industries, two separate questionnaire surveys were conducted in Irbid. The purposes of these surveys are as follows:

i) To find out establishments interested in moving into IIE as a result of their expansion or relocation plans, and

ii) To find out land and floor demand by size and industry by those establishments who are interested in IIE.

303 These two surveys are described below.[1/]

i) General Interview Survey (hereinafter referred to as the General Survey) of manufacturing establishments in Irbid which was held by a team of Yarmouk University students from December 6 to December 11, 1980, covering almost all of the major establishments in Irbid, and

ii) Applicant Interview Survey (hereinafter referred to as the Applicant Survey) of those existing and prospective industrialists who registered at the office of the Municipality of Irbid from December 6 to December 10, 1980 in response to newspaper advertisement, and radio broadcasting, initiated by the Mayor of Irbid, requesting registration to those who wish to locate their factory at the proposed IIE when it becomes available.

304 As to the General Survey, 234 factories registered at the Chamber of Commerce, Irbid, plus 9 factories which are major factories outside of Irbid Municipality but with large size and close to the Municipality plus 3 factories which recently obtained industrial license from the Ministry of Industry and Trade were listed up as a comprehensive list of industries in Irbid. Out of these 246, 68 registered factories plus 9 outside-of-Irbid plus 3 licensed-factories totaling 80 were surveyed. Out of 80, effective date were collected from 64 factories.

305 As to the Applicant Survey, there were 110 applicants to the Municipality office, and out of them 2 were excluded from the Survey because they were already covered by the General Survey. As a result, effective data were collected from 108 present and prospective industrialists, none of which is overlapping with the factories covered by the General Survey.

306 In addition to the above two Surveys, there is a list of factories waiting for moving into the existing industrial estate. On the list, 81 are registered as waiting factories, out of which 6 were covered by the Applicant Survey, and there is no overlapping factory between the General Survey and those in the waiting list. Consequently, 75 factories independent of those covered by the two Surveys are waiting for moving into the existing industrial area which is now fully occupied and has no space for them. Consequently, these 75 factories should be accommodated by the new IIE.

3.2.2 Overall Results of Factory Surveys in Irbid

307 Table 3.1 shows overall results of factory surveys in Irbid (see Annex 3.2). As a result of the General Survey, 34 firms out of

---

1/ For the detail of survey questionnaire, see Annex 3.1.

64 effective answers have wishes to move into IIE. In an Applicant Survey, 101 firms out of 108 effective answer have interests in moving into IIE. Seventy five firms has been on the waiting list. Combining these two surveys and one list, in total 210 factories were found as candidate for IIE.

Table 3.1 Overall Results of Factory Surveys in Irbid

	General Survey	Applicant Survey	Waiting Firms for Existing Ind. Area	Total
Effective Answer	64	108	-	
Firms Answered "Yes" or "May be" to move into IIE	34	101	75	210
No Answer	1	-	-	
Firms Answered "Not" to move into IIE	29	7	-	

Source: Study Team.

308 Table 3.2 shows the preference of the firms with respect to the ownership of the land when they move into IIE. It should be noted that one-third of firms by the General Survey prefer "Buying Land", however, the majority of firms by the Applicant Survey prefer "Leasing". As to the factories on the waiting list, they could be considered as being the candidates for the new IIE since there is no space left for them in the existing industrial area. Since they are the applicant to the standard factory units, we also consider that they want leasing of the land. The result seems to reflect financial conditions of firms located in Irbid since those firms in the General Survey belong to rather large-scale operation while firms in the Applicant Survey are classified into small or medium scale firms and purchase of factory land may be a financial burden for firms in the Applicant Survey in light of their scale of operation.

Table 3.2 Preference of "Buying" or "Leasing"

	General Survey	Applicant Survey	Waiting Factories
Firms Wanting to "Buy"	11	7	-
Firms Wanting to "Lease"	7	61	75
Firms Accepting Either	14	30	-
Not Specified	2	3	-
Total	34	101	75

3.2.3 Factory Interview Survey in Amman and Zarqa

309 Interview Survey of manufacturing establishments in Amman and Zarqa (hereinafter referred to as the Amman-Zarqa Survey) was held by a team of Jordan University students from December 6 to Decmeber 16, 1980. Based on a list of factories registered at the Amman Chamber of Industry and a list of factories which recently obtained industrial license from the Ministry of Industry and Trade, 120 factories were initially selected for interviewers, according to type of industries and scale of operation with respect to employment and capital.

310 Out of 120 factories, 63 factories provided information in which effective data were collected from 54 factories. As a result of the Amman-Zarqa Survey, 12 factories or 22 percent of the sample answered "yes" to move into IIE and one factory answered "may be" to move into IIE. Out of 13 factories, 11 factories specified land demand for IIE which amounts to about 15.4 ha as seen in Annex 3.2.3.

311 Since there are more than 1,000 factories on the list registered at the Amman Chamber of Industries, the factories interviewed by the Amman-Zarqa Survey represent about 5 percent of the population. Land demand for IIE revealed in this Survey is, therefore, considered to represent considerably small portion of potential industrial land demand by entrepreneurs in Amman and Zarqa region.

3.3 Industrial Land Demand for IIE

3.3.1 Introduction

312 The size of IIE as an industrial estate was estimated to be 26.6 ha in the Prefeasibility Study of IIE. This demand estimate of IIE was derived by a deductive method based on the industrial development framework of Irbid Governorate. In the present Study, inductive methods were used to estimate the industrial land demand for IIE based on the Interview Surveys described in the previous section. First, land demand by factories which want to relocate or expand into IIE and by waiting factories was estimated from the results of the Interview Surveys. Second, land demand by new investors during the period between 1981 and 1990 was projected by analyzing the historical trend of investment in the Irbid Region. The results were then combined to derive the industrial land demand of IIE for 1986 and 1990. Figure 3.1 shows the flowchart of land demand projection.

3.3.2 Industrial Land Demand for Relocation, Expansion and Waiting Factories

313 Since the required land area per establishment could be different among various types of industries, 210 candidate firms from the Interview Survey (see paragraph 307) are classified into 9 types of industries for the purpose of land demand estimation. Classification used in this Study is as follows:

i) Metal works (including metal furniture and construction materials of metal)
ii) Furniture and room units (made of wood)
iii) Food and beverages
iv) Garments and Clothes
v) Plastics and Chemicals
vi) Construction materials (Bricks, tyles and clay products)
vii) Auto-repair shops
viii) Trading
ix) Paper and paper products (including printing and publishing)

Table 3.3 shows breakdwon of willingness to move into IIE of 169 firms in the General and Applicant Surveys by types of industries classified above.

a. Land Demand by Industries in the General Survey

314. Land area demanded in the General Survey is listed by types of industries in Table 3.4. Land area demanded by 34 firms in the General Survey reaches 79,772 m^2, of which 28,710 m^2 is demanded by metal works industry, 23,500 m^2 by construction materials industry and 12,462 m^2 by furniture and room units industry.

Figure 3.1 Flow Chart of Land Demand Projection

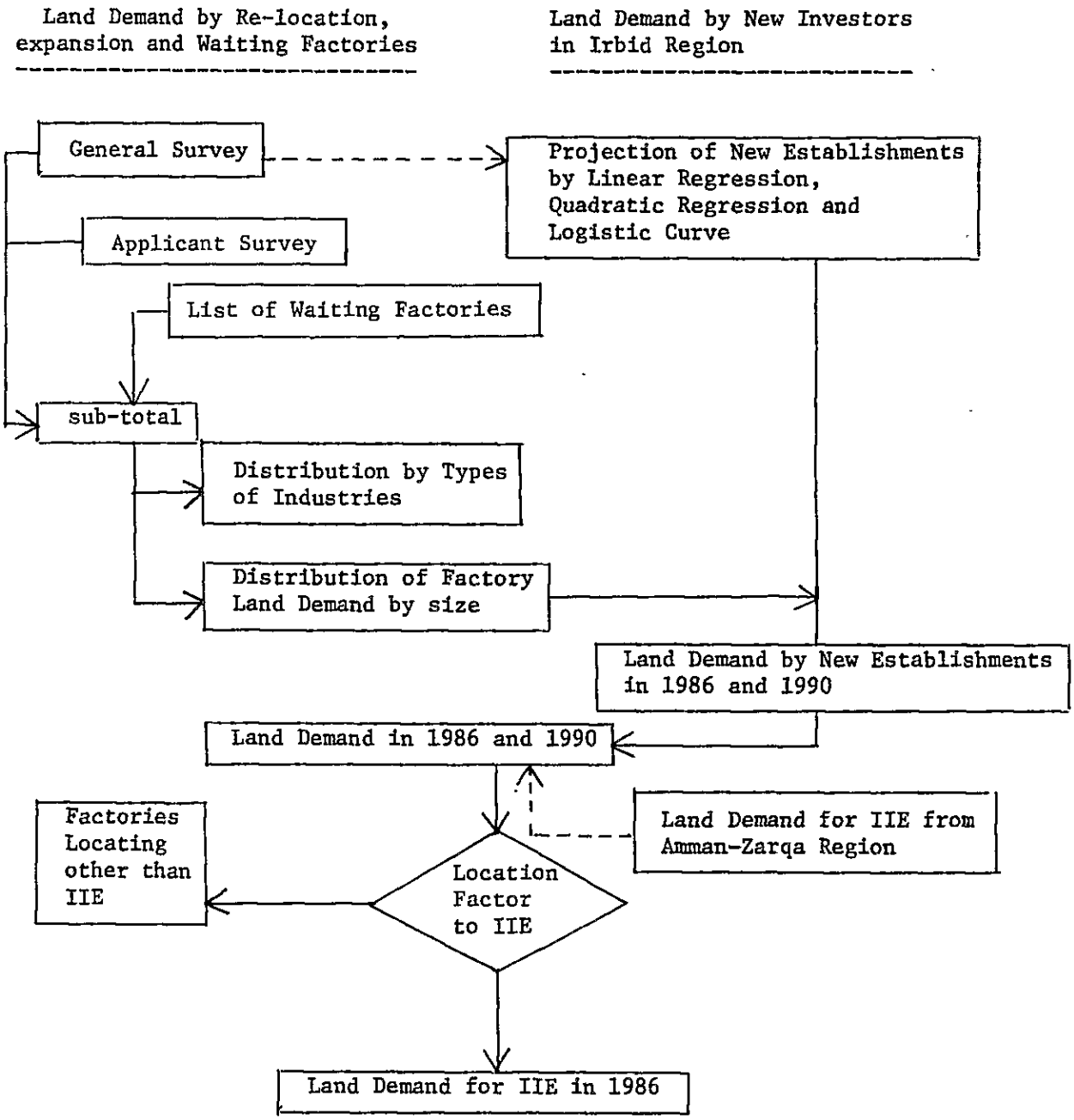


Table 3.3 Distribution of Willingness to Move into IIE by Type of Industry

Industry	General Survey		Applicant Survey		Total	
	"Yes" or "May be"	"Not"	"Yes" or "May be"	"Not"	"Yes" or "May be"	"Not"
1 Metal Works	10	7	24	2	34	9
2 Furniture and Room Units	9 3	4	17	3	26	7
3 Food and beverages	3	6	-	-	3	9
4 Garments and clothes	1	2	-	-	1	3
5 Plastics and chemicals						
6 Construction materials	7	5	14	2	21	26
7 auto-repair shops	4	1	41	-	45	1
8 Trading						
9 Paper and paper products	-	2	-	-	-	2
	34	29	101	7	135	34

Source: Study Team.

Table 3.4 Land Demand by Types of Industries in the General Survey

	Number of Firms (A)	Land Demand (m^2) (B)	(B)/(A)
1. Metal Works	10	28,710	2,871
2. Furniture and Room Units	9	12,462	1,384
3. Food and Beverages	3	8,000	2,667
4. Garments and Clothes	1	500	500
5. Plastics and Chemicals	-	-	-
6. Construction Materials	7	23,500	3,357
7. Auto-repair Shops	4	6,550	1,638
8. Trading	-	-	-
9. Paper and Paper Products	-	-	-
Total	34	79,722	2,344

Source: Study Team.

b. Land Demand by Industries in the Applicant Survey

315 Land demand by the Applicant Survey is rather hard to be identified, because firms, in general, did not specified necessary area either as land area or floor space. Only 18 firms specified necessary area in both terms. Land and floor area of these 18 firms are shown in Table 3.5, according to the type of industries as shown below.

Table 3.5 Land and Floor Area Demand by 18 Firms in the Applicant Survey

	No. of Firms (N)	Land Area (m^2) (L)	(L)/(N)	Floor Area (m^2) (F)	(F)/(N)	(F)/(L)
1. Metal Works	4	3,100	780	1,040	260	33.54%
2. Furniture and Room Units	2	1,100	550	450	225	40.91%
3. Food and Beverages	-	-	-	-	-	-
4. Garments and Clothes	-	-	-	-	-	-
5. Plastics and Chemicals	-	-	-	-	-	-
6. Construction Materials	3	3,500	1,170	464	154	13.26%
7. Auto-repair Shops	8	1,730	220	508	64	29.36%
8. Trading	1	1,100	1,100	100	100	9.09%
9. Paper and Paper Products	-	-	-	-	-	-
Total	18	10,530	585	2,562	142	24.27%

Source: Study Team.

316 Unit values for land and floor area in Table 3.5 seem to be biased toward higher range, since many applicants who did not specify their demand either as land or floor belongs to relatively small-scale firms. However, it is suggested to keep extra area for these firms, that makes them possible to expand and to improve their business in future. Therefore, the values in Table 3.5 are adopted as standard units to estimate land and floor demands of the rest of 83 firms in the Applicant Survey which was not covered in Table 3.5.

317 Since each one of 83 firms indicates either land or floor area and a type of industry to which each one of 83 firms belongs is already known in the Applicant Survey, the ratio of floor to land for

each type of industry derived in Table 3.5 is used to estimate land or floor demand for the rest of 83 firms (for detail, see Annex 3.3). The results of this estimation indicate that total land demand by applicants becomes 56,870 m^2 and that total floor demand becomes 13,471 m^2 as shown in Table 3.6.

Table 3.6 Land and Floor Demand of Applicants by Types of Industries

	Number of Firms	Land Area Demanded (m^2)	Floor Area Demanded (m^2)
1. Metal Works	23	16,030	5,495
2. Furniture and Room Units	17	7,680	2,752
3. Food and Beverages	-	-	-
4. Garments and Clothes	-	-	-
5. Plastics and Chemicals	-	-	-
6. Construction Materials	14	16,500	1,847
7. Auto-repair Shops	41	9,580	2,827
8. Trading	6	7,080	550
9. Paper and Paper Products	-	-	-
Total	101	56,870	13,471

Source: Study Team.

c. Land Demand by Waiting Factories

318 Table 3.7 shows a breakdown of 75 waiting factories by types of industries. Almost all of them are relatively small in size like as the tenants of standard factory buildings in the existing industrial area. For the purpose of demand estimation, unit value of floor space

is assumed to be 75 m^2 on the average, which is much larger than that of the standard factory buildings in the existing industrial area, and the ratio of floor to land is assumed to be 30 percent.

Table 3.7 Land Demand of 75 Waiting Factories by Types of Industry

	Number of Firms	Land Area Demanded (m^2)	Floor Area Demanded (m^2)
1. Metal Works	50	12,500	3,750
2. Furniture and Room Units	4	1,000	300
3. Food and Beverages	-	-	-
4. Garments and Clothes	-	-	-
5. Plastics and Chemicals	-	-	-
6. Construction Materials	-	-	-
7. Auto-repair Shops	21	5,250	1,575
8. Trading	-	-	-
9. Paper and Paper Products	-	-	-
Total	75	18,750	5,625

Source: Study Team.

Therefore, the estimated floor demand becomes 5,625 m^2 and the estimated land demand becomes 18,750 m^2 as shown in Table 3.7.

d. Summary of Estimated Land Demand in 1980

319 Total land demand originated from two Factory Interview Surveys and a list of waiting factories is summarized as below.

Land demand originated
from the Genreal Survey: 79,720 m^2 by 34 factories
from the Applicant Survey: 56,870 m^2 by 101 factories

from the list of waiting factories: 18,750 m^2 by 75 factories

into total land area of 155,340 m^2 by 210 factories.

320 Table 3.8 below shows a distribution of land area demand of 210 firms by types of industries. Metal works industry has the largest number of candidate firms as well as the largest amount of land area followed by construction materials industry. Furniture and room units industry and auto-repair shops demand roughly the same amount of land of 21,000 m^2. It should be noted that there was no firm classified into plastics and chemicals industry as well as paper and paper products industry.

Table 3.8 Distribution of Land Demand for Re-location, Expansion and Waiting Factories by Types of Industries

Industry	Number of Firms	Land Area (m^2)	Distribution
1. Metal Works	83	57,350	36.88%
2. Furniture and Room Units	30	21,170	13.61%
3. Food and Beverages	3	8,000	5.15%
4. Garments and Clothes	1	500	0.32%
5. Plastics and Chemicals	-	-	-
6. Construction Materials	21	40,000	25.73%
7. Auto-repair Shops	66	21,360	13.74%
8. Trading	6	7,100	4.57%
9. Paper and Paper Products	-	-	-
Total	210	155,480	100.00%

Source: Study Team.

321 Table 3.9 shows a size distribution of 210 firms. One hundred and twenty-eight out of 210 firms or 61 percent fall in the category of less than 250 m^2 of land demand while there are only six firms which belong to the category of more than 4,000 m^2 of land demand.

Table 3.9 Size Distribution of Land Demand for Re-location, Expansion and Waiting Factories

Category of Land Size (m^2)	General Survey		Applicant Survey		Waiting Factories		Total	
	Number of Firms	Accumulated Land Demand (m^2)	Number of Firms	Accumulated Land Demand (m^2)	Number of Firms	Accumulated Land Demand (m^2)	Number of Firms	Accumulated Land Demand (m^2)
Less than 250	6	722	47	7,590	75	18,750	128	27,062
250-500	5	2,500	22	9,510	-	-	27	12,010
500-1,300	6	6,000	28	27,770	-	-	34	33,770
1,300-4,000	12	31,500	3	7,000	-	-	15	38,500
More than 4,000	5	39,000	1	5,000	-	-	6	44,000
Total	34	79,722	101	56,870	75	18,750	210	155,342

3.3.3 Industrial Land Demand by New Investors up to 1986 and 1990

a. Historical Trend of Annually Established Firms

322 Industrial land demand so far estimated is effective as of the end of 1980, while the target year of full occupancy of IIE is scheduled in 1986 (see Chapter VII). Therefore, it is necessary to estimate an additional industrial land demand which will be brought out by new investors until 1986 and 1990. In the followings, three different procedures were adopted to estimate industrial land demand for IIE by new investors.

323 Ninty-five firms indicated the year of establishment in the General and Applicant Surveys as shown in Table 3.11. Since the statistical population of the Interview Surveys amounts to 248 firms in the Irbid Region, number of firms established in each year in the sample was adjusted to reflect the statistical population and the moving average of the three most recent years was computed to derive a long term trend of number of firms established in each year. These are shown in Table 3.12 and Figure 3.2. As seen in Figure 3.2, there were three peaks in the number of newly established firms in which the most recent one was observed in 1977-78. Also it should be noted that more than 70 percent of firms in the Region have been established after 1975, that reveals rapid industrialization process realized in the Irbid Region in recent years.

b. Projections by Linear and Quadratic Regressions

324 Given the moving average number of newly established firms, two forms of regression analyses were undertaken to project a number of annually established firm in future as below.

i) Linear Regression

$$Nt = -4.43436 + 0.83073t \qquad r^2 = 0.592$$

ii) Quadratic Regression

$$Nt = 4.47408 - 1.14892t + 0.07070t^2 \qquad r^2 = 0.831$$

Where Nt is the number of firms established in t-year after the base year, and the base year was set to be 1952 where t = 0.

The projected number of new establishments in each year between 1981 and 1990 is shown in Table 3.10 and Figure 3.3.

Table 3.10 Projected Number of Newly Established Firms between 1981 and 1990 by Linear and Quadratic Regressions

Type of Projection	Year									
	1981	82	83	84	85	86	87	88	89	90
1. Linear Equation	20	20	21	22	23	24	25	25	26	27
2. Quadratic Equation	34	37	40	44	47	51	54	58	63	67

Table 3.11 Year of Establishment of 95 Firms in the General and Applicant Survey.

Industry	Year of Establishment																							
	1950	1951	1956	1957	1958	1959	1963	1964	1965	1966	1967	1968	1969	1970	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
1) Metal Works					1						2	1				1	1	1	4	1	4	5	4	25
2) Furniture & Room Units	1		1			1	1				2		2		1			6	6	1	1	2	2	27
3) Food & Reverages				1				1	1		1		1							2	1	2	1	11
4) Garment & Clothes	1														1	1					1		1	5
5) Plastics & Chemicals																								0
6) Construction Materials								2		1		1		1				1	2	3			2	13
7) Auto-Repair Shops		1																1		2		5	3	12
8) Trading																					1	1		2
9) Paper & Paper Products																								0
Total	2	1	1	1	1	1	1	3	1	1	5	2	3	1	2	2	1	9	12	9	8	15	13	95

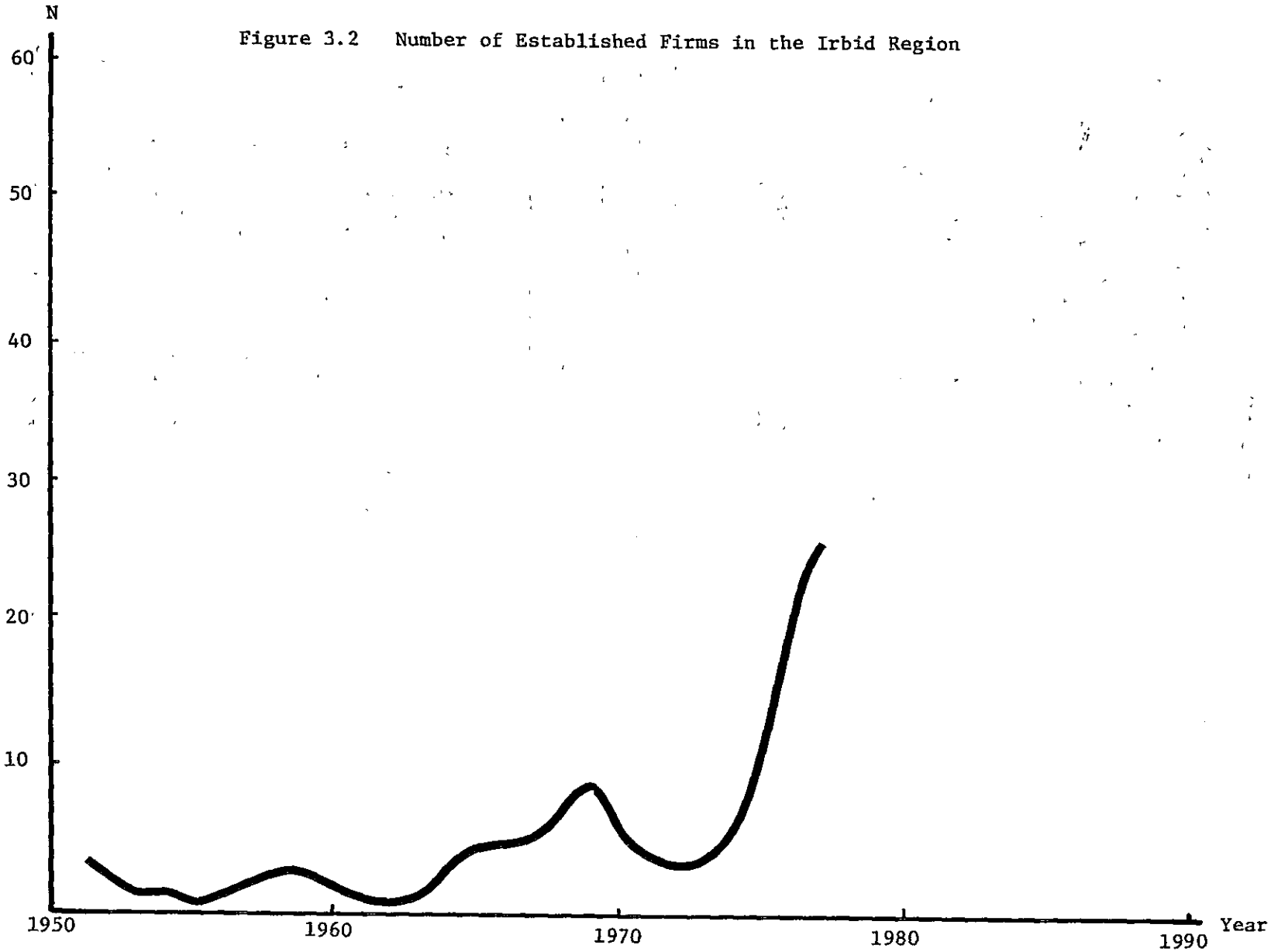
Source: Study Team.

Table 3.12 Adjusted Number of Firms Established in Each Year and Moving Average

Year of Establishment	Adjusted Number of Established Firms	Three-Year Moving Average
1950	5.221	
1951	0	
1952	2.611	2.607
1953	0	0.870
1954	0	0.870
1955	0	0
1956	2.611	0.870
1957	2.611	1.741
1958	2.611	2.611
1959	2.611	2.611
1960	0	1.741
1961	0	0.870
1962	0	0
1963	2.611	0.870
1964	7.832	3.481
1965	2.611	4.351
1966	2.611	4.351
1967	13.053	6.092
1968	5.221	6.963
1969	7.832	8.702
1970	2.611	5.221
1971	0	3.481
1972	5.211	3.607
1973	5.211	3.474
1974	2.611	4.344
1975	23.495	10.439
1976	31.326	19.144
1977	23.495	26.105
1978	20.884	25.235
1979	39.158	27.845
1980	33.937	31.326

Source: Study Team.

Figure 3.2 Number of Established Firms in the Irbid Region



c. Projection by Logistic Curve

325 As it is depicted in Figure 3.3, the projection by linear regression seems to be too conservative, while the projection by quadratic regression seems to be too radical. Therefore, another form of projection technique, i.e., the logistic curve, was attempted in order to reflect the most recent investment trend depicted in Figure 3.2. The estimated equation of the logistic curve is given below:

$$Nt = \frac{45.32351}{1+e^{2.2052 - 0.35714t}}$$

Where Nt is the number of firms established in t-year after the base year and the base year was set to be 1972 where t = 0. The projected number of new establishments in each year between 1981 and 1990 is shown in Table 3.13 and Figure 3.3.

Table 3.13 Projected Number of Newly Established Firms between 1981 and 1990 by Logistic Curve

Type of Projection	Year									
	1981	82	83	84	85	86	87	88	89	90
Logistic Curve	33	36	38	40	42	43	43	44	44	45

d. Summary of the Projected Number of New Establishment

326 In the previous sections, three different forms of projection were attempted. Among them, the projection by the logistic curve is considered to be moderate as seen in Figure 3.3. In the following, it will be used as the basis for the projection of industrial land demand up to 1986 and 1990.

e. Conversion of Newly Established Firms into Industrial Land Demand

327 The accumulated number of newly established firms between 1981 and 1986 becomes 232, while the number between 1987 and 1990 becomes 175 as shown in Table 3.13. In order to convert these projected number of establishments by new investors into industrial land demand, the size distribution of land demand revealed in Table 3.9 was employed. In Table 3.9, size of land was categorized into five groups in which the largest one was set to be the category of more than 4,000 m^2/factory.

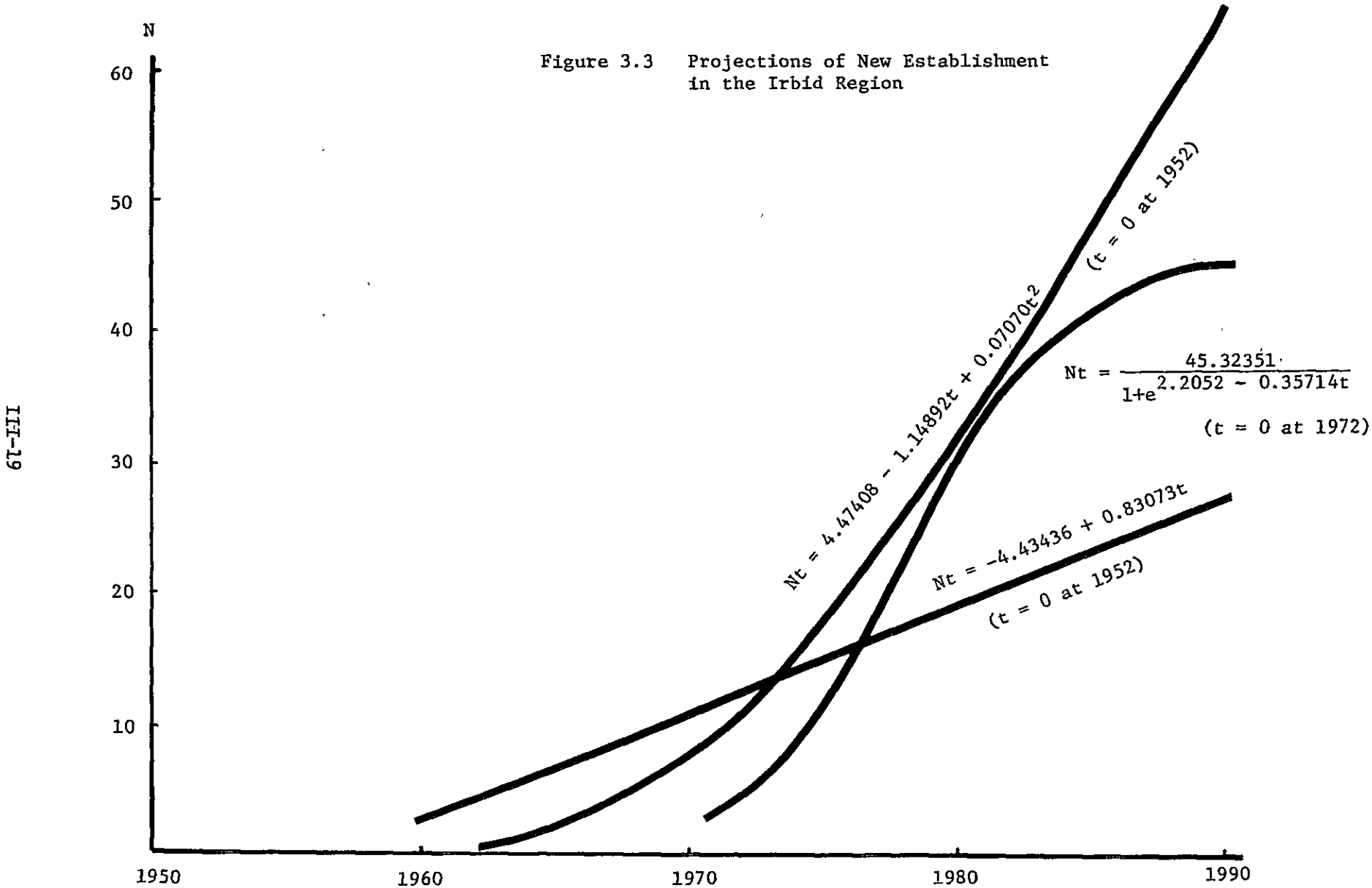


Figure 3.3 Projections of New Establishment in the Irbid Region

Since IIE is designed to promote small and medium scale industry, the category of more than 4,000 m^2/factory in Table 3.9 was excluded in the following demand projection. This also makes the demand projection to be conservative one because the resulted projection shifts downword. The smallest two categories in Table 3.9 were also combined into one, i.e., the category of less than 500 m^2/factory for the purpose of demand projection. The modified size distribution and the average land demand per factory in each size category are shown in Table 3.14.

Table 3.14 Modified Size Distribution of Industrial Land Demand for the Projection of Industrial Land in 1986

Category of Land Size (m^2/factory)	Percentage of Factories in the Category	Average Land Size in the Category
Less than 500	76.0%	252 m^2 = 250 m^2
500 - 1,300	16.7%	993 m^2 = 1,000 m^2
1,300 - 4,000	7.3%	2,567 m^2 = 2,500 m^2
Total	100%	

Source: Table 3.9.

328 The accumulated number of establishments by new investors up to 1986, i.e., 232 anticipated establishments, were broken down into three size categories by using the relative share in each category (second column in Table 3.14) and then multiplied by the average land size of each category (third column in Table 3.14). The results of industrial land demand projection in 1986 are shown in Table 3.15. The projected land demand by new investors between 1981 and 1986 shall be 12.5 ha in total for 232 establishments, and it is almost equally distributed among three size categories, i.e., 4.4 ha for the category less than 500 m^2/factory, 3.9 ha for the category between 500 and 1,300 m^2/factory and 4.2 ha for the category between 1,300 and 4,000 m^2/factory.

Table 3.15 Projected Industrial Land Demand up to 1986

Category of Land Size (m^2)	Number of Establishments	Land Demand (m^2)	Average Land Size (m^2/establishment)
Less than 500	176	44,000	250
500 - 1,300	39	39,000	1,000
1,300 - 4,000	17	42,500	2,500
Total	232	125,500	-

Source: Table 3.14.

329 Upon a successful implementation, IIE as a growth pole of the region would have a significant impact on improving investment environments. It is further anticipated that scale of operation of each factory becomes larger than the present one in order to capture scale merits sustained by technological improvement. For the purpose of projecting industrial land demand between 1987 and 1990, these factors should be taken into consideration. This means that size distribution of industrial land demand indicated in Table 3.14 should be further modified upwards and/or that average land size per factory should be expanded. In the followings, two cases of modified size distribution of industrial land as shown in Table 3.16 were assumed for projecting industrial land demand up to 1990.

330 The accumulated number of establishments by new investors between 1987 and 1990, i.e., 175 anticipated establishments, were distributed into three categories in Table 3.16 and then multiplied by the average land size of each category. Table 3.17 shows the results of industrial land demand projections in 1990. The projected land demand in 1990 shall be 16.2 ha in Case 1 and 17.5 ha in Case 2.

Table 3.16 Modified Size Distribution of Industrial Land Demand for the Projection of Industrial Land up to 1990

Category of Land Size (m^2/factory)	Percentage of Factories in the Category		Average Land Size in the Category (m^2/factory)
	Case 1	Case 2	
Less than 500	50 %	40 %	250
500 - 1,300	30 %	40 %	1,000
1,300 - 4,000	20 %	20 %	2,500
Total	100 %	100 %	

Table 3.17 The Projected Industrial Land Demand up to 1990

Category of Land Size (m^2/factory)	Case 1		Case 2	
	Number of Establishments	Land Demands(m^2)	Number of Establishment	Land Demand(m^2)
Less than 500	87 (50%)	21,750 (13.4%)	70 (40%)	17,500 (10%)
500 - 1,300	53 (30%)	53,000 (32.7%)	70 (40%)	70,000 (10%)
1,300 - 4,000	35 (20%)	87,500 (53.9%)	34 (20%)	87,500 (50%)
Total	175 (100%)	162,250 (100%)	175 (100%)	175,000 (100%)

Source: Table 3.16

3.3.4 Projected Industrial Land Demand for IIE

331 From item d in section 3.3.2. and Table 3.15 in section 3.3.3., the projected land demand in 1986 becomes 280,840 m^2 as follows:

i) Immediate Land Demand by Factory Interview Surveys in Irbid; 155,340 m^2 for 210 factories

ii) Land Demand by New Investors between 1981 and 1986; 125,500 m^2 for 232 factories

In addition, there shall be a considerable amount of industrial land demand for IIE by investors in Amman and Zarqa region as mentioned in section 3.2.3. This additional demand was excluded from the projected land demand for IIE mentioned above, which is, therefor, considered to be rather conservative projection.

332 Among these factories and potential investors, some will probably locate their factories outside IIE before its completion. Although it is difficult to forecast a probable rate of location other than IIE, it is assumed that 35 percent of the forecasted number of establishments find their own sites outside IIE before its completion. Accordingly, the industrial land demand for IIE was adjusted as shown in Table 3.18. In total, industrial land demand for IIE in 1986 shall be 18.3 ha and it is distributed roughly equally into the four categories of land size.

Table 3.18 Industrial Land Demand for IIE in 1986

Category of Land Size (m^2)	Number of Establishment	Land Demand (m^2)	Average Land Demand (m^2)
Less than 500	215 (74.9%)	54,000 (29.6%)	250
500 - 1,300	47 (16.4%)	47,300 (25.9%)	1,000
1,300 - 4,000	21 (7.3%)	52,700 (28.9%)	2,500
More than 4,000	4 (0.4%)	28,600 (15.6%)	7,200
Total	287	182,600	

Source: Tables 3.9 and 3.15.

333 Since the industrial land demand so far derived is for factory land use exclusive of land for other uses such as road, utility facilities and administrative building, it has to be converted to the land demand as an industrial estate. In general, factory land represents about 65% to 70% of the total land of an industrial estate depending on other conditions such as required level of utility facilities and supporting facilities, topography, etc. Therefore, the total land demand of IIE is tentatively estimated to be 27.5 ha for the purpose of land use planning in Chapter V. In addition, the total land demand for new investment up to 1990 shall be 22.5 ha, if it takes the form of an industrial estate.

3.4 Review of Industries Proposed by Previous Studies

334 Besides the relocation and expansion of existing industries, the industrial estate shall bring an opportunity to establish new pioneer industries to Irbid and its surrounding region. At present, socio-economic conditions of the northern region seem to be comparatively disadvantageous relative to the metropolitan region (Amman-Zarqa), particularly in the size of market, agglomeration economies, and communication and transportation services. Such disadvantages which tend to aggravate regional difference in economic growth can be overcome by the provision of an adequate infrastructure for industrial development. The comparative advantage of Irbid region will be much improved by a systematic provision of infrastructure needed by industries. This can be done by the establishment of an industrial estate. In this section, industries proposed by previous studies such as the Prefeasibility Study of IIE, Master Plan of Amman Industrial Estate and Industrial Programming Study of Jordan are examined as a step of screening appropriate industries for IIE.

3.4.1 Industries Proposed by the Prefeasibility Study of IIE

335 In the Prefeasibility Study, 23 industries have been identified as likely industries which would be located in the proposed IIE. They have been chosen mainly on the basis of:

i) The availability of materials,
ii) The proximity to markets,
iii) The linkage with existing and probable industries in the region, and
iv) The technological appropriateness in the region.

These industries have become the basis of our examination.