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HIGH-LEVEL ADVISORY SERVICES IN THE FIELD OF INDUSTRIAL SURVEY FOR THE PREPARATION OF THE NATIONAL DEVELOPMENT PLAN

SI/JOR/86/805

JORDAN

Terminal report*

INDUSTRIAL SURVEY OF JORDAN

Prepared for the Government of Jordan
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme
and the Arab Industrial Development Organization

Based on the work of Viekoslav Kegnar,
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United Nations Industrial Development Organization
Vienna

*This document has not been formally edited.

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Explanatory notes

The monetary unit in Jordan is the dinar (JD).

References to tons (t) are to metric tons.

One dunum equals 0.1 hectar.

Besides the common abbreviations, symbols and terms, the following have been used in this report:

AIDO	Arab Industrial Development Organization
CIF	Cost, insurance, freight
ISIC	International Standard Industrial Classification
ISTC	International Standard Trade Classification
UHT	Ultra-high temperature

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PREFACE

Project SI/JOR/86/805 - Industrial Survey of Jordan - was a joint UNIDO/AIDO programme executed in co-ordination and collaboration with these two organizations and the Government of Jordan, particularly the Ministry of Industry and Trade and the Department of Statistics. The summarized objectives of the Project were:

(a) A factual independent assessment of the performance of the following four key industrial subsectors

- food industries,
- textile industries,
- chemical industries,
- building materials industries,

in order to determine their present status, pace and pattern of growth, main constraints and strategy within the framework of the country's overall industrial strategy.

(The project's involvement was limited to the survey of the above four subsectors as part of and in pursuance of a comprehensive industrial survey which the Government was expected to undertake.)

(b) Consolidation, processing and storage of industrial information and data emanating from the industrial survey, using a computer system.

The Industrial Adviser (Project Co-ordinator) assigned to the Project by UNIDO, was entrusted with the following duties:

- review the present status and emerging trends of industrial development;

- review the progress and outputs of the industrial survey being undertaken by the Government, and in doing so, guide and co-ordinate the work of national experts assigned to the Project by UNIDO;
- identify industrial sub-sectors with higher development potential; establish development priority, and define the scope, direction and strategy for industrial development;
- advise and assist in the synthesization and integration of the industrial survey in a macro-economic frame-work;
- advise on the establishment and operation of an integrated industrial data system.

The UNIDO Project Co-ordinator, author of this Report, was expected to fulfill his duties in close co-ordination with the National Project Director assigned to the Project by the Ministry of Industry and Trade, the Co-ordinator assigned by AIDO and the four national experts assigned by UNIDO to carry out the survey and analysis of the four specific industrial subsectors.

The Project Co-ordinator arrived in Amman on 18 February 1987, whereas the four national experts took up their assignment only on 1 March 1987, by which time the Project Co-ordinator had started the initial work. The Project became fully operational on 1 March 1987 and followed the Work Plan prepared by the Project Co-ordinator in consultation with the National Project Director, the National Experts, and the UNIDO headquarters.

The first Tripartite Review Meeting (The Government, AIDO and UNIDO) for the project was held in Amman from 4 to 6 April 1987 when the progress of the project was reviewed and the scope, direction and schedule of the

remaining work and the contents of the project output, namely the sectoral and subsectoral surveys/reports, were determined. The Deputy UNDP Resident Representative in Amman also attended part of the meeting.

The second Tripartite Review Meeting for the project was held in Amman on 6 and 7 June 1987. The project outputs, namely the Industrial Survey and the four subsectoral surveys, were thoroughly reviewed and the amendments required therein agreed upon. All the three partners concerned, namely the Government, the AIDO and the UNIDO, expressed full satisfaction at the project output and appreciated the invaluable work and contributions of the international and national experts assigned to the Project.

In keeping with the agreement at the Tripartite Review Meeting, all the key elements of the survey and analysis of the four industrial subsectors are integrated in this main report, namely the Industrial Survey. The subsectoral surveys have been treated as working documents and will be printed by the Government for reference and follow-up work in conjunction with the Industrial Survey. Also, as agreed at the Tripartite Review Meeting, the Government organized a series of technical meetings attended by leading Government technical staff/specialists and the four National Experts of this project in order to thoroughly review and finalize the recommendations for the four industrial subsectors concerned. The recommendations finalized at these technical meetings, which are based on and fall in line with the original recommendations of the respective subsectoral surveys, are condensed and incorporated in this report (Industrial Survey); the main recommendations are reproduced in annex III.

The project produced the following outputs:

(a) An integrated Industrial Survey - key output of the project. The Survey brings out, in a macro-economic framework, the present structure, pace and pattern of growth, constraints and development potential of the concerned four subsectors. The pre-requisites for strengthening the structure, efficiency, viability and competitiveness of these subsectors have also been recommended.

(b) Four subsectoral surveys - namely Building Materials Industries; Chemical Industries; Food Processing Industry; and Textiles Industry - have been another output. These surveys contain an in-depth study and analysis of the four sub-sectors, together with realistic and practical recommendations for their improvement and promotion.

(c) A reliable data base.

(d) Improved knowledge and experience of a number of national officials and counterparts in industrial survey concepts, techniques and methodology.

The only output that has not been realized yet is a computerized industrial data system required for industrial planning and monitoring purposes. This output has been subjected to a long delay due to the time taken by the Government (The Ministry of Industry and Trade) to make a decision on the type of computer system best suited to the needs and tasks of the Ministry.

The inputs provided by the three project partners, namely the Government, the AIDO and UNIDO, in accordance with the stipulations in the project, consisted of the following:

(a) The Government

A senior officer of the Ministry of Industry and Trade, namely Dr. Eid Jamil Ireifidj assumed the role of National Project Co-ordinator for the project and was associated with the project on a full-time basis, providing invaluable guidance and direction to the project. The Government also provided four qualified counterpart staff, assigning one each to the four UNIDO National Experts, and also assigned one industrial statistician to assist the UNIDO Project Co-ordinator on a regular basis. All necessary secretarial assistance and logistic support and facilities were fully provided by the Government to facilitate the work of the project and the project personnel.

(b) AIDO

The AIDO input stipulated in the project, $US 75,000, has been remitted directly to the Government for expenditures on the project in accordance with the agreement between the Government and AIDO. One senior executive of AIDO, namely Mr. Muhammad Said Ali, then Director of the Global studies Dept., AIDO, was appointed the AIDO Co-ordinator for the project; he participated in the Tripartite Review Meetings and made substantial contributions in defining, reviewing the technical contents, format and output of the project, namely the Industrial Survey. AIDO also assigned its senior officer, namely Mr. Seif Eidin Elramahi, to participate in the second Tripartite Review Meeting, particularly in the technical review and finalization of the Survey.

(c) UNIDO

UNIDO's inputs to the project, originally in the amount of $US 74,000, were subsequently raised to $US 82,173, in keeping with the needs of the project. Within this budgetary framework, the following constituted the main UNIDO inputs:

(i) Project Personnel

Industrial Adviser (Project Co-ordinator), namely Mr. V. Kesner for four months;

National Experts (each for three months)

Dr. Ayed S. Amr (Food Processing Industries)
Mr. Issam Abdo Hayek (Textile Industries)
Mr. Hani Abu Hijle (Building Materials Industries)
Dr. Saleheddin A. Sayed (Chemical Industries)

The above project personnel carried out the sectoral and sub-sectoral studies and analyses and produced the project outputs, namely the Industrial Survey and the Subsectoral Surveys.

(ii) Equipment

The provision earmarked in the project budget ($US 13,000) for the procurement of a computer system to be installed in the Ministry of Industry and Trade for processing and storage of data emanating from this survey could not be delivered, pending a Government decision on the type of computer system best suited to the requirement and tasks of the Ministry.

(iii) Costs of editing and printing the Industrial Survey

Fully met from UNIDO's inputs. Additionally, UNIDO has provided for the costs of missions to Amman of one UNIDO Senior Officer to participate in the technical review and finalization of the project output.

SUMMARIZED FINDINGS AND RECOMMENDATIONS

Findings

The Government industrial policies being applied up to this date have worked very successfully. They comprise: active investment promotion; export-led industrialization based on cooperation with neighbouring and other Arab countries; import substitution stimulative measures; reduction of regional development disparities; promotion of joint ventures; and promotion of small-scale industries.

While progress has been made in industrial development and promotion, there are a number of serious constraints, mainly: low capacity utilization; high local dependence on imports; lack of intersectoral and intra-industry linkages; narrowness of the domestic market; limited exports possibilities; inadequate industrial exports incentives; low level of science and technology; insufficient labour productivity; shortages of technological manpower; lack of comprehensive feasibility studies; regional overconcentration of industrial investments; and inadequacy of integrated industrial planning capability.

Recommendations

The present Survey indicates that the favourable conditions experienced by the Jordan manufacturing sector during the past decade would no longer prevail. The changing environment calls for a new approach to development.

In this regard, the manufacturing sector should utilize more efficiently the country's abundant natural resources; increase capacity utilization, employment opportunities, capital and labour productivity; rationalize new investments; make efforts in increasing domestic exports and decreasing imports; encourage scientific research and trasfer of modern technology; strengthen inter-Arab industrial and commercial relations.

In implementing the above-summarized main long-term objectives, the recommended basic strategies could be concentrated on the export-oriented industries, carried out by the "priority industries", selected from both local resources-based and non-local resources-based industries. This requires: systematic support from science, technology and manpower; modernization and rationalization of the manufacturing structure; improved incentive systems and infrastructure; and strategic physical location.

The application of an export-oriented strategy requires the pursuit of appropriate policies (specified in chapter 8 of the Survey). The starting point for defining priority industries is the comparative advantage they offer regarding local manufacturing development, increase of self-sufficiency and stimulation of exports.

Science and technology requires research manpower, institutional arrangements, incentives and financial support. More academics should be engaged, more quality-control laboratories established, and cooperation between the industries and the corresponding scientific institutions strengthened. Such an approach would encourage the use of new technologies and the rationalization of industrial activities.

Some of the incentives are suggested in order to boost technology activities and to stimulate private-sector involvement in the field. The incentives entail financial encouragement.

Small-scale industries should also be included in the suggested modernization and rationalization of industrial activities.

The policy of geographical dispersal should be closely supported by adequate basic infrastructures. For these reasons, the regional component should be included into the indigenous overall economic planning.

The proposed institutional rearrangements include the indispensable introduction of planning and follow-up at the level of the manufacturing sector and its subsectors; elaboration of comprehensive industrial surveys; elaboration of complete and realistic feasibility studies accompanied by follow-up of project implementation; preparation of complete industrial statistical data; and avoidance of conflicting statistical information on the same economic categories published in different sources.

The recommended institutional rearrangements comprise also strengthening the capabilities of the Government in the field of planning and evaluating feasibility studies, as well as greater technical assistance from UNIDO and other UN agencies, Arab and other friendly institutions in different sectors of manufacturing development.

Finally, sectoral recommendations for food, textile, chemmical and building materials industries are summarized at the end of the Report. Details are attached to the Report and can also be found in the subsectoral final reports.

1. INTRODUCTION

Jordan has been actively and consistently pursuing an economic policy and programme which places high priority on industrial development. As a result, substantial progress has been made in industrial development over the past decade and industry has become a large and highly significant sector of the country's economy.

However, despite the remarkable development and contribution of the industrial sector during the earlier years of the decade - the starting point in projecting for 1981-1985 - its performance during the latter period declined considerably. The growth rate of the value added realised in the sector did not exceed 4.9% per year, as against a targeted rate of 17.8%. Although in the first two planned years it was above the targeted rate (29.7% and 18.7% respectively), it fell later below the average, attaining 4.3% in 1983, then 13.3% in 1984 and only 2.1% in 1985. In 1986, the implemented rate of growth was the same as in the previous year: 2.3%.

Realising that, the Government determined to reverse the trend by undertaking corrective actions and measures. It also realised that in order to precisely determine the problems and prospects of furthering industrial growth, and to generate factual industrial information and data for the formulation of a realistic industrial development plan and programme within the framework of the country's current and future Five-Year Plans, a comprehensive industrial survey was necessary. Accordingly, it launched a survey in 1984 starting with a full-fledged industrial census and selecting four key industrial subsectors - food, textiles, chemicals and building materials - to be covered by the survey. The goals and objectives of the survey comprised reviewing and updating data and information obtained by the industrial census, identifying sub-sectors with higher development potential and recommending a set of strategies, including possible investment programmes and policies, during the current five-year period.

Concerning the industrial census, early in 1986, questionnaires were distributed by the Ministry of Industry and Trade to 800 establishments with 10 and more employees; 567 answers have been collected.

But, according to the Industrial Census 1984, published by the Department of Statistics in 1986, the total number of manufacturing establishments in 1984 was 8,533 including 1,986 with five or more persons. The rest (6,847) were establishments with less than five persons.

Therefore, it was decided to use not only the Ministry's industrial census data, but also those elaborated by the Department of Statistics and so to attain more or less complete coverage of the manufacturing sector.

Moreover, some sub-sectoral statistical data for 1985 have also been used in order to update the 1984 data. For the same reasons, some 1986 data have been collected during the Project Team members' field visits and direct contacts with companies.

Originally, it was foreseen that the outputs of the present Industrial Survey would be utilised in the preparation of the Five-Year Plan 1986-1990; but the Plan was promulgated in late 1986 and the Industrial Survey was completed only in May 1987. However, although the Survey results can no longer be incorporated in the current Plan, they could still alert the authorities as to whether industrial development is on the right track or not and can be used also for any corrective measures.

The outcome of the industrial sector/subsectoral surveys is presented in this report, analyzing the overall review of the manufacturing sector and its concerned subsectors. The same has been done in the four subsectoral reports on the basis of the work and findings of the respective project team members.

2. STRUCTURAL STATUS OF THE MANUFACTURING SECTOR IN 1984

2.1. National economy and place of the manufacturing sector in it

National economy

According to the national accounts published in the Statistical Yearbook 1985, the national income and the gross domestic product were increasing at the following rates during the period 1980-1985:

Table 1. National income and gross domestic product during 1980-1985

JD million

Year	National Income value	index	GDP at market prices value	index
1980	1190.1	100.0	984.3	100.0
1981	1482.7	124.6	1164.2	118.3
1982	1674.2	140.7	1321.2	134.2
1983	1770.3	143.1	1422.7	144.5
1984	1843.3	154.9	1490.0	151.4
1985	1864.0	156.6	1589.0	161.4

The table shows that the national income grew slower than the gross domestic product at market prices. This is due to the gross domestic product at factor costs which grew slower than that at market prices.

The other two factors influencing the growth of the gross national income and gross domestic product are

depreciation and net indirect taxes: both were 144.1 % and 137.1% respectively higher, or more than double in 1985 as compared with 1980.

Due to such high rates of growth, accompanied by a moderate growth of the gross domestic product at factor cost - only 48.3% in 1985 as compared with 1980 - the gross national income increased by 56.6% and the gross domestic product at market prices by 61.4%.

Place of the manufacturing sector

The industrial origin of the gross domestic product at market prices in 1984 is shown in the next table:

Table 2. Gross domestic product by sectors in 1984

JD million

Economic sectors	Value	Structure in %
Gross domestic product	1490.0	100.0
Out of which :		
- Agriculture	95.8	6.4
- Mining and quarrying	56.8	3.8
- Manufacturing	166.4	11.3
- Electricity and water	32.4	2.2
- Construction	127.0	8.5
- Trade	241.5	16.2
- Transport	143.5	9.6
- Finance	144.5	9.7
- Social services	36.3	2.4
- Other a/	445.8	29.9

a/ Includes Government services, non-profit establishments, household services and indirect taxes.

The table shows that the manufacturing sector, with the share of 11.3% of the total gross domestic product, is placed on the top when compared with the other four productive sectors (agriculture, mining and quarrying, electricity and water and construction) or it is on the second place, that is, just after trade, when compared with all nine economic sectors.

The picture is more expressive when analysing employment in 1984. Almost three quarters (more exactly 73.3%) of the total productive sectors' (agriculture excluded) employment concern the manufacturing sector, whereas electricity and water engaged only 11.3% and construction 15%.

The two above-mentioned indicators confirm the well-known fact that manufacturing plays an important part in Jordan's economy. Namely, during recent years the Jordanian Government has placed a high priority on development of the industrial sector. Consequently, expansion of phosphate mining and trading activities; establishment of chemical industries based on phosphate and potash ores; increase of cement production, and establishing processing industries are some of the activities that have contributed significantly to the predominant role of the manufacturing sector within the national economy.

However, a comparison between the actual growth rates in the various economic sectors and those envisaged by the Five-Year Plan 1981-1985 shows that the actual annual rates fell short of projections, including t at of the manufacturing sector.

On the other hand, the achieved growth rate was only 4.9%, instead of the planned 17.8%, or a quarter approximately of

the planned one. Serious drops were also registered in other sectors being more or less on the same level as manufacturing, like trade (4.3 %) and transport and communication (5.0%). Some others were even lower, like construction (2.1%) and public administration and defense (2.2%). Only for agriculture as well as electricity and water were actual annual growth rates higher than those for manufacturing: 7.0% and 9.6% respectively.

The shortfall is attributed to the under-utilization of the productive capacities of a number of new industries as well as to competition by imports and lack of expertise in external marketing of domestically manufactured goods.

2.2. Definition of the manufacturing sector for the purposes of the Industrial Survey

The manufacturing sector treated in this survey comprises industrial activities covered under the ISIC code numbers 2 (mining and quarrying) and 3 (manufacturing), thus meaning the approach applied in the Industrial Census published by the Department of Statistics in December 1986.

Mining and quarrying is included because of phosphates production which is one of the predominant economic activities in the country and because phosphates are indispensable raw materials for various chemical industries.

The manufacturing sector, defined in this way, is divided into two groups.

The first group, stipulated by the Project document, comprises four key subsectors with nine sub-subsectors. They are:

- food industries
  - food manufacturing
  - beverages
  - tobacco
- textile industries
  - textiles
  - clothing
- chemical industries
  - chemicals and chemical products
  - petroleum refining
  - plastics and plastic products
- building materials industries.

The second group, denominated according to the Industrial Census 1984 as "other kind of industry", includes mining and quarrying as well as all the other manufacturing subsectors. Some information and findings on this group, especially on metal-working and electrical industries, are registered in the next paragraphs of the Survey, as requested by the Tripartite Project Review meeting held from 4 through 6 April 1987.

On this occasion it will be advantageous to recall that the current Five-Year Plan 1986-1990 foresees the elaboration of an updated Industrial Survey. It is recommended not only to update the actual Survey, but also to elaborate a comprehensive industrial survey covering all the mining and manufacturing subsectors. So, it would provide data and information necessary for the evaluation of

the current Five-Year Plan and the formulation of the fourth Five-Year Plan 1991-1995.

Justification for selecting four subsectors

The four manufacturing subsectors specified in the previous section were selected for the elaboration of the Industrial Survey because they play a key role in the manufacturing activities of the country, as is evident when analysing their share in the gross output and value added of the total manufacturing sector.

In 1984, the total manufacturing gross output and value added of establishments with 5 and more employees amounted to JD 959.0 and 268.8 million respectively. The four selected subsectors shared in the totals in the following way (based on Table 4 in annex I):

Table 3. Share of four selected subsectors in total manufacturing gross output and value added

	Gross output	Value added
	in %	
- food industries	13.0	20.2
food manufacturing	7.0	5.9
beverages	1.7	3.0
cigarettes and tobacco	4.3	11.3
- textile industries	2.4	3.3
textiles	1.3	1.8
clothing	1.1	1.5
- chemical industries	45.2	19.9
chemicals & chemical products	16.1	7.6
petroleum refining	27.2	10.2
plastics & plastic products	1.9	2.1
- building materials industries	8.9	16.1
Total	69.5	59.5

This means that four selected subsectors represent about two thirds of the gross output, whereas their share in the value added is a little lower. The high percentage was one of the criteria when selecting industries for the elaboration of the Survey.

In the group "other kinds of industry", the shares in the gross output and value added are (based on Table 4 in annex I):

Table 4. Share of "other kinds of industry" in the total manufacturing gross output and value added

	Gross output in %	Value added in %
- leather industries	0.6	0.9
- furniture and wood industries	2.2	1.1
- paper and paper products	1.4	1.3
- printing and publishing	1.3	1.9
- metal-working industries	5.7	4.8
- electrical industries	6.3	7.8
Total	17.5	17.8

It is obvious that the relative importance belongs also to the other manufacturing activities, in particular to the metal-working and electrical industries.

Also, when elaborating the next industrial survey one should not neglect mining and quarrying because of their close linkage with other industrial activities and high importance in the national economy. After all, the share of this kind of industry in the total gross output and value added is 10.8% and 19.1% respectively.

So, the summarized shares of three manufacturing groups in the total manufacturing gross output and value added are the following:

- four selected subsectors	69.5%	and	59.5%	respectively,
- other kinds of industry	17.5%	"	17.8%	"
- mining and quarrying	10.8%	"	19.1%	"
total	97.8%	"	96.4%	"

The difference to 100% includes the so-called industrial services, totaling 212 establishments (in 1984).

The other criteria justifying selection of the four subsectors were: high share in total manufacturing employment; relatively high self-sufficiency in raw materials; and production for local consumption. Their share in total manufacturing employment is the following (based on Table 13 in annex I):

Table 5. Share of four selected subsectors in total manufacturing employment, establishments with 5 and more persons

	Number of employees	%
Total manufacturing sector	41873	100.0
Out of which :		
- Food industries	6094	14.5
food manufacturing	4498	10.7
beverages	866	2.1
cigarettes and tobacco	730	1.7
- Textile industries	2726	6.5
textiles	1006	2.4
clothing	1724	4.1

- Chemical industries	7460	17.8
chemicals and chemical products	3388	8.1
petroleum refining	2615	6.2
plastics and plastic products	1457	3.5
- Building materials industries	4754	11.4
Total	21034	50.2

Thus, half of the employees in manufacturing establishments with 5 and more persons work in the four selected subsectors and their sub-subsectors.

Finally, the criteria concerning some specific production characteristics are:

- production based preponderantly on local sources is typical for chemical and building materials industries;
- production designed preponderantly for the local market is attributed to the food and textile industries.

It is necessary to underline, in conclusion, that the above-elaborated criteria seem convincing in selecting the four subsectors for in-depth evaluation, although the elaboration of an overall industrial survey is indispensable in any case.

2.3. Grouping and geographical distribution of establishments

Grouping of establishments

According to the Department of Statistics, the manufacturing sector, presented in the Industrial Survey 1984, is divided into two groups: establishments with 5 and more employees and establishments with less than 5 employees.

The first group includes 1,686 establishments with 41,873 employees (see annex I) and the second group 6,847 establishments and 14,978 employees. So the total number of manufacturing establishments is 8,533 and the total number of employees 56,851. Consequently, the establishments with 5 and more employees represent 19.8% measured by number of establishments and 73.7% measured by number of employees, and the establishments with less than 5 employees 80.2% and 26.3% respectively of the total manufacturing sector.

The percentages show that the first group covers one fifth of the total manufacturing sector, with three quarter of employees, and the second group is composed by a large number of establishments (four fifths) with only a quarter of employees. The consequence is 25 persons as the average employment per establishment with 5 and more workers and only 2 persons in the establishments with less than 5 persons.

Furthermore, in 1984 the first group of establishments had generated JD 959.0 million of gross output and 268.8 million of value added, or 95.6% and 92.6% respectively; and the strikingly low difference of 4.2% and 7.8% only is attributed to the second group, with less than 5 persons.

For these reasons, it has been decided, when recording statistical data, to give more attention to the first group of establishments, with 5 persons and more, having in mind, too, that the data concerning production and inputs on quantities, capacities, exports, sources of investment financing and employment by nationalities are

given in the Industrial Survey Questionnaires of the Ministry of Industry and Trade, which means only for establishments with 10 and more employees.

Consequently it would be better to divide in the future the actual manufacturing sector into 5 groups:

- establishments with less than 5 employees covering industrial services, craft and traditional cottage industries
- small-scale industries with 5-10 employees
- medium-scale industries with 10-50 employees
- large-scale industries with 50-200 employees
- largest industries with more than 200 employees (only petroleum refining).

For the next industrial survey, it would be sufficient to concentrate on industries with 5 and more employees only.

This approach is recommended for the overall analysis. However, it could be modified and establishments with less than 5 persons also analysed when the number of these establishments is significant as compared with the total subsectoral number. They are:

- food industries with 412 establishments or 57% of the total subsector,
- clothing industries with 611 establishments or 84% of the total subsector,
- wood industries with 967 establishments or 88% of the total subsector,

- building materials industries with 600 establishments or 71% of the total subsector,
- non-electr. machinery industries with 1,045 establishments or 83% of the total subsector.

In any case, it cannot be neglected that small-scale industries all over the world play a vital role in the economy. This is particularly the case in Jordan, where demand constraints restrict the size of a unit.

Therefore, a comprehensive plan for the promotion and development of the small-scale industries is expected to be formulated by the Government, including technical and managerial assistance; assistance in testing raw materials and finished products; training facilities; preferential purchase by the Government when the quality of the products is acceptable; and special customs duties when small-scale establishments offer gradual substitution of imported goods by local products.

Geographical distribution of establishments

According to Table 18 in annex I, about 3/4 of manufacturing establishments with 5 and more persons, measured by their number and number of employees, are located in the Amman governorate: more exactly 73.8% of establishments and 71.0% of employees. Also concerning establishments with less than 5 persons in the Amman governorate, there are 69.1% establishments and 70.6% of employees. It is similar to the Egyptian industries, 75 per cent of which are located at Cairo and Alexandria.

The second Jordanian industrial area is Irbid governorate where the number of establishments amounts to 20% of the total, approximately.

The remaining 10% is distributed among three other governorates: Balqa', Karak and Ma'an.

The concentration of industries in the Amman area is even higher when it is a question of the medium- and large-scale industries' geographical distribution: 567 establishments with 10 and more employees. According to the Ministry of Industry and Trade, the distribution is the following:

- Amman (including new governorates Zarka and Mafraq)	90.2 %
- Irbid	2.6 %
- Balqa'	6.2 %
- Karak	0.3 %
- Ma'an	0.7 %

In Zarka and Mafraq there are 91 establishments or 16.1%; thus, in the Amman governorate (defined after the recent reorganization) the concentration is 74.1%, or three quarters of the medium-and large-scale industries are concentrated in it.

The high concentration of industries in Amman area has created many problems typical of contemporary life, including environment pollution, transport bottlenecks, infrastructure shortcomings and similar. For such a situation, it appears that the present system of Jordanian planning should be completed with the regional component

having in mind the rapid urbanization of Amman accompanied by intensive industrial concentration. The policy of dispersed growth would prevent the social drawbacks of concentrated industrial growth.

The establishment of new industrial zones is one form of modern urbanization pattern, as well as growth poles based on local endowment factors. The urban development and planning services could take determined action in this sense by proposing comprehensive schemes and programmes.

2.4. Production analysis by subsector

Production in terms of quantities

The available physical output statistics show that all four selected subsectors are directed mainly to the production of consumer goods. Some sub-subsectors are also engaged in production of intermediates such as cotton and cotton-blended yarns, woollen worsted fabrics, polymer intermediates, oxygen and acetylene gases, chlorine, caustic soda, hydrochlorid acid, and phosphoric acid.

Production by the four subsectors and their sub-subsectors, in terms of volume, is registered as follows (see Table 6 in annex I):

- Food industries
  - dairy products, fruits and vegetables, oils and fats, grain-mill products, bakery and biscuits, sugar, chocolate

and other food products (jelly, spices, ready-to-eat meals) animal feeds and cigarettes (tons)	893 410
- liquors, beer, soft drinks and mineral water (litres)	113 059 000
- Textile industries	
- cotton and cotton blended yarn, woollen worsted fabrics, school-boys' and girls' uniform fabrics, wool mixed and acrylic blankets, head dresses, towels and bed sheets, under- and outwear, wool, acrylic and pray carpets (tons)	3 487
- socks (dozen)	108 000
- wearing apparel (pieces)	3 778 000
- Chemical industries	
- petroleum products (tons)	2 581 000
- acetylene, chlorine, caustic soda, hydrochloric acid, polymer and intermediates, diammonium phosphate, phosphoric acid, aluminium fluoride, paints, thinners, wall pastes, detergents and toilet soap, rubber plastic pipes and bags, plastic containers, houseware goods, brushes and mattresses (tons)	680 269

- human and veterinary drugs (units)	100 000 000
- paste detergents (boxes)	47 216
- gas oxygen (m3)	860 000
- pesticides (tons)	50 000
- matches (boxes)	500 000 000
- ball pens (units)	3 900 000
- mattresses (m2)	81 984
- Building materials industries	
- portland cement (tons)	1 880 351
- pottery, earthenware, glass sheets and glass products and ready mix concrete (tons)	152 890
- china and cement tiles (m2)	2 772 764
- cement blocks and concrete poles (pieces)	2 780 106

The above data show that profiles of food and associated industries and also chemical industries are more diverse than textile industries and building materials industries. Classified according to the ISIC, food industries have 18 and chemical industries 12 sub-subsectors, whereas the textile industries have 6 and building materials industries only 5.

Capacity utilization

Capacity utilization in 1984, shown in the table below, has been calculated on the base of the installed capacities and production data in terms of volume for main commodities.

Table 6. Installed capacities, production and capacity utilization, 1984

	Unit	Installed capacity	Production	Capacity utilization
Food industries				
- Dairy products	tons	51500	30926	60.1
- Fruits & vegetables	"	10400	7295	70.1
- Oils & fats	"	6340	1902	30.0
- Grain mill products	"	419550	352424	84.0
- Bakery & biscuits	"	785120	471073	60.0
- Sugar products	"	930	491	52.8
- Chocolate products	"	21950	10661	48.6
- Other foods a/	"	1484	772	52.0
- Animal feeds	"	285300	128389	45.0
- Liquors	000 litres	6290	2553	40.6
- Beer	"	12500	5021	40.2
- Soft drinks & mineral water	"	162280	105485	65.0
- Cigarettes	tons	7200	5027	69.8
Textile industries				
- Cotton & cotton-blended yarn	tons	2000	1862	93.1
- Woollen worsted fabrics	"	600	516	86.0
- Schoolboys' & girls' uniform fabrics	"	570	179	31.4

- Wool mixed blankets	tons	185	48	26.0
- Acrylic blankets	"	140	54	38.6
- Head dresses	"	35	18	51.4
- Towels & bed sheets	"	80	54	67.5
- Under- & outwear	"	940	674	71.7
- Socks	dozen	162000	108000	66.7
- Wool carpets	tons	115	27	23.5
- Acrylic carpets	"	75	13	17.3
- Pray carpet	"	45	42	93.3
- Wearing apparel	000 pieces	5038	3778	75.0
Chemical industries				
- Gases: - oxygen	m3	2000000	260000	13.0
- acetylene	tons	200	75	37.5
- Chlorine, caustic soda & hydrochl. acid	"	12000	7500	62.5
- Polymer inter-mediates	"	13000	4975	38.3
- Pesticides	litres	125000	50000	40.0
- Diammonium phosphate	tons	550000	548417	99.7
- Phosphoric acid	"	32000	31320	99.9
- Aluminium fluoride	"	10000	2300	23.0
- Paints	"	25000	14100	56.4
- Thinners	"	1000	676	67.6
- Wall pastes	"	2500	868	34.7
- Human drugs - Veterinary drugs	000 units	160000	100000	62.5
- Detergents	tons	45000	33056	73.5
- Paste detergents	boxes	47300	47216	99.8
- Toilet soap	tons	5000	772	15.4
- Matches	000 boxes	1000000	500000	50.0
- Petroleum refined products	tons	5000000	2581000	51.6

- Rubber	tons	150	52.5	35.0
- Plastic pipes	"	9000	5089	56.5
- Plastic bags	"	7500	4997	66.6
- Plastic containers	"	9500	6275	66.1
- Polystyrene boxes	"	6000	1625	27.1
- Agriculture plastic houses	units	3000	1988	66.3
- Ball pens	mill.pens	4	3.9	97.5
- Houseware goods	tons	16250	8059	49.6
- Brushes	"	2200	1113	50.6
- Mattresses	m2	240000	81984	34.2
Building materials				
- Pottery	tons	8100	3240	40.0
- China tiles	m2	380000	378200	99.5
- Earthenware	tons	1800	1649	91.6
- Glass sheets	"	26000	2616	10.1
- Glass products	"	1500	915	61.0
- Portland cement	"	2000000	1 880351	94.0
- Cement tiles	m2	4350000	2 394564	55.0
- Cement blocks	pieces	9234000	2 770286	30.0
- Concrete poles	"	10000	9820	98.2
- Concrete pipes	metres	536000	375168	70.0
- Ready mix concrete	tons	352000	144470	41.0

Source : Industrial Survey Questionnaires 1984 - Ministry of Industry and Trade as well as companies' year-books and information.

a/ Includes food products according to ISIC No.3221 such as jelly, spices, ready-to-eat meals, citric acid, etc.

According to these statistics, the average capacity utilization of the four selected subsectors in 1984 was 57.4%. Higher than average was building materials industries (62.8%); on average was textile industries (57.0%); and below average were food (55.2%) and chemical industries (54.6%).

The analysis by commodities points out that the capacity utilization of some production lines was at the optimum level or even above it:

	%
- fruits and vegetables	70.1
- grain and mill products	84.0
- cotton and cotton-blended yarn	93.1
- woollen worsted fabrics	86.0
- under- and outwear	71.7
- pray carpets	93.3
- wearing apparel	75.0
- diammonium phosphate	99.7
- phosphoric acid	99.9
- detergents	73.5
- paste detergents	99.8
- ball pens	97.5
- china tiles	99.5
- earthenware	91.6
- concrete poles	98.2
- concrete pipes	70.0

As is obvious, the majority of them realised even the maximum capacity utilization. It is also worth mentioning that the phosphates capacity utilization was 97.1% (installed capacity 6300 and production 6120 thousand tons), whereas that for potash production

was only 44.5% (capacity 1100 and production 490 thousands tons).

Inadmissibly low capacity utilization was registered in the following industries:

	%
- oils and fats	30.0
- schoolboys' and girls' uniforms	31.0
- wool carpets	23.5
- acrylic carpets	17.3
- aluminium fluorite	23.0
- wall pastes	34.7
- plasticizers	24.0
- toilet soap	15.4
- rubber	35.0
- polystyrene boxes	27.1
- matresses	34.2
- glass sheets	10.1
- cement blocks	30.0

The reasons for such a situation should be examined carefully and adequate measures urgently recommended, not only for industries with very low capacity utilization but also for those between the optimum and very low rates. The analysis should be extended to 1985 and 1986, if possible, in order to see the progress, to define issues and constraints, and to recommend measures for improving the recorded situation. But, according to the preliminary findings, the main reasons for the underutilization of productive capacities are, among other things, marketing difficulties.

Recession has caused a decrease in the purchasing power of the consumer, which has reflected directly on the food industries' different subsectors. Most of the industries in question were established during the economic boom years of the late seventies and early eighties. Their installed capacities were designed for export, but new conditions have caused lack of solvency by some exports markets. Another factor is the inability of local producers to meet high quality standards requested by the Jordanian consumer and offered by many food imports.

Also, blanket production had to be decreased due to the blankets imported at very low prices. Or, local demand is stronger for acrylic blankets and carpets than for expensive wool blankets and carpets.

The petroleum refinery production registered a decrease in 1985 which has one positive aspect as it reduced crude oil imports; but it also caused a decline in capacity utilization. It should also be noted that toilet soap production registered low capacity in 1985 and 1986, which could be a result of originally too-large capacity installations coupled with exporting problems. The production of polystyrene boxes had to be adapted to local demand and was seriously influenced by imports.

On the other hand, some industries, which started production just in the course of 1984 - e.g. acrylic carpets, aluminium fluoride, plastisizers and glass sheets - are only at the trial phase of manufacturing.

Intra-industry output structure of four selected subsectors

According to Table 4 in annex I, three main components of the selected subsectors and their sub-subsectors - gross output, intermediate consumption and value added - participate in the total manufacturing sector (establishments with 5 and more employees) as follows:

Table 7. Share of subsectoral gross output, intermediate consumption and value added in the total manufacturing sector

- in %

Subsector	Gross output	Intermediate consumption	Value added
- Food industries	13.1	10.0	21.2
Food manufacturing	6.8	7.3	5.7
Beverages	1.8	1.2	3.3
Cigarettes & tobacco	4.5	1.5	12.2
- Textile industries	2.3	2.0	2.9
Textiles	1.3	1.1	1.8
Clothing	1.0	0.9	1.1
- Chemical industries	47.2	57.2	21.5
Chemicals & chemical products	16.8	20.2	8.2
Petroleum refining	28.4	35.1	11.1
Plastics and plastic products	2.0	1.9	2.2
- Building materials industries	8.6	5.5	16.5
- Subtotal	71.2	74.7	62.1
- Other kinds of industries	28.8	25.3	37.9
- Total manufacturing sector	100.0	100.0	100.0

The table shows that three main components participate in the total manufacturing sector with 71.2%, 74.7% and 62.1% respectively, thus confirming their relative import-

ance when speaking about the subsectoral structure of the manufacturing sector. This also was one of the reasons when selecting the four subsectors to be analysed in the Survey.

Due to petroleum refining, chemicals and chemical products, the chemical industries are on top, participating with 47.2% of the total manufacturing gross output, 57.2% of the total intermediate consumption and 21.5% of the total value added. The second place belongs to the food industries (13.1%, 10.0% and 21.2%) the third place to the building materials (8.6%, 5.5% and 16.5%) and the fourth place to the textile industries (2.3%, 2.0% and 2.9%).

It is worth mentioning that the other kinds of industries' shares are 28.8%, 25.3% and 37.9% respectively or between a fourth and a third of the total manufacturing gross output, intermediate consumption and value added.

It is also interesting to analyse the horizontal share of the intermediate consumption and value added in the gross output per subsectors and sub-subsectors. It is shown in the next table :

Table 8. Share of the intermediate consumption and value added in the gross output by subsectors and sub-subsectors

-in %

Subsector	Gross output	Intermediate consumption	Value added
- Food industries	100.0	54.6	45.4
Food manufacturing	100.0	76.3	23.7
Beverages	100.0	48.8	51.2
Cigarettes & tobacco	100.0	24.4	75.6

- Textile industries	100.0	64.2	35.8
Textiles	100.0	61.9	38.1
Clothing	100.0	66.3	33.7
- Chemical industries	100.0	87.3	12.7
Chemicals and chemical products	100.0	86.2	13.8
Petroleum refining	100.0	89.2	10.8
Plastics and plastic products	100.0	69.1	30.9
- Building materials industries	100.0	46.2	53.8
- Subtotal	100.0	75.6	24.4
- Other kinds of industries	100.0	63.1	36.9
- Total manufacturing sector	100.0	72.0	28.0

As it can be seen, two main economic components - intermediate consumption and value added - participate in the total manufacturing sector (establishments with 5 and more employees) with 72.0% and 28.0% respectively, thus coming close to the international average standards.

For illustration, these correlations in some selected foreign factories are :

- France : cotton yarns production 70.5 : 29.5
- India : worsted yarns and fabrics 82.7 : 17.3
- India : concentrated super-phosphate 87.[illegible] : 12.1
- Japan : underwear 74.5 : 25.5
- Middle Europe : concrete products 55.4 : 44.6
- Yugoslavia : flour and flour products 69.6 : 30.4

At a glance, it is obvious that there are two groups of sub-subsectors: those with higher and the others with lower than average value added share in the gross output.

The first group consists of beverages, cigarettes and tobacco, textiles, clothing, plastic products and building materials. Only chemical products and petroleum enter into the second group, whereas the food manufacturing is more or less on an average.

The preliminary impression is that total current expenditures concerning intermediate consumption are in some cases very high, especially in petroleum refining (89.2%) as well as in chemicals and chemical products (86.2%), whereas in other sub-subsectors total intermediate costs are very low, particularly in cigarettes and tobacco (24.4%), building materials (46.2%) and beverages (48.8%).

One of the reasons for a high intermediate consumption and consequently low value added consists in purchasing imported raw materials and semi-finished products. More information on this is given in the next section, but regardless of it, a detailed study of all input components should be done carefully including electricity, water, fuel, spare parts, transport, and other production costs as well as policy regarding legal charges, rent, interest on loans, currency exchange and other financial, administrative and miscellaneous charges. The final output of such a study will evolve realistic recommendations on measures to increase the profitability of selected subsectors and their sub-subsectors.

Structural composition of value added

Main components of the total value added are : compensation of employees, depreciation and operating surplus. They take part in the total value added of each subsector (i.e. food, textile, chemical and building materials industries) in the following way (calculations based on data given in Table 3 of annex I):

- compensation of employees	32.0%
- depreciation	22.7%
- operating surplus	40.2%

The rest (5,1%) concerns indirect taxes assessed on producers in respect of the production, sale, purchase or use of goods and services, which they charge to the production costs. It includes import duties, production fees and sales taxes. In other words, the share of indirect taxes in the value added does not depend in principle on the companies' decisions but on the economic policy makers.

The other three items reflect more or less the in-house policy of the producers. In 1984 one third (32%) of the total value added was appropriated to the compensation of employees, including wages and salaries, bonuses, cost of living allowances and fees to members of boards of directors, before deducation of income and other taxes.

The depreciation ratio amounts to about 1/5 (22.7%) of the value added. It seems to have been increased in order to generate more money for new investments and for replacement of obsolete fixed assets for the reasons being explained in one of the next sections concerning the value of fixed assets and depreciation policy.

Among all three analysed items the highest share (40.2%) concerns operating surplus. Having in mind a reasonable and long-term entrepreneurial policy it might be advisible to decrease such a high share in favour of depreciation and thus contribute to the modernization of the Jordanian manufacturing sector.

In analysing the situation by sub-subsectors it has been observed that higher compensation of employees than the average has been registered by food industries, clothing, chemicals and plastics. Among them, cigarettes production and beverages are on the top. On the average are textiles and building materials and considerably below the average is petroleum refining.

The comparative sub-subsectoral analysis of depreciation and operating surplus demonstrates that for instance textiles, clothing and petroleum refining industries have appropriated very low part of value added to the depreciation funds and a high part to the operating surplus. The case is tobacco and cigarettes industry attributing major part of the value added (JD 2.3 million) to the compensation of employees and only JD 0.7 million to the depreciation and operating surplus. However, it should also be mentioned that the indirect taxes of tobacco and cigarettes industries have ammounted to JD 29.8 million or 90.6% of total value added. So, the remaining funds have been used for compensation of employees first of all, and the balance for depreciation and operating surplus.

Dependence of production on imports

The dependence of the manufacture of some selected commodities on imports of raw materials, intermediates and

semi-finished products is shown in table 8 of annex I. According to it, the manufacturing demand is 100% covered by local sources in the following cases:

- Food industries :
  - tomatoe manufacturing
  - olive oil pressing
- Chemical industries :
  - phosphates
  - potash
  - gas oxygen
- Building materials :
  - portland cement
  - cement blocks
  - concrete pipes
  - ready mix concrete.

All the other sub-subsectors depend on imports. Among them, 100% dependence is registered by :

- Food industries :
  - canned chick peas and beans
  - beer
  - fruit drinks
- Textile industries :
  - cotton and cotton blended yarn
  - head dresses
  - towels and bed sheets
  - socks
  - all kinds of carpets
- Chemical industries :
  - wall pastes
  - pharmaceutical products

detergents
matches
petroleum refined products
plastic bags
polystyrene boxes
ball pens
mattresses

In other words, most products of the food-processing industry, including beverages, cigarettes and tobacco, depend preponderantly, and textile and chemical industries almost totally on imported inputs. At the same time phosphates, potash, gas oxygen and the entire building materials industries' demand is covered by local sources.

Such a kind of self-sufficiency should be promoted in the other manufacturing acitivities, especially in the field of food-processing where a better co-ordination with agricultural activities could be implemented in the near future.

The same should be pursued with regard to the local production of cotton and local use of sheep wool in order to lessen imports necessary for the production of adequate textiles. The eventual use of local textiles in producing head dresses could also be investigated.

Special attention should be paid to the chemical industries because of the abundance of some domestic natural resources, like vast phosphate rock deposits and the Dead Sea chemical components. Also detailed study should be undertaken on the exploitation and manufacturing of some minerals, whose existence has already been proven,

such as iron, lead sulphide, tin, granite, pyrite, molybdenum and decorative marble rocks.

Moreover, some other natural mineral resources such as phosphate deposits, building materials, and potash brines from the Dead Sea are not being fully utilized. The same is true for the uranium extracted from the phosphoric acid.

Production and exports

Table 9, given in annex I, presents the list of some selected commodities production and exports in terms of value. The summarized data are given in the table below.

Table 9. Production and exports of four selected subsectors in 1984

JD thousand

Subsector	Production	Exports	Exports / Production %
Food industries	125 795	16 549	13.2
Textile industries	19 648	11 210	57.1
Chemical industries	430 757	157 340	36.5
Building materials industries	55 304	3 433	6.2
Total	631 504	188 532	29.9

Out of total exports valued at JD 188.5 million, 83.4% concern exports of chemical industries including phosphates and potash. All the other sub-sectoral exports are related to food industries (8.8%), textiles (6.0%) and building materials industries (1.8%).

When analysing the exports by product, it is understood that the chemical industries have exported in 1984 about one third of the production value, due to the exports of phosphates, potash, phosphoric acid, pharmaceuticals, detergents, matches, plastic containers, agriculture plastic houses and household goods.

The second group of exports concerns textile industries with more than half of their production exported, presented in terms of value. However, out of 13 selected commodities only three items - cotton yarn, woollen worsted fabrics and wearing apparel have been exported.

The food industries have exported only 13.2% of their production, out of which the significant exports refer to animal feeds and cigarettes.

Finally, building materials industries are oriented almost entirely to the domestic market. The exception is only Portland cement and cement tiles whose exports have amounted to 5.1% and 15.9% respectively.

In total the value of JD 188.5 million exported goods presents only 39.9% of the total JD 631.5 million produced commodities. It means that the nine analysed sub-subsectors are oriented preponderantly to cover local demand, except some chemical industries that are significantly export-oriented.

The principal markets for Jordanian exports lie in the neighbouring Arab States especially Iraq, Saudi Arabia and Syrian Arab Republic. Other countries like socialist countries of Eastern Europe, India, Japan and partially the European Community are mainly importers of Jordanian phosphates.

The common characteristic of the analized subsectors with regard to production and export is that food, textiles and building materials industries cater mainly for the domestic market, whereas the chemical industries production is predominantly export oriented. Concerning the value of exports (phosphates and potash excluded), this was very low in 1984 and production highly dependent on imports as it was underlined in the preceding section.

2.5. Fixed assets, depreciation, investments and paid-up capital

Value of fixed assets and depreciation

Structural value of fixed assets is given in Table 12 of annex I as well as the depreciation.

The value of the fixed assets of the four subsectors 1/ is JD 618.1 million or 56.3% of the total.

The highest concentration of fixed assets is ascribed to building materials (37.8%), chemicals and chemical products (27.4%) and petroleum refining (19.5%) or more than 4/5 of the sub-subsectoral total. However, it does not mean that all the three sub-subsectors are capital intensive industries. Such an attribute can be assigned only to the petroleum refining, chemical fertilizers, aluminium fluoride production, potash extraction and processing and cement production. The other industries can be denoted as small or medium-scale labour-intensive industries.

1/ Food, textile, chemical and building materials industries comprising nine sub-subsectors as specified in the previous paragraphs.

The rest of 43.7% or JD 480.4 million is related to the so-called other kinds of industry including mining and quarrying, metal-working and electrical industries, showing the relative importance of these three sub-sectors in the total manufacturing sector.

According to the depreciation rates, the average lifetime in the four selected subsectors is 16 years, whereas the span for all nine sub-subsectors is 12-24 years. Compared with some international standards the situation is as follows

	Standard life	Selected sub-subsectors
food manufacturing	12	14.5
chemicals	11	13
plastic products	11	13.5
petroleum refining	16	13
building materials (stone & clay products)	15	24

It is obvious that the lifetime in all selected sub-subsectors, except petroleum refining, is higher than the international standards. In short, it should be recommended to increase the depreciation rates in a selective way for some sub-subsectors and/or for some capital goods such as machineries and equipment in order to assure faster modernisation of existing establishments.

Investments and sources of financing

During the past Five-Year Plan period 1981-1985 the total value of actual investments amounted to JD 599 million or, on average, JD 119.8 million per year, compared to JD 759

million (JD 152 million per year) anticipated by the Plan, i.e., the performance rate was 79% of the Plan target. However, this relatively high realisation ratio did not truely reflect actual physical achievement in the implementation of industrial projects because an increase in prices led to a rise in investment costs for certain projects and consequently an unsatisfactory implementation and the inability of certain major industries, such as fertilizers and potash, to attain capacity targets on time.

In actual terms, public sector investments have amounted to JD 59 million as against JD 42 million envisaged by the Plan, whereas private and mixed sector investments totalled JD 540 million compared to a targeted JD 717 million.

In such a situation total manufacturing investments in 1984 have come to JD 52.8 million (table 10 in annex I) or close to the implemented five-year average. Out of it JD 18.1 million or 34.4% of the total is attributed to investments in the four selected subsectors.

The difference of 65.6% is related to the other industries, the same phenomenon as with the fixed assets.

The structure of investments is given in the following table (for details see table 10 in annex I):

Table 10. Structure of investments

- in %

Subsector	Land	Buildings & Constr.	Machin. & Equip.	Transp. vehicles	Others	Total
- Food industries	-	16.7	49.6	8.8	24.9	100.0
Food manufacturing	-	0.8	76.6	1.1	21.5	100.0
Beverages	-	21.2	32.1	15.0	31.7	100.0
Cigarettes and tobacco	-	69.5	18.1	10.9	1.5	100.0
- Textile industries	-	0.4	65.5	8.8	25.1	100.0
Textiles	-	0.2	62.8	7.6	29.4	100.0
Clothing	-	1.5	73.9	12.3	12.3	100.0
- Chemical industries	1.2	20.9	58.8	5.8	13.3	100.0
Chemicals and chemical products	-	25.6	62.2	2.6	9.6	100.0
Petroleum refining	-	12.8	39.8	24.0	23.4	100.0
Plastics and plastic products	7.8	7.1	60.9	3.6	20.6	100.0
- Building materials industries	3.5	11.0	37.1	13.9	34.5	100.0
- Subtotal	1.9	15.7	48.8	9.6	24.0	100.0
- Other kinds of industries	0.6	11.6	31.7	1.8	54.3	100.0
- Total manufacturing sector	1.1	13.0	37.6	4.5	43.8	100.0

The analysis of four selected subsectors (see subtotal) shows that out of JD 18.1 million, 48.8% was alloted to the machinery and equipment, 15.7% to the buildings and construction and 9.6% to the transport.

Practically no money, except JD 86000 for plastic industries and JD 251000 for building materials industries, was spent for buying land. Consequently, the actual in-

vestments were directed to the expansion of existing and not the errection of new industrial projects.

When it is a question of subsectors and their sub- sub-sectors the highest share is due to the building materials industries (39.1%) and to the chemical industries (28.5%) of the subsectoral total). The rest of 32.4% includes other industries such as food and textile industries, petroleum refining, plastics and plastic products.

Relatively high are the so-called other expenditures: 24.0% of the total subsectoral investments. They include purchase of furniture and fixtures, small tools and other assets. They seem extraordinarily high in building materials industries, requiring a separate and detailed analysis.

When it is a question of sources of financing, private and public sectors have a share in the selected subsectors' total investment of 67.9% and 26.3% respectively, the latter being concentrated on the large-scale capital intensive projects and the former on all other industrial projects, especially those small- and medium-scale industries manufacturing consumer goods and some intermediates.

The rest of 5.8% includes private institutions and societies as well as foreign investments.

All in all, the private sector's role in the manufacturing sector confirms the government policy of essentially free enterprise system. Accordingly, the Government controls only a few sensitive industries which could be considered necessary for national security interests or which represent investments beyond the capacity of private sector.

Generally, the Government maintains a suitable equity position in the major export-oriented industries, with the private interests accounting for the remainder. These mixed corporations function as private enterprises and their planned investments are included in the total planned private sector investments.

Paid-up capital

The paid-up capital of four analysed subsectors and its sub-subsectors amounted to JD 259.5 million in 1984 (see table 17 in annex I) or 54.0% of the total manufacturing sector paid-up capital.

The highest share, 45.2% of the total, is ascribed to four chemical industries sub-subsectors. The next group is building materials production with 39.9%. The two last groups are three sub-subsectors of food industries, whose share is 10.5% and textile industries with 4.4%.

2.6. Projects underimplementation

According to Table 20 in annex I, there are 48 main projects under implementation related to food industries, textile industries, chemical industries and building materials production.

The total investment costs, value of exports and number of new employees are shown in the table 11.

Table 11. Projects under implementation, summarized review

Subsector	Number of projects	Investment cost	Exports	New employees
		JD		
Food industries	8	5235	-	430
Textile industries	5	670	375	65
Chemical industries	33	11400	2268	500
Building materials industries	2	600	1750	96
Total	48	17905	4393	1091

In fact, the preparatory works for most projects have been completed in 1984 or even earlier. But the starting years of implementation are different, mainly due to difficulties in finding suitable sources of financing. Consequently,

4 projects have started to be implemented in 1983
6 " " " " " " " 1984
15 " " " " " " " 1985
22 " " " " " " " 1986
1 " " " " " " " 1987.

A great number of them has already been completed or shall be completed in the course of 1987. Only fruit juice concentrates should be completed in 1988 and the exact date of completing salts, liquids and other chemicals extraction from the Dead Sea is at present unknown.

In fact, total investment cost of 48 listed projects under implementation amounting to JD 17.9 millions is approximately on the level of the 1984 investments. Only 5 projects' investments are higher than JD 1.000.000.

They are: meat and meat products, fruit juice concentrates, amides, eye drops and plastic houses. On the other side there are some projects with about JD 20000 and less, like curtain strips, wool and wall pastes, plastic handles and wheels, plastic doors and windows, and mattresses.

New food processing projects are designed to the local market needs, whereas all other commodities to be produced are foreseen to be exported at about one quarter in value terms of total expected investment.

The total number of newly created jobs is 1091, a factor which will have a positive effect on the unemployment situation in the country.

2.7. Employment

Distribution of employment

Tables 13, 14 and 15 in annex I show the distribution of employment by activities, sex and nationality for the establishments with 5 and more employees. The summarized distribution is given in the table below.

Table 12. Distribution of employment

	Food industries	Textile industries	Chemical industries	Building materials industries	Total manufac. sector
- Distribution by activities and occupation :					
Total	6094	2730	7460	4754	41873
Production employees	4453	2206	4918	3426	30277
Administr. employees	841	355	1397	748	6935
Others	800	169	1145	580	4661
- Distribution by sex :					
Males	5651	799	6782	4699	39067
Females	443	931	678	55	2806
- Distribution by nationality :					
Jordanians	5089	1986	6556	4185	17816 a/
Non-Jordanians	1005	744	904	569	3222 a/

a/ Only of the four selected subsectors.

In 1984 the four selected industries have engaged 21034 persons or 30.2% of the total 41873 manufacturing employees. Out of it the capital-intensive chemical industries including petroleum refining employed 35.4%, food industries 29.0%, building materials industries 22.6% and textile industries 13.0 %.

In addition to it, other kinds of industries had 20835 employees or 49.8% of the total, out of which metal-working industries 8007, electrical industries 4044 employees. The remaining 8784 persons include workers employed by mining

and quarrying, leather and leather products, paper, printing and industrial services.

The distribution of the four selected industries' employees according to their occupation is the following :

production workers	71.3%	
administrative workers	15.9%%	
others	12.3%	(including transportation, communications and services)

It means that 1 administrative worker is covered by 5 production workers. If administrative and other workers are put together, the proportion is 1:3.

Proportions in four selected subsectors and their sub-subsectors are :

1 to 2.9 production workers over 1 adm. and other workers : beverages, chemicals and chemical products, petroleum refining, textiles and building materials ;

3 to 4.9 production workers over 1 adm. and other workers : plastics and food manufacturing ;

5 to 6.1 production workers over 1 adm. and other workers : cigarettes including tobacco and clothing.

The sub-subsectors with a proportion higher than the average 1:3 are: food manufacturing, cigarettes and tobacco, clothing and plastics. In all other sub-sub-sectors the proportion is lower. It is ob-

vious that the first four sub-subsectors are more labour intensive industries than the other five.

The correlations within metal-working and electrical industries are 1.6 and 1.9 production workers respectively over 1 administrative and other worker.

The four analysed subsectors have engaged 90.0% of males and only 10% of females. The highest share of females has been registered in textiles and clothing with 32.1% and 35.3% respectively, a situation similar to other countries. In all the other sub-subsectors the share of females in the total labour force is about 3% or even less. In the building materials industries it is only 1.2%.

Distribution by nationality is given only for nine selected sub-subsectors, using combined data of the Industrial Census 1984 prepared by the Department of Statistics and Survey Questionnaires launched by the Ministry of Trade in 1984.

The Employment Survey 1984 published by the Department of Statistics could not be exploited because it offers statistics for the employment by nationality only for the total manufacturing (excluding mining and quarrying) and no details by subsector.

According to Table 12 above, the domestic manpower with 84.7% of the total is predominant in all the four subsectors. There are some sub-subsectors like cigarettes

including tobacco and petroleum refining that are entirely Jordanian industries with only 1.9% and 0.1% non-Jordanians respectively.

On the other hand the industries with the highest non-Jordanians share are plastics and plastic production (33.8%), clothing (32.1%) and beverages (22.6%). All the other analysed industries are more or less on the average level of 15.3%.

When analysing the total manufacturing sector (mining and quarrying excluded), the manpower is composed of 81.3% Jordanians and 8.7% non-Jordanians. However, it is recommended to gather, as soon as possible, more detailed data regarding nationality and sex of the work force, such information being indispensable for a detailed analysis of labour productivity.

Employees and size of establishments

The average size of an establishment is measured by the number of employees per establishment. In 1984 it was 25 persons in the establishments with 5 and more workers. The average size was highest in the petroleum refining: 2615 employees and in the cigarettes and tobacco manufacturing : 183.

The second group comprises establishments with an average between 25 to less than 65 (between 65 and 183 employees there are no units). They are :

- beverages 54 employees
- chemicals and chemical prod. 61 "
- plastics & plastic products 29 "

The third group includes the following establishments with less than 25 employees :

- food manufacturing	14 employees
- textiles	22 "
- clothing	15 "
- non-metalic mineral products	19 "

The average employment in the so-called "other kinds of industries is" :

- above the average of 25 workers :

- mining and quarrying	41 employees
- basic metal products	44 "
- electrical machinery	36 "
- electrical energy production	1252 "
- leather & leather products	31 "
- paper & paper products	50 "
- printing & publishing	27 "

- below the average :

- footwear	20 "
- furniture & wood products	19 "
- non-metallic machinery	15 "
- transport equipment	20 "
- industrial services	7 "

So, the majority of manufacturing establishments are small- and medium-scale industries. Only three industries can be considered as large-scale industries. They are petroleum refining (2616 employees), electrical energy production (1252 employees) and cigarettes and tobacco (183 employees).

2.8. Capital intensity and labour productivity

Capital intensity

The capital intensity as calculated here means the total fixed assets before depreciation divided by the value added. In other words it is an indicator showing the amount of fixed assets necessary for the production of one Jordanian dinar of value added.

Owing to this approach, the average capital intensity for nine selected sub-sectors is JD 3.7. The sub-subsectors can be split into two groups:

a) first group with more than JD 3 over one JD of value added, i.e. :

- chemicals and chemical products	JD 7.7
- petroleum refining	" 4.1
- building materials	" 5.3

b) second group with JD 3 and less over one JD of value added, i.e. :

- food manufacturing	JD 2.5
- beverages	" 2.1
- cigarettes and tobacco	" 0.2
- textiles	" 2.1
- clothing	" 0.9
- plastics and plastic products	" 3.0

It is obvious that lower capital intensity or less fixed assets for the corresponding production is required by the second group of sub-subsectors. And on the other hand, value added of the first group of industries is conditioned by higher fixed assets than the average.

Such a difference in capital intensity of the two groups results from the amount of fixed assets concentrated in nine analysed sub-subsectors. The first group includes industries with a high concentration of fixed assets. They are in % of the nine sub-subsectors total (see Table 12 in annex I):

- chemicals and chemical products 27.4%
- petroleum refining 19.5%
- building material products 37.8%

The share of the second group in the subtotal is exceedingly low due to the low concentration of fixed assets :

- food manufacturing 6.3%
- beverages 3.0%
- cigarettes and tobacco 1.0%
- textiles 1.6%
- clothing 0.4%
- plastics and plastic products 2.9%

By the way, the capital intensity of the other kinds of industries is JD 4.7, out of which the capital intensity of metal-working and electrical industries is JD 3.3 and 9.5 respectively. The fixed assets concentration in both industries is 5.0% and 23.4% respectively. It shows that both above mentioned subsectors can also be included into the industries with high fixed assets concentration.

For comparison, data on the capital intensity in some selected countries are given below:

- France	: cotton yarns production	n.v.u.	1.6
- India	: cotton spinning	"	1.7
	worsted yarn & fabrics	"	1.2
	concentrated super-phosphates	"	6.1
- Japan	: sweaters & sport skirts	"	1.5
	underwear & bathing suits	"	1.4
- Yugoslavia:	ready-made wearing	"	1.3

Labour productivity

For the purpose of this Survey, labour productivity is measured by the value added produced by a worker or a production worker in 1984.

The average labour productivity for nine analysed sub-subsectors is JD 7933 value added per one worker.

It is higher than the average in the following sub-subsectors :

- beverages	JD 10162
- cigarettes & tobacco	" 45068
- petroleum refining	" 11319
- building materials	" 9310

an lower than the average as follows :

- food manufacturing	JD 3424
- textiles	" 4771
- clothing	" 1798
- chemical & chemical products	" 6794
- plastics & plastic products	" 4118

Labour productivity compared with the capital intensity shows that the sub-subsectors with a low or relatively low capital intensity have registered a high or very high labour productivity compared with the averages of JD 3.7 and JD 7933 respectively. That is the case in the first group specified below:

	Capital intensity	Labour productivity
- beverages	2.1	10162
- cigarettes & tobacco	0.2	45068
- petroleum refining	4.1	11319

The second group comprises the sub-subsectors with both, capital intensity and labour productivity below of the averages 3.7 and 7933 respectively. They are :

- food processing	2.5	3424
- textiles	2.1	4771
- clothing	0.9	1798
- plastics and plastic products	3.0	4118

The third group includes only building materials where both capital intensity and labour productivity are higher than the averages :

- building materials	5.3	9318

The remaining sub-subsector is chemicals and chemical products with higher capital intensity and lower labour productivity than the averages:

- chemicals and chemical products	7.7	6496

The general conclusions could be summarized as saying that, in principle, the sub-subsectors with a lower capital intensity have succeeded to register a higher labour productivity and vice versa, with, of course, some exceptions including sub-subsectors with both lower or higher rates of productivity.

In any case, a more detailed analysis is recommended, covering also the depreciation when it is a question of fixed assets. The calculation of the labour productivity could be based also on gross output (in terms of value and quantity), on the compensation of employees and operating surplus divided by not only the total manpower but also the production workers. In addition, both, total and production manpower data should represent the annual average in order to eliminate the annual fluctuations.

It is hoped that such an approach would give a more exact picture of both capital intensity and labour productivity of the Jordanian industries.

For additional information the labour productivity in the metal-working and electrical industries is given below:

- metal-working industries	JD 3025
- electrical industries	JD 5383

2.9. Exports and imports of manufactures

Exports

The total exports of the four subsectors are based on Foreign Trade Statistics 1984 and 1985 (Department of Statistics) modified and adapted partly to the ISIC classification. The following SITC commodities have been omitted :

- dairy products, birds, eggs, natural honey, edible fruits and nuts, peel, melons and citrus fruit, coffee, tea, maté and spices, because they are agricultural and not industrial products ;
- phosphates, which, according to the SITC are included in the building materials, but according to ISIC they have to be included into the mining and quarrying sector.

According to that sort of corrections, the exports of four selected subsectors in 1984 were as follows (Table 22 in annex I):

- Total exports	JD 134.6 million
out of which :	
- food industries	" 16.3 "
- textile industries	" 17.7 "
- chemical industries	" 89.9 "
- building materials industries	" 10.7 "

In accordance with it, the share of the four selected subsectors in their total exports is the following:

- food industries	12.1 %
- textile industries	13.2 %
- chemical industries	66.8 %
- building materials industries	7.9 %

It is self evident that chemical industries exports are highly predominant as compared with the other three subsectors.

The significant exports of the four subsectors are:

- food industries (JD 4 million and more) :
  - animal fodder — JD 7.1 million
  - tobacco and cigarettes — " 4.0 "
- textile industries (JD 3 million and more) :
  - cotton and cotton blended yarn — JD 3.1 million
  - ready-made apparel, clothing and textile fabrics — " 12.5 "
- chemical industries (JD 3 million and more) :
  - inorganic chemicals — JD 3.2 million
  - pharmaceutical products — " 11.5 "
  - fertilizers — " 58.9 "
  - tanning and tanning products, dyes, paints etc. — " 2.1 "
  - soap and other washing preparations — " 5.6 "
  - resins and other plastic materials — " 8.1 "
- building materials industries (JD 2 million and more) :
  - cement, lime etc. — JD 6.4 million
  - articles of stone, cement etc. — " 4.4 "

In addition it is noteworthy that in 1984 natural phosphates exports amounted to 4.6 million tons valued at JD 69.6 million, or 26.7% of the total country's exports. The most important buyers were India, Indonesia, Japan, Pakistan, Romania and Yugoslavia.

The above noted data differ partially from Table 9 "Production and exports", because they include all manufactures exports according to SITC, while Table 9 covers only exports of goods manufactured according

to ISIC. Regardless of it, both tables point out that chemical industries exports are in the forefront of the four subsector's exports.

In 1984, total exports amounted to JD 261.1 million. So the four selected subsector's exports amounting to JD 134.6 million represented 51.5% of the total.

The leading buyers of Jordanian manufactures are Iraq and Saudi Arabia with 25.9% and 14.8% respectively. The third place belongs to India with 13.1% and the fourth to Pakistan with 4.3% due preponderantly to phosphates. The fifth place belongs to Kuwait with 4.0%, and the rest of 37.9% was divided among 59 countries all over the world.

Jordanian manufacturers' export experience is predominantly based on trade links just within the Middle East region and in particular with Iraq, Kuwait, Saudi Arabia and Syrian Arab Republic. Consequently, Jordanian companies have been operating in preferential markets controlled by bilateral agreements which has afforded favorable entry conditions for their exports. A consequence of this controlled export environment is that Jordanian firms are unfamiliar with the commercial practises necessary to tackle markets outside the region.

Successful export performance is not determined by price alone. Other factors such as product design, aesthetic appearance, delivery terms, functional performance and quality also influence the foreign buyers' purchasing decision.

In addition, the lack of marketing experience and the lack of information about foreign markets have to be overcome if domestic exports are to be increased.

For all these reasons, a long-term programme of export promotion should be prepared, including measures aimed at encouraging, helping, developing and diversifying exports.

Imports

Imports classification of the four selected subsectors is modified in the same way as for exports (see the previous section).

In 1984 the four selected industries' imports were as follows (Table 23 in annex I):

- total imports	JD 443.8 million
out of which :	
- food industries	JD 53.5 "
- textile industries	JD 55.9 "
- chemical industries	JD 304.3 "
- building materials industries	JD 30.1 "

The structure of the imports is :

- food industries	12.1 %
- textile industries	12.6 %
- chemical industries	68.5 %
- building materials industries	6.8 %

The significant imports of manufactures are:

- food industries (JD 4 million and more) :

- fats and oils	JD 10.5 million
- sugar and sugar confectionery	JD 7.6 "
- animal fodder	JD 15.4 "

- textile industries : (JD 3 million and more) :

- man-made fibres	JD 17.5	million
- cotton	" 3.6	"
- carpets, mats etc.	" 4.1	"
- apparel and clothing	" 19.9	"

- chemical industries (JD 3 million and more) :

- mineral fuels	JD 213.4	million
- inorganic chemicals	" 22.3	"
- pharmaceuticals	" 12.4	"
- fertilizers	" 3.1	"
- miscellaneous chemical products	" 9.6	"
- artificial resins etc.	" 22.5	"
- rubber and similar	" 12.6	"

- building materials industries (JD 2 million) and more :

- cement, lime etc.	JD 12.8	million
- articles of stone, cement etc.	" 2.6	"
- ceramic products	" 6.8	"
- glass and glass sheets	" 7.9	"

It is obvious that chemical industries are also on top of the list of importers, like on that of exporters.

In 1984 the total manufacturing imports were JD 1071.3 million. So, the four selected subsectors' imports amounting to JD 443.8 million represented 41.4% of the total.

The leading partners for Jordanian manufacturing imports are :

Saudi-Arabia	19.5 %
USA	11.1 %
Japan	7.4 %
United Kingdom	6.7 %
Federal Republic of Germany	6.3 %
Italy	5.9 %
France	4.5 %
Switzerland	4.3 %

The eight above-mentioned countries cover 65.7% of Jordanian manufacturing imports. The rest of 34.3 % includes imports from 80 different countries all over the world.

Out of it, imports from Arab Common Market Countries originate from Democratic Yemen, Egypt, Iraq, Libya and Syrian Arab Republic and also from 13 other Arab countries.

Because of such an unconvenient situation it is necessary to take adequate measures in order to reduce imports and to stimulate only those imports which are indispensable for manufacturing commodities designed for export or for replacement of imported goods.

In this sense, the strategy introduced by the Egyptian Government in 1985, could be studied carefully. Namely, imports were classified into four categories: banned goods - those superfluous to the economy's needs; unnecessary goods - subject to tariffs between 250% and 400%; imports for which local substitutes are available - subject to tariffs between 100% and 125% ; essential imports for local manufacturing industries - subject to tariffs between 10% and 25%.

Balance of trade

The external trade balance for 1984, meaning imports less exports, was the following :

	JD million
food industries	- 37.2
textile industries	- 38.2
chemical industries (crude oil incl.)	-214.5
chemical industries (crude oil excl.)	- 1.1
building materials industries	- 16.7
total four industries (crude oil incl.)	-306.6
total four industries (crude oil excl.)	- 93.6
total imports less exports (crude oil incl.)	-810.2
total imports less exports (crude oil excl.)	-595.8

As it can be seen, the balance is negative for all four selected subsectors. The chemical industries' balance stands out with JD-214.5 million as too high due to exigent import of crude oil; if imports of crude oil are excluded, the balance is only JD -1.1 million. It reflects on the trade balance of the four subsectors and also on the grand total:both are negative.

A more profound analysis shows that 1 Jordanian dinar of export is covered by the following JDs amount of imports :

	Imports in JD for one JD of exports
- food industries	3.282
- textile industries	3.158
- chemical industries	3.389
- building materials industries	2.246
- average for four above cited industries	3.235
- average for the total imports/exports	4.103

The correlations shown above result from the external balance presented at the beginning of this section. Namely, the balance is negative: one JD of the four subsectors' exports is covered by more than 3 JD of imports. Among them building materials industries with 2.2 JD and textiles industries with 3.0 JD are below the average, but food industries a 1 chemical industries are above the average with JD 3.282 and 3.389 respectively. However, crude oil imports excluded, chemical industries' external trade balance is very positive: one JD of exports is covered with only JD 1.012 of imports (exports JD 89.8 million and imports JD 90.9 million).

The average for the total imports/exports is also negative: JD 4.103. The Jordanian purchasing power for imports from the proceeds of its national exports is unsatisfactory due to the deficit in the external balance of trade. Namely, Jordanian foreign trade has traditionnally been characterized by a high level of imports in relation to a low level of exports. Consequently, a large trade deficit has been prevailing during the analysed period.

Free zones and joint ventures

One concrete measure taken in order to increase export earnings and to reduce imports is the establishment of free zones. They are aimed at encouraging investment by the private sector, attracting foreign investments in the commodity-producing sector and providing facilities and exemptions to promote commercial transactions through the encouragement of transit trade. The zones also provide storage facilities for import- and export-bound goods.

To date, Jordan has established two separate industrial free zones: one in Zarka near Amman and one at the port of Aqaba. Potentially the most attractive is Aqaba Industrial Zone established in 1973 with the land areas amounting to 2300 dunums. It should be increasingly attractive for light manufacturing industries given its location at the country's sole seaport.

The Zarqa Free Zone commenced services in 1983. It has the total area of 5500 dunums, out of which about 1000 dunums have been developed.

Jordan, as a location for joint ventures, is judged by foreign companies operating in Jordan as highly attractive. Availing themselves of the advantages offered by the Jordanian approach, they have found their participation both profitable and providing good potential for expansion. Namely, once a firm has been legally established on an equal footing with any Jordanian firm, it can import, export, operate a factory, stock parts and other industrial materials, or sell directly to dealers or through agents.

Participation in joint enterprises involves participation in equity, as well as contractual agreements about patents, know-how and supply of materials.

Exploration of joint-venture opportunities requires motivation from more than one side. Face to face encounters have to be arranged, and the opportunities offered by both parties need to be investigated. It is one of the attractive and concrete forms in promoting foreign trade.

3. STRUCTURAL CHANGES OF THE MANUFACTURING SECTOR IN 1985 AND 1986

The situation of the manufacturing sector during 1984 has been fairly reflected based on the statistics available for that year.

In order to update them the Project Team has succeeded to receive recently some statistical data for 1985 (prepared by the Department of Statistics) concerning information on the gross output and its main components in terms of value for the establishments with 5 and more employees, number of establishments and number of employees. The Department of Statistics has also published statistics for 1985 on exports and imports.

Also, the Central Bank of Jordan has published recently data on the production of 18 selected industrial commodities, in quantities, in 1984, 1985 and 1986 (Monthly Statistical Bulletin, February 1987).

These three kinds of sources were used in order to update partially the manufacturing sector status of 1984. Some additional data and information have also been collected during the field trips. They were considered in the sectoral final reports.

3.1. Number of establishments and employment, 1985 compared with 1984

According to Tables 16 & 19 in annex I, changes in the number of establishments and in employment in 1984 and 1985 are shown in the following table:

Table 13 : Number of establishment & employment in 1984 & 1985

	Number of establishments with 5 and more employees			Total employment		
	1984	1985	Index	1984	1985	Index
- Food industries :						
Food manufacturing	314	353	112.4	4498	5242	116.5
Beverages	16	18	112.5	866	905	113.7
Cigarettes & tobacco	4	4	100.0	730	754	103.3
- Textile industries :						
Textiles	45	46	102.2	1006	987	98.1
Clothing	117	128	109.4	1724	1836	106.5
- Chemical industries :						
Chemicals & chemical products	56	67	119.6	3388	3801	112.2
Petroleum refining	1	1	100.0	2615	2762	105.6
Plastics & plastic products	50	50	100.0	1457	1542	105.8
- Building materials industries :	248	259	104.4	4754	4832	101.6
- Subtotal	851	926	108.8	21038	22741	108.1
- Other kinds of industry	835	893	106.9	20835	21936	105.3
- Total manufacturing sector	1686	1819	107.9	41873	44677	106.7

It is obvious that both, the number of establishments and the total number of employees, increased in 1985 as compared with 1984 by 8.8% and 8.1% (four analysed subsectors) and by 7.9% and 6.7% respectively (total manufacturing sector).

The increase of both items is also noticed with all the selected sub-subsectors and with the other kinds of industry. Number of establishments remained the same only with regard to the production of cigarettes, petroleum refining and plastic industries, because there is no need for the time being to erect additional capacities. On the other hand, the total number of employees stagnated only in textiles and building materials. All the other sub-subsectors including other kinds of industries, grew more or less moderately.

In spite of it, the gross output in terms of value and quantities declined considerably in 1985 as compared with 1984. Such a discrepancy is illustrated in the next section of the Survey.

3.2. Manufacturing output in 1985 compared with 1984

The performance of the manufacturing output for establishments with 5 and more employees in terms of value is shown in the next table :

Table 14 : Manufacturing gross output & value added 1984 and 1985, establishments with 5 and more persons

JD million, current prices

	Gross output			Value added		
	1984	1985	Index	1984	1985	Index
- Food industries :						
Food manufacturing	65.1	72.3	111.0	18.4	15.6	84.8
Beverages	17.2	18.7	108.7	8.8	10.5	119.3
Cigarettes & tobacco	43.4	46.9	108.1	32.9	36.1	109.7

- Textile industries :						
Textiles	12.6	14.3	113.5	4.8	5.1	106.3
Clothing	9.2	8.6	93.5	3.1	2.5	80.6
- Chemical industries :						
Chemicals & chemical products	161.4	89.2	55.3	22.1	16.3	73.8
Petroleum refining	272.1	260.2	95.6	29.6	34.1	115.2
Plastics & plastic products	19.4	17.7	91.2	6.0	5.0	83.3
- Building materials industries	82.4	81.5	98.9	44.3	42.7	96.4
- Subtotal	682.7	609.4	89.3	166.9	167.9	100.6
- Other kinds of industry	276.3	305.5	110.6	101.9	114.6	112.5
- Total manufacturing sector	959.0	914.9	95.4	268.8	282.5	105.1

The table shows that in 1985 the gross output of nine selected subsubsectors and of total manufacturing sector, as compared with 1984, had a negative growth rate of -10.7% and -4.6% respectively.

Only four sub-subsectors registered a positive growth rate: food manufacturing 11.0%, beverages 8.7%, cigarettes and tobacco 8.1% and textiles 3.5%. The other five sub-subsectoral gross output rates of growth are negative. In the group "other kinds of industry" the gross output expanded by 10.6%. Out of it metal-working and electrical industries output registered an increase of 15.0% and 13.3% respectively.

The changes of the value added differ to some degree from those of the gross output. Namely, in 1985 the value added of nine sub-subsectors stagnated (growth rate 0.6%),

but the value added of the total manufacturing grew by 5.1%.

The sub-subsectoral analysis shows that in most cases the changes in value added follow those of the gross output. Again, four sub-subsectors have a positive, and five sub-subsectors a negative rate of value added.

One exception is petroleum refining whose value added grew by 15.2% although the gross output registered was negative (-4.4%). Most probably the total intermediate consumption dropped due to the decrease of crude oil prices and the energy economy. However, despite lower gross output, the value added came out as positive.

3.3. Production of some commodities in 1985 & 1986

Table 7 in annex I gives information on the production of 18 selected commodities in terms of volume. Some quantities for 1984 differ from the same commodities recorded in Table 6, but in principle differences are not so significant that they would influence general findings.

The Central Bank data (Table 15 below) show the following changes for 1985 and 1986:

Table 15 : Production changes in 1985 and 1986

Commodities	1984 = 100	
	1985	1986
Phosphates	97.7	100.6
Potash	186.9	226.8
Fodder	75.0	72.9
Alcoholic drinks	77.0	75.8
Cigarettes	81.5	76.6
Textiles	171.1	171.1
Spinning	90.7	53.9
Fertilizers	94.4	101.9
Chemical acids	84.4	85.8
Detergents	58.8	110.2
Petroleum products	96.5	89.9
Cement	99.8	88.6

It means that out of 12 listed commodities belonging to the 4 selected subsectors, 2 of them registered an increase of production in 1985 as compared with 1984: production of potash (86.9%) and textiles (71.1%). The production of other 10 commodities in 1985 was below that one recorded in 1984.

The situation was not better in 1986. Potash production increased by 126.8% as compared with 1984 and detergents by 10.2%. The production of phosphates and fertilizers was on the level of 1984, and the production of textiles on the level of 1985. The production of all other commodities declined in 1986 as compared with 1984 and 1985.

It is worth mentioning that petroleum refining declined in 1985 by only 0.2%, but in 1986 even by 11.4% as compared with 1984. This drop is responsible for the total manufacturing gross output decrease by 4.6% and that of the nine selected sub-subsectors by 10.7%.

When it is a question of metal-working and electrical industries, iron and liquid batteries production expanded in 1986, as compared with 1984, by 27.1% and 11.2% respectively, whereas the production of metal pipes dropped by 15.0%.

According to the Central Bank of Jordan 22nd Annual Report 1985, the total industrial production index number rose in 1985 by only 0.3% as against 14.6% in 1984 (1979 = 100.0). Stagnation or a change to a negative index number is listed in all the production activities except clothes and textiles and iron production. The changes are shown in the next table.

Table 16 : Production index number changes in 1985 against 1984

1979 = 100

Production	1985 against 1984
Food, beverages & fodder	- 12.8
Cigarettes and matches	- 18.3
Textiles and clothing	+ 32.4
Chemicals	- 4.4
Petroleum refining	- 2.6
Cement	- 0.2

Other kinds of industry :	
iron	+ 19.0
batteries	- 0.9
footwear and leather	+ 1.6
paper and cardboard	+ 24.4
Phosphates	- 2.3
Electricity	+ 9.5
Overall industrial production index number change	+ 0.3

Under such circumstances, the Government has accorded the industrial sector continued support. Thus, some protectionist measures were adopted including a ban on the importation of certain goods which compete with domestic products such as soft drinks, alcohols, iron and insulation products. They also included imposing higher tariff rates on a number of imports like liquid batteries, pipes, certain beverages, shoes and detergents. Some 288 new industrial companies were registered in 1985 as against 177 new companies in 1984, but the total capital of the new companies was only JD 8.4 million against JD 9.8 million in 1984. Obviously, that situation has reflected the continuation of recessionary conditions and the consequential reluctance tc invest in industry.

3.4. Foreign trade in 1985 compared with 1984

Available data, published by the Department of Statistics, indicate that the volume of the total foreign trade declined by 0.8% in 1985 after it had expanded by 5.5% in 1984, as it is presented in the next table :

Table 17 : Total exports and imports in 1984 and 1985

JD million

	1984	1985	Index
Domestic exports	261.1	255.3	97.8
Imports	1071.3	1066.7	99.6
Total	1332.4	1322.0	99.2

It is obvious that the decline of 0.8% is composed of the decline of domestic exports by 2.2% and that of imports by 0.4%.

The above decline originates from the drop in domestic exports due to the shrinking export markets under the impact of economic recession engulfing Arab countries, as well as developing countries, which constitute a traditional outlet for Jordanian exports.

The decline in domestic exports occured mainly in fertilizers, other chemicals and phosphates.

Imports were also declining. The decrease of total imports by only 0.48% was due to the importation of two civil aeroplanes. If the cost of these two aeroplanes were deducted, 1985 imports would be by additional 2% lower than their 1984 level.

4. SCIENCE AND TECHNOLOGY

Jordan's interest in formulating policies for science and technology started in the early sixties with the establishment of the Scientific Research Council in 1964. Later the Council was abolished and a Directorate for Science and Technology was established at the Ministry of Planning, with the objective of supporting scientific institutions and contract research.

Jordan's capacity to undertake scientific research was enlarged with the establishment of several scientific institutions including four universities (University of Jordan at Amman, Jordan University of Science and Technology and Yarmouk University at Irbid and Mu'tah University at Kerak), the Research and Studies Department at the Central Bank, the Agricultural Research and Extension Department at the Ministry of Agriculture, the research unit of the Jordan Phosphate Mining Company and the Royal Scientific Society with its specialised industrial laboratories.

Special attention is given to national standards, metrology, testing of materials and products, quality control, calibration and maintenance. This was intensified after the establishment of the Directorate of Standards and Measures at the Ministry of Industry and Trade and at the laboratories of the Royal Scientific Society.

During the last two decades of growth, Jordan saw the introduction of advanced technologies in large- and medium-scale industrial projects, especially in petroleum refining, cement, phosphates, fertilizers, potash and glass. But in many other industries the situation is less favourable.

In the four selected subsectors the situation is as follows :

Food industries

Out of 334 establishments and 6094 employees in them, only 15 of them had quality control laboratories in 1984, and 22 in 1986. Only 1 PhD, 7 masters and 9 bachelors of science or holders of higher degrees were engaged in 22 quality control laboratories over 277 workers.

Despite such a very limited number of high-calibre staff, the food industries witnessed an increase in the number of in-plant quality control laboratories in the last two years. It is expected that this trend will continue.

Otherwise, except some training courses offered by the University of Jordan and collaboration between the University and the local food industries, there are no research and training activities in any of three sub-subsectors.

Praiseworthy is the endeavour made by a number of workshops which have been producing some kind of food-processing machinery and equipment. There is still urgent need of more attention and encouragement.

Textile industries

There are neither laboratories nor research workers in the textiles and clothing sub-subsectors, as well as no research activities and training, although they are very much needed, especially in the field of textiles printing and dyeing and in designing ready-made apparel.

Chemical industries

The position of science and technology in this subsector is much better than in other three analysed subsectors. Although the funds allocated for research and training in this kind of industrial activities - information collected in direct contacts with the industries - show that the research expenditures amounted to JD 142050 in 1984, to JD 275600 in 1985, and to JD 666200 in 1986, out of which only the Arab Potash Company has spent about JD 360000 in the last two years. During the same period the training expenditures raised from JD 40300 in 1984 to JD 139400 in 1986, headed by the Petroleum refinery.

The research and training activities can be further developed due to the availability of qualified people and institutions with well equipped laboratories being capable of conducting scientific work. The progress of this kind of activities depends on financial support and proper guidance, indicating the field and volume of research and the policy.

The cooperation of the chemical industries with the academic institutions is satisfactory due to the fact that both have started taking positive attitudes toward collaboration in industrial research.

Building materials industries

In this subsector every factory has its own laboratory for routine quality control. Also, every factory producing pottery, china tiles, earthenware, glass and glass products, cement, as well as cement and cement products has its own training programme.

Total expenditures in this field were about JD 58000 in 1984, JD 34243 in 1985 and JD 7927 in 1986. The cement factory at Fuheis (Amman) is the most active in organising courses for its employees and also for trainees from other Arab countries.

According to the information collected, in 1984 there were no expenditures on research and studies, in 1985 only JD 10700 and in 1986 only JD 23700. However, attempts are made to solve specific production problems like bubbles in the glass, or with regard to cement, China tiles and earthenware, to improve the quality of the products.

Moreover the Royal Scientific Society is asked every now and then to study specific problems of the building materials production.

Despite all the above-mentioned attempts by four selected subsectors, there is a continuing and urgent need for intense efforts to bring about qualitative improvement in the science and technology activities. These should encompass the development of trained manpower and the improvement of management and production efficiency. This also will necessitate the introduction of new areas of scientific investigation with demonstrable impact on Jordan's scientific standing and future development.

One of the solutions is to concentrate the resources on post-graduate studies and to involve Jordanian universities in a more task-oriented research. This would require close co-operation with industry and with institutions involved in science and technological research.

5. PROJECTS UNDER STUDY

Table 21 in annex I gives detailed information on projects under study. These are summarized in table 18, below.

Table 18 : Projects under study

	Number of projects	Investment Cost JD 000	New employees
Food industries	5	4470	170
Textile industries	2	55	17
Chemical industries	21	537598	167 a/
Building materials industries	2	70	23 b/
Total	30	542193	377

a/ Concerns only 11 projects.

b/ Concerns only 1 project.

The largest investments of JD 537.6 million are attributed to the chemical industries; one more proof of the predominant role of chemical industries in the economic development of the country.

However, huge projects like concentrated phosphoric acid, monoammonium phosphate and diammonium phosphate, amounting to JD 404 million, have been postponed for the time being because negotiations with the foreign potential buyers of the future production have not yet been finalized. The rest of JD 133.6 million concerns other chemical projects' economical pre-feasible. Some

of them are equally important from the point of view of domestic market and export opportunities, like for instance: veterinary drugs, projects related to potash and fertilizers, magnesium and refactory bricks and similar.

All five food-processing projects are important because they offer an increase of national self-sufficiency in the supply of basic consumer goods.

This is also true for two textile and two building materials industries projects.

In addition to afore-mentioned projects under study, it is advisable to initiate and promote small-scale industrial and handicraft projects that could contribute significantly to Jordan's economy. The list of imports is very long and the manufacture of any import substitute is welcome. Jordan's neighbours need many products that could be produced in Jordan and exported to them.

The private sector has shown dynamic growth and ability to adapt to the constraints inherent to Jordan, such as finite supply of water, limited availability of some natural resources, small domestic market, high dependence on imports of consumer goods, and especially intermediates and capital goods, and almost total dependence on imported energy. The flexibility of the private sector in those circumstances should be supported by offering more development opportunities together, if necessary, with additional incentives to attract foreign investment capital.

One of such project ideas is waste and refuse collecting and selecting. The waste products and residues are diffused into the atmosphere, the water or the ground. The pollution

of these natural resources is extremely serious, especially in industrial and intensely populated areas. A reasonable measure to be undertaken is to collect the existing waste and to recycle it in order to reduce the existing use of natural resources and save the natural environment.

For instance, it is possible to recycle used glass containers and all kinds of broken glass. There are huge quantities of thrown away soft-drink bottles, pickles' containers and other glass refuse that could be used in glass product manufacture. In Switzerland, for instance, 60% of produced glass returns to the factories, in the Netherlands 50%, and in the Federal Republic of Germany 30%.

Or the used paper. Japanese industries recycle 48% of the waste paper, the European Community 45%, the Federal Republic of Germany 46% and Czechoslovakia 44%.

Or iron. In the developed countries 50% of produced iron comes back to the melting houses, and also 40% of copper, 25% of aluminium, 38% of lead and 21% of zinc.

Also, there are possibilities for handicraft workshops to offer new commodities and thereby increase job opportunities, which would be beneficial to the national economy. Many imported plastic articles could be produced locally in small workshops as well as small-scale paper products, knitwear articles, machinery spare parts etc., projects in which private investors could be interested.

Realising that many possibilities exist, it is recommended to elaborate detailed studies and to offer them to individuals and manufacturing firms as soon as possible.

6. MANUFACTURING SECTOR AND THE FIVE-YEAR PLAN 1986-1990 PROJECTIONS

Since the year 1985 was the base year for the elaboration of the Five-Year Plan 1986-1990, it is necessary, first of all, to start the chapter by summarizing the results of the manufacturing sector in that year.

According to Table 14, the total manufacturing sector's value added rose from JD 268.8 million in 1984 to JD 282.5 million in 1985, thus effectuating a growth rate of 5.1%.

The other source of information is the National Accounts 1982-1986. According to it, the value added achieved in 1985 was JD 275.6 million, representing a growth rate of 2.1% over 1984.

However, the Five-Year Plan 1986-1990 has envisaged the increase of the manufacturing sector value added from JD 167 million in 1985 to JD 223 million in 1990 at 1985 prices, at an annual growth rate of 6.9%.

In addition to it, the value added of the mining and quarrying sector is envisaged by the Plan to increase from JD 57 million in 1985 to JD 83 million in 1990 at 1985 prices, i.e. an annual growth rate of 7.8%.

After summarizing both sectors, in order to be comparable with the above specified statistical data com-

prising both, the manufacturing sector and mining and quarrying, the value added would be JD 224 million in 1985 and JD 306 million in 1990, giving an annual growth rate of 6.3 %.

When preparing the Plan, the value added data for 1985 were estimated, but now the actual data for that year are available. It means that the starting 1985 value added could be considered at the amount of JD 282.5 million including manufacturing and mining sectors.

Upon that, the Plan's targetted annual growth rate is 6.3%, whereas the implemented one during the period 1981-1985 is 4.9% (for both sectors). On the other hand two different growth rates implemented in 1985 as compared with 1984 could be observed as more or less realistic: 5.1% (Table 14 of the Survey) and 2.1% (National accounts 1982-1986).

So, calculations made on the basis of those four annual growth rates give the following projections of value added in 1990 :

Table 19 : Manufacturing value added in 1990, four variants

JD million, 1985 prices

Variants	1985	1990
1984-1985 growth rate of 2.1%	282.5	313.6
1981-1985 growth rate of 4.9%	282.5	358.8
1984-1985 growth rate of 5.1%	282.5	361.6
1986-1990 growth-rate of 6.3%	282.5	384.2

The last two variants seem to be too optimistic if one has in mind the fact that industrial production is suffering from the continued stagnation of domestic demand and exports slowing down, accompanied by the influence of the world recession. In addition, according to the Annual Report of the Central Bank, the industrial production rose in 1985 only by 0.3% as compared with 1984. On the other hand, the first variant looks rather pessimistic. So, the solution could be located somewhere between 2.1% and 4.9% i.e. 3.5% approximately.

Applied as the annual growth rate for the 1986-1990 period it will give a targetted value added, based on 1985, of JD 336.2 million.

The moderate projection can be justified by the investment data. According to the Five-Year Plan 1986-1990, total manufacturing and mining investment outlays are envisaged at JD 393.2 million, thus giving the arithmetic average of JD 78.6 million per year. However, total investments realized in 1984 amounted to JD 52.3 million, reaching only two thirds of the projected annual average. Then, investment costs of projects, whose implementation period covers 1986 and 1987, total only JD 17.9 million, and the projects under study (except fertilizers whose implementation has been postponed) JD 133.6 million.

Under those circumstances it is advisable to be cautious and to expect a more moderate growth of the industrial sector, as suggested above, rather than what is originally foreseen by the current Plan.

When it is a question of the four subsectors analysed in the Survey, it should be underlined that the Plan document does not give any information concerning the manufacturing subsectors. Owing to that it is impossible to make any estimations on the growth implementation of the four subsectors during 1986-1990. The only solution is to make some appropriate assessments, based on the value-added performance by subsectors in 1985 and their shares in the nine sub-subsectors subtotal (Table 5 in annex I).

According to it the value added by the four subsectors performed in 1984 and 1985 was the following.

Table 20. Value added 1984 and 1985 by four subsectors, establishments with 5 and more persons

JD million, current prices

Subsector	1984 value	1985 value	%	Index 1984=100.0
Food industries	57.1	62.2	37.0	108.9
Textile industries	7.9	7.6	4.5	96.2
Chemical industries	57.7	55.4	33.0	96.0
Building materials industries	44.3	42.7	25.4	96.4
Total	167.0	167.9	100.0	105.4

Having in mind the implemented production of above four subsectors in 1985 and the assumed development trends in the current five-year period, it can be roughly estimated that chemical industries especially and building materials industries too, based preponderantly on local resources, will sustain the present situation. It can be

also expected that food industries will continue the same growth trend as it was in 1985 as compared with 1984, and that the textile industries' efforts will register some progress. Based on all that it could be presumed that the share of the four subsectors' value added in the total manufacturing value added 1990 will be at least as it was in 1984, that is approximately 63%. So, the roughly estimated value added of the four subsectors would be about JD 212 million.

Presuming the same shares as they were in 1984, but corrected moderately in favour of chemical industries and building materials industries, the above-cited value added could be split in the following way :

Table 21. Estimated value added in 1990 by four subsectors

JD million, 1985 prices

Subsector	1985	1990	Annual growth rate
Food industries	62.2	70	2.5
Textile industries	7.6	9	3.4
Chemical industries	55.4	80	7.8
Building materials industries	42.7	53	4.2
Total	167.9	212	4.7

Implementation of such a modest pace of growth could be expected on the understanding that the investments mentioned in the previous chapters would be realized and an adequate incentive and economic policy applied.

7. BASIC ISSUES, CONSTRAINTS, SHORTCOMINGS AND FINDINGS

Jordan's economy is essentially a free-enterprise system based upon a partnership between the public and private sectors. Jordanian Government encourages direct foreign private and public investment and permits 100% ownership of domestic enterprises.

Within the framework of such general characteristics, the industrial policies which the Jordanian Government has been applying to the manufacturing sector, are generally regarded as appropriate and in fact have worked successfully up to this date.

The major policies comprise :

- active investment promotion through incentives including encouragement of Investment Law which provide attractive incentives for investment projects supporting the country's long-term development goals and inducing foreign investment in Jordan ;

- export-oriented industrialization based especially on the mutual co-operation with the neighbouring and other Arab countries; the free zones of Aqaba and Zarka are established in that sense in order to further promote exports and export earnings ;

- import substitution, stimulating industrial enteprises which offer import reduction and decrease of too high local dependence on foreign goods and services ;

- joint ventures are encouraged by the authorities and welcomed by the private sector; on the other hand, foreign companies have found their participation both profitable and providing good potential for expansion ;

- promotion of industries based on local resources, in particular chemical industries and non-metallic mineral production ;

- efforts in reducing disparities in regional development and employment opportunities by establishing industrial estates outside "greater Amman"; the estates are expected to offer prepared industrial sites, standard and terraced factories, warehouses, exhibition centres, housing for staff and workers and also additional investment incentives ;

- updating regulations governing industrial licensing procedures in order to simplify them and accelerate implementation of new projects ;

- promotion of the private entrepreneurship and especially that in small-scale industries, based on the Government's unequivocal committment to continuing Jordan's essentially free entreprise system, and on the fact that the private sector has shown dynamic growth, and ability to adapt itself to the current economic situation.

Such policies have been faced by some structural issues, problems and constraints associated with the manufacturing sector. They can be summarized as follows :

- Low capacity utilization -

Except some cases. the manufacturing capacity utilization is very low. It is unacceptable that some installed capacities have been utilized by less than 50% and some among them by even less than 20%;

- Local demand dependence on imports -

The dependence on imported raw materials and intermediates is a continued problem of the manufacturing industries. The majority of the four selected subsectors depend on imports by 80-100%. Only building materials industries, some food processing industries and chemicals based on local sources can be considered as independent of imports.

- Lack of intersectoral linkage -

Lack of interconnections between the industrial and other productive sectors, particularly agriculture, results in a relative underdevelopment of the food industries. Also the textile industries import large quantities of cotton and wool, but both imports could be perhaps reduced by their local production;

- Lack of intra-industry linkage -

Lack of this kind of linkage results in the increased dependence on imports, like e.g. of food industries which import machinery and equipment, some of which could be produced locally. Or chemical industries which

need a range of intermediates for whose production the domestic resources are abundant.

- Small size of the domestic market -

This is one very important constraint to the successful economic growth of Jordan's manufacturing sector, since the local market cannot absorb industrial products. In addition to it, the market is flooded with competitive imports leading to production surpluses.

- Limited exports possibilities -

Except phosphates, some chemicals and textiles exports and other industrial exports are very limited due to insufficient integration and co-operation at the Arab regional level. Consequently, the Jordanian foreign trade balance is highly dependent on imports.

- Inadequate industrial exports promotion incentives -

Incentives encouraging industrial exports and investments therein are not adequate with respect to accelerated depreciation of fixed assets, tax deductions in favour of research and development centres, tax exemptions on profits realised from exports and on reinvested profits.

- Low level of science and technology -

The modern industries demand high technology. However, the policy instruments to foster the industrial technology remain inadequate with little research and development activities within the manufacturing enter-

prises and their co-operation with the scientific institutions. There are some industries like food processing and textiles with no quality-control laboratories and with no scientific workers. Such a lack of interest in science and technology hinders the formulation of any coherent and comprehensive policy designed to develop indigenious industrial technology in Jordan. As a result, the policy instruments and institutional mechanisms to stimulate introduction of modern industrial technology remain inadequate with little research and development activities.

- Low labour productivity -

In the greater part of the analysed subsectors, labour productivity is below the average. Only beverages, cigarettes and tobacco, petroleum refining and building materials have registered higher labour productivity than the average, whereas it is significantly lower than the average with all the other five sub-subsectors.

- Shortages of skilled manpower -

The shortage of skilled manpower is marked by a very low number of engineers in many industrial establishments.

At the same time, in recent years Jordan has exported skilled and educated manpower to the Arab Gulf States and unskilled and semi-skilled workers have begun to flow into Jordan. Consequently, the necessary technology is imported and partly modified and improved to suit local conditions or to meet market changes.

- Lack of comprehensive feasibility studies -

Weakness of domestic expertise in the preparation of feasibility studies, coupled with the weakness of the marketing and project evaluation, results in the implementation of industrial projects producing losses or realizing overcapacities.

- Regional overconcentration of industrial investments -

Overconcentration of industrial capacities in the Amman Governorate results from the abundance of industrial and infrastructural services offered by the capital, such as good water and electricity supply, excellent telephone and telex services, high class hotels, excellent air connections, suitable housing and good supply with foodstuffs and other consumer goods. Due to lack of all those services in other regions of Jordan, investors prefer to implement their business activities in the capital.

- Lack of integrated industrial planning -

The manufacturing sector is not presented in a standard form in the present and earlier plan documents. Sectoral plan documents are not elaborated and no adequate plan data available. Some incomplete and insufficient goals and projections do not give either comprehensive information on the performance of previous plan forecasts or adequate projections for the future plan periods. Lack of some industrial planning categories, that have not been so far put into the plan documents, are of high priority, like detailed employment and investment policy,

labour and capital productivity, manufacturing sectoral and overall industrial planning etc., and they must be tackled in the future together with a systematic planning implementation and monitoring. The inadequacy of the supporting system is also one of the constraints in applying modern industrial planning techniques and procedures.

Efficient industrial planning requires reliable statistical data. However, lack of proper coordination and cooperation among the institutions engaged in statistical activities has generated conflicting information on the same items. It is difficult to believe that different sources should have had access to different statistics on the same industrial categories like the production in quantities, gross output in values, employment etc. Possibly responsibles in industrial firms gave different information asked on the same items at different times.

8. RECOMMENDATIONS

Jordan is now in a new phase of development. During the last decade the country has gained increased importance as a regional business area and the economic growth has noticed a significant progress through the main industrial and mining domestic exports like phosphates, fertilizers, potash (from 1984), pharmaceuticals, wood frames etc. and through some agricultural exports such as tomatoe and tomatoe juices, citrus fruits, cucumber, eggplants and squash. However, the volume of external trade declined in 1985 after it had expanded in 1984.

This development, including the structural constraints of the economy, has been reviewed and the review has indicated that the generally favourable conditions during the past decade would no longer prevail. The changing environment calls for a new approach to development. To continue the process of economic development, the manufacturing sector should play a dynamic role, guided by long-term development objectives, which in turn should be supported by new development strategies.

8.1. Main recommendations for the manufacturing sector

Considering the above-mentioned situation, the basic long-term objectives for the development of the manufacturing sector proposed by the Industrial Survey are the following:

- to promote opportunities for the maximum and efficient utilisation of the country's abundant natural resources;

- to accelerate the growth of the manufacturing sector by ensuring a continued increase of capacities utilisation, an increase of employment opportunities and labour productivity, and national, and economically feasible, investments accompanied by reasonable depreciations of fixed assets ;

- to aim at encouraging a decrease of the present negative external trade balance ;

- to encourage establishment and development of scientific research, transfer and application of advanced technology in order to enhance the growth and technical progress of the manufacturing sector ;

- to strengthen inter-Arab industrial cooperation and integration by encouraging joint projects, especially those employing appropriate and modern technology.

These objectives require a set of development strategies, which are discussed below, supported by appropriate policies for their implementation.

Within this framework, the major effect should be concentrated on basic elements of strategies:

- export-oriented industries,
- carried out by the priority industries,
- and selected from both :

- local resources-based and
- non-local resources-based industries.

This requires systematic support from :

- science, technology and manpower,
- modernisation and rationalisation of the manufacturing structure,
- improved incentive systems,
- infrastructure and strategic physical location,
- institutional rearrangements.

The application of an export-oriented strategy requires the pursuit of appropriate policies whose key principles could be summarised in the following manner :

- balanced incentives for import-substitution and export increase ;

- a trade régime for all exporters giving them unrestricted access to (i) export markets but ensuring that tradable inputs are offered at no more than world prices, and (ii) tariff exemptions on imported inputs in addition to existing income-tax exemptions, together with exemptions from indirect taxes on inputs;

- variations in effective protection within the manufacturing sector should be a basic guideline in setting tariff rates, but should also be kept to minimum ;

- anyone engaged in export activities, regardless of kind of industry or product, should be able to benefit from the exports incentives;

When defining priority industries the starting point should be the comparative advantage offered by certain groups of products with regard to:

- local manufacturing development,
- increase of self-sufficiency,
- stimulation of exports.

These three criteria should be applied, first of all, to local resource-based industries. They are preponderantly chemicals based on phosphate and potash and the entire building materials production. The self-sufficiency could also be extended to the field of food industries through a closer cooperation with the agricultural sector. Textile industries could also elaborate a long-term cooperation with the agriculture in assuring some quantities of raw materials inputs.

Priority could also be given to the industries producing capital goods and intermediates in chemical industries, electrical and metal-working industries.

Science and technology development is one of the most fundamental problems in countries like Jordan intending growth to a higher level of industrialisation. Closely analysing Japan, Republic of Korea, Taiwan and Singapore, two types of patterns may be observed :

- the required technology is provided to the industry through local engineers and scientists, who obtain the know-how through either training and exchanging knowledge or through technology licences from advanced countries;

- the required technology is provided not only through the local manpower, but additionally brought into the country directly by the foreign corporations and direct investment.

The process of acquiring technology capability requires research manpower, institutional arrangements, incentives and financial support.

Currently the academic personnel is insufficient in the majority of industries not only when it is a question of the everyday production but also in the field of the research activities. Such a shortcoming should be rectified by engaging urgently more academics in industries like food processing, textiles, chemicals and building materials production, to cover the production lines, quality control and research activities. The use of expatriate researchers, including those offered by the international assistance institutions and agencies, could also be considered, because this is a good channel of introducing modern technologies to the indigenous industries and of rationalising the manufacturing structure.

The establishment of quality-control laboratories, wherever it is necessary, and especially in the food and textile industries, should be one of the primordial tasks in the near future. Close cooperation and collaboration of the industries with the corresponding scientific institutions like universities and the Royal Scientific Society, should also be encouraged by setting of standards of collaboration and by establishing funds on the level of the enterprises which will be primarily used for industrial research.

Some of the incentives to be suggested in order to boost the manufacturing sector in technology activities and to stimulate the private-sector engagement in this field are :

- exemption from import duty and investment tax, and accelerated depreciation on the research and development equipment ;
- exemption from income tax for the portion of the current income aimed at the technology development ;
- any company entitled to the income tax exemption or reduction, might be allowed to have additional 2-3 years of the same privilege if it spends on the average more than, for example, 2 to 4 per cent of its sales revenue on research and development activites during the privileged period ;
- preferential loans for research and development ;
- special grants or interest-free loans for prototype or research projects which are suggested to be implemented in Jordan for the first time.

Small-scale industries should also be included into the suggested modernisation and rationalisation activities, especially those which are able to supply high-quality components and parts at competitive prices.

Any factory, wherever located, needs a supporting infrastructure such as transportation, water, sewage, communication and other facilities. All these influence the physical location of the factory and geographical

dispersal of the industries, not withstanding also natural and manpower resources. To achieve geographical dispersal and to reduce the urbanization problems at Amman and its outskirts, these infrastructures should be provided not only in the Amman area, but also in other regions of Jordan, thereby also creating employment opportunities in these regions. For these reasons the regional component should be introduced into the economic and social planning of the country's development.

The development tasks to achieve the objectives of the suggested manufacturing sector development require some institutional rearrangements. They concern three salient points :

- planning and follow-up system ;
- industrial surveys and statistical data ;
- the feasibility studies elaboration and projects implementation follow-up.

With regard to the planning stage it is suggested that the Ministry of Industry and Trade be charged with the responsiblity of:

- elaborating the first draft of the future manufacturing development plans to be discussed with the Ministry of Planning, Chamber of Industry, Central Bank of Jordan and Industrial Development Bank, which will then be included in the overall five-year plans;

- after adopting a manufacturing development plan it would be necessary to follow-up the performance of such a plan and to undertake adequate measures for its successful implementation.

The manufacturing development plans should involve planning on the level of industrial subsectors and not only on the level of overall manufacturing as it is the case with the present plan.

It is also recommended to elaborate a comprehensive industrial survey covering all industrial subsectors and not only some of them, as it is the case with the present Survey. Such a survey should provide a complete information on the entire manufacturing sector as the prerequisite of the industrial development within the framework of the next five-year plan. Survey performance should also be followed-up.

In elaborating the survey, complete industrial statistical data are required to be prepared by the Department of Statistics in close cooperation with the Ministry of Industry and Trade and other concerned institutions. The purpose of this recommendation is to eliminate present discrepancies and incongruity of the same economic units published in different sources of statistical information.

Comprehensive statistical production and marketing statistical information are indispensable for the elaboration of complete and realistic feasibility studies needed for investment decision and project preparation, implementation and management. Such a data and information base must be built up in order

to avoid recurrence of the incidence of failure of some projects in the recent past.

The strengthening of the capabilities of governmental agencies in evaluating feasibility studies and the utilization of local expertise whenever available are prerequisites which should be given immediate attention.

Finally, when it is a question of institutional rearrangements and measures, technical assistance by UNIDO and other UN agencies, as well as the assistance of Arab and other friendly institutions and countries would play an important role in the technical, economic and professional segments of the manufacturing development. The elaboration of a long-term plan of technical cooperation will be one of the important factors in helping and enhancing the industrial activities of the country.

Such technical assistance could be concentrated on strengthening and enhancing the government capabilities for the integrated industrial planning, implementation and monitoring within the third Five-Year Plan 1986-1990.

8.2. Summarized subsectoral recommendations

The detailed sectoral recommendations are specified in the corresponding final reports. Out of them only main ideas and measures are summarized in this section. Excerps from the recommendations made in the subsectoral reports are reproduced in annex III, sections A to D.

- Food industries -

The recommendations concern capacity utilization, size, quality control, production cost, marketing, expertise and packaging. The last and the most interesting paragraph entitled "Project ideas" gives a long list of project ideas for the following 11 sub-subsectors: dairy products, meat and poultry products, fruits and vegetables, oil and fat products, milling industries, sugar and chocolate products, bakery products, animal feeds, other foodstuffs, drinks and food packaging.

- Textile industries -

The subsectoral survey suggests the establishment of a weaving factory for producing cotton and cotton blended fabrics, two units for dyeing (one for imported fibres and one for locally produced yarns), additional knitted underwear production units to cover local needs, new spinning factory for man-made yarns production and a fashion design centre for clothing subsector. Furthermore, the survey recommends to organize the collection of local sheep wool for the production of blankets, carpets and rugs, as well as to examine the feasibility of cotton plantation, in order to dicrease dependency upon the present imports of wool and cotton.

- Chemical industries -

Except general recommendations, the specific recommendations include concrete proposals concerning

uranium extraction from phosphate ore or phosphogypsum, production of mixed fertilizers, and exploitation of the Dead Sea resources (soda ash, potassium sulphate, magnesium salts, caustic soda, chlorine, lithium etc.) and recovery of sulphur from crude oil during the refining process, and using it in the fertilizers production. The existing and proposed projects need costly energy based on imported crude oil. Therefore, possibilities of using alternative energy sources (local oil shale, solar energy, biogas) should be studied carefully. The increased share of petrochemicals is also recommended to be studied seriously. Six commodities are listed to be determined initially and based on the intermediates already being produced in Saudi-Arabia; additional ones could be specified in close cooperation with that neighbouring countries. Finally, some recommendations concern plastics production aimed at introducing new plastic consumer goods and reducing their present imports.

- Building materials industries -

Recommendations include measures aiming at an improvement of the structure of the subsector. One of the most important measures refers to giving priority to industries depending mainly on local sources.

9. CONCLUSION

Each of the findings and recommendations is important to the forthcoming period of Jordanian industrial development. However, they need to be adopted as part of a coordinated strategy so as to bring about changes in the industrial environment and to pave the way for export-oriented manufacturing growth. Finally they require a full commitment to expose the economy to competition which should stimulate its growth and enhance its efficiency. This essential ingredient of commitment will bring about benefits emanating from a well conceived development policy.

Annex I

STATISTICAL TABLES

Contents

Note: Totals may not add precisely because of rounding.

Table 1 : TOTAL MANUFACTURING GROSS OUTPUT, INTERMEDIATE CONSUMPTION AND VALUE ADDED 1984

JD Million

Kind of industry	Gross output	Intermediate consumption	Value added
Food manufacturing	69.8	52.7	17.1
Beverages	17.2	8.4	8.8
Cigarettes and tobacco	43.4	10.6	32.9
Textiles	13.2	8.1	5.1
Clothing	11.0	6.7	4.3
Chemicals & chemical products	161.4	139.2	22.1
Petroleum refining	272.1	242.6	29.6
Rubber & rubber products	0.0	0.0	0.0
Plastics & plastic products	19.4	13.4	6.0
Building materials	88.8	42.0	46.8
Subtotal	696.3	523.7	172.7
Other kinds of industry	304.3	186.7	117.5
Total manufacturing sector	1000.6	710.4	290.2

Source : Department of Statistics - Industrial Census 1984, December, 1986.

Table 2 : INTERMEDIATE CONSUMPTION 1984

JD million

Kind of industry	Total	Out of which: a/	
		Local sources	Imports
Food manufacturing	52.7	26.0	19.4
Beverages	8.4	2.1	3.7
Cigarettes & tobacco	10.6	1.8	7.9
Textiles	8.1	0.5	5.8
Clothing	6.7	2.2	3.0
Chemicals & chemical products	139.2	73.2	49.1
Petroleum refining	242.6	0.03	232.8
Rubber & rubber products	0.0	0.0	0.0
Plastics & plastic products	13.4	1.6	8.7
Building materials	42.0	10.8	3.7
Subtotal	523.7	118.2	334.1
Other kinds of industry	186.7	34.9	48.4
Total manufacturing sector	710.4	166.2	382.5

a/ It covers only the value of raw materials purchased for the production 1984; consequently the two items are only a part of total intermediate consumption.

Source : Department of Statistics - Industrial census 1984, December, 1986.

Table 3 : VALUE ADDED 1984

JD Million

Kind of industry	Total	Out of which : a/		
		Compensation of employees	Depreciation	Operating surplus
Food manufacturing	17.1	5.9	2.8	7.7
Beverages	8.8	1.8	1.4	0.7
Cigarettes & tobacco	32.9	2.3	0.5	0.2
Textiles	5.1	1.5	0.6	2.5
Clothing	4.3	2.1	0.2	1.6
Chemicals & chemical products	22.1	8.5	13.1	- 1.2
Petroleum refining	29.6	10.0	9.1	51.9
Rubber & rubber products	0.0	0.0	0.0	0.0
Plastics & plastic products	6.0	2.1	1.3	2.3
Building materials	46.8	9.3	9.7	11.0
Subtotal	172.7	43.5	38.6	76.7
Other kinds of industry	117.5	49.4	27.3	40.0
Total manufacturing sector	290.2	92.9	65.9	116.7

a/ Net indirect taxes are not tabulated ; consequently the three items cover only a part of total value added.

Source : Department of Statistics - Industrial census 1984, December 1986.

Table 4 : TOTAL MANUFACTURING GROSS OUTPUT, INTERMEDIATE CONSUMPTION AND VALUE ADDED 1984

Establishments with 5 and more persons

JD million

Kind of industry	Gross output	Intermediate consumption	Value added
Food manufacturing	65.1	49.7	15.4
Beverages	17.2	8.4	8.8
Cigarettes & tobacco	43.4	10.6	32.8
Textiles	12.6	7.8	4.8
Clothing	9.2	6.1	3.1
Chemicals & chemical products	161.4	139.2	22.1
Petroleum refining	272.1	242.6	29.6
Plastics & pastic products	19.4	13.4	6.0
Building materials	82.4	38.1	44.3
Subtotal	682.7	515.8	166.9
Other kinds of industry	276.3	174.4	101.9
Total manufacturing sector	959.0	690.2	268.8

Source : Department of Statistics - Industrial Census 1984, December 1986.

Table 5 : MANUFACTURING GROSS OUTPUT
INTERMEDIATE CONSUMPTION AND VALUE ADDED 1985

Establishments with 5 and more persons

JD Million

Kind of industry	Gross output	Intermediate consumption	Value added
Food manufacturing	72.3	56.7	15.6
Beverages	18.7	8.2	10.5
Cigarettes & tobacco	46.9	10.8	36.1
Textiles	14.3	9.2	5.1
Clothing	8.6	6.2	2.5
Chemicals and chemical products	89.2	72.9	16.3
Petroleum refining	260.2	226.1	34.1
Rubber & rubber products	—	—	—
Plastics & plastic products	17.7	12.7	5.0
Building materials	81.5	38.9	42.7
Subtotal	609.4	441.7	167.9
Other kinds of industry	305.5	191.0	114.6
Total	914.9	632.6	282.3

Source : Statistical table 1985 - Department of Statistics.

Table 6 : PRODUCTION OF MAIN COMMODITIES 1984
in quantities and values

Commodities	Quantities in production units		Value in JD thousands
Food industries			
- Dairy products	tons	30926	8136.1
- Fruits & vegetables	"	7295	2582.9
- Oil & fats	"	1902	1902.5
- Grain mill products	"	352424	17349.9
- Bakeries & biscuits	"	471073	12821.1
- Sugar products	"	491	221.0
- Chocolate products	"	10661	6397.0
- Animal feeds	"	128389	14764.7
- Liquors a/	000 litres	2553	3411.0
- Beer	"	5021	715.4
- Soft drinks & mineral water	"	105485	13070.5
- Cigarettes	tons	5027	43459.2
Textile industries			
- Cotton & cotton blended yarn	tons	1862	3032.4
- Woollen worsted fabrics	"	516	5168.7
- Schoolboys' & girls' uniform fabrics	"	179	480.7
- Wool mixed blankets	"	48	80.0
- Acrylic blankets	"	54	126.5
- Head dresses	"	18	90.0
- Towel & bed sheets	"	54	65.8
- Under- & outwear	"	674	1415.4

- Socks	dozen	108000	352.3
- Wool carpets	tons	27	104.0
- Acrylic carpets	"	13	42.3
- Pray carpets	"	42	121.5
- Wearing apparel	000 pieces	3778	8568.2

Chemical industries

- Phosphates b/	000 tons	6120	78900.0
- Potash b/	"	490	14900.0
- Gases: oxygene	m3	860000	360.0
acetylene	tons	75	
- Chlorine, caustic soda & hydrochloric acid	"	7500	980.0
- Polymer intermediates	"	4975	1540.0
- Pesticides	"	50	290.0
- Diammonium phosphate	"	548417	44700.0
- Phosphoric acid	"	31320	3980.0
- Aluminium fluoride	"	2300	120.0
- Paints	"	14100	6900.0
- Thinners	"	676	200.0
- Wall pastes	"	868	100.0
- Human drugs	000 units	100000	12500.0
- Veterinary drugs	"		1100.0
- Detergents (liquid & powder)	tons	33056	10870.0
- Paste detergents	boxes	47216	140.0
- Toilet soap	tons	772	540.0
- Matches	mill. boxes	500	4950.0
- Petroleum refined products	tons	2581000	225700.0
- Rubber	"	52.5	87.0
- Plastic pipes	"	5089	4900.0

- Plastic bags	tons	4997	2000.0
- Plastic containers	"	6275	4300.0
- Polystyrene boxes	"	1625	1600.0
- Agriculture plastic houses	units	1988	2600.0
- Ball pens	mill.pens	39	300.0
- Houseware goods	tons	8059	4100.0
- Brushes	"	1113	600.0
- Mattresses	m3	81984	1500.0

Building materials industries

- Pottery	tons	3240	68
- China tiles	m2	378200	1042
- Earthenware	tons	1649	
- Glass sheets c/	"	2616	327
- Glass products	"	915	115
- Portland cement	"	1880351	43945
- Cement tiles	m2	394564	4515
- Cement blocks	pieces	2770286	317
- Concrete poles	"	9820	935
- Concrete pipes	metres	375168	1409
- Ready-mix concrete	tons	144430	1235

Sources: Industrial Survey Questionnaires 1984 - Ministry of Industry and Trade as well as companies' yearbooks and information.

a/ Major products are arack and alcohol.

b/ They are recorded here, although being classed with the mining sector, because of their special importance for the manufacturing sector.

c/ Trial production.

TABLE 7 : PRODUCTION OF SOME COMMODITIES IN QUANTITIES in 1984, 1985 and 1986

	Unit	1984	1985	1986	1984 = 100.0	
					1985	1986
- Phosphate	000 tons	6213.1	6067.1	6249.2	97.7	100.6
- Potash	"	486.0	908.2	1102.0	186.9	226.8
- Fodder	"	61.2	45.9	44.6	75.0	72.9
- Alcoholic drinks	000 litres	7202.0	5547.2	5457.2	77.0	75.8
- Cigarettes	mill. cig.	4341.9	3538.1	3327.7	81.5	76.6
- Textiles	000 metres	1201.5	2055.6	2055.8	171.1	171.1
- Spinning	tons	1831.1	1660.3	987.0	90.7	53.9
- Upper leather	000 m2	199.3	180.2	222.3	90.4	111.5
- Sole leather & wool	tons	43.9	29.3	18.1	66.7	41.2
- Fertilisers	000 tons	541.0	510.5	551.1	94.4	101.9
- Chemical acids	"	1194.6	1007.6	1024.8	84.4	85.8
- Detergents	"	25.5	15.0	28.1	58.8	110.2
- Cement	"	2026.3	2022.9	1794.7	99.8	88.6
- Iron	"	164.9	198.4	209.6	120.3	127.1
- Metallic pipes	"	14.7	14.2	12.5	96.6	85.0
- Petroleum products	"	2510.9	2423.9	2257.1	96.5	89.9
- Paper and cardboard	"	18.0	21.1	15.1	171.2	83.9
- Liquid batteries	000 bat.	50.1	49.6	55.7	99.0	111.2

Source : Monthly Statistical Bulletin,
February 1987 - Central Bank of Jordan.

TABLE 8 : BALANCE SHEET OF SOME SELECTED MANUFACTURED COMMODITIES 1984

Commodities	Unit	Demand	Supply	
			Local sources	Import
Food industries				
- Dairy products	tons	39615	8304	31311
- Tomato products	"	32764	32764	—
- Olive oil pressing	"	47425	37425	—
- Canned chick peas & beans	"	854	—	854
- Sesame products	"	5431	61	5370
- Milling products	"	500234	49700	450534
- Liquors	"	5492	708	4784
- Beer	"	746	—	746
- Fruit drinks	"	125	—	125
- Cigarettes	"	5027	2450	2577
- Tobacco	"	77.5	2.9	74.6
Textile industries				
- Cotton & cotton blended yarn	tons	2091	—	2091
- Woollen worsted fabrics	"	516	—	516
- Schoolboys' & girls' uniforms	"	179	18	161
- Wool mixed blankets	"	48	5.2	42.8
- Acrylic blankets	"	54	5.8	48.2
- Head dresses	"	18	—	18
- Towels & bed sheets	"	54	—	54
- Under- & outwear	"	674	30	644

- Socks	"	54	—	54
- Wool carpets	"	26.7	—	26.7
- Acrylic carpets	"	13	—	13
- Pray carpets	"	42.5	—	42.5
- Wearing apparel	000 metres	5678	2289	3389

Chemical industries

- Phosphates	000 tons	6120	6120	—
- Potash	"	490	490	—
- Gases: oxygen	m3	100%	local sources	—
acetylene	tons	75	—	75
- Chlorine, caustic soda & hydro acid	"	3776	3500	276
- Polymer inter-mediates	"	4956	799	4157
- Pesticides	"	81.2	62.5	18.7
- Diammonium phosphate	"	1374893	97c615	404376
- Phosphoric acid	"			
- Aluminium fluoride	"			
- Paints	"	14505	2505	12000
- Thinners	"	676	—	676
- Wall pastes	"	a l l	i m p o r t e d	
- Human drugs	000 units	a l l	i m p o r t e d	
- Veterinary drugs		a l l	i m p o r t e d	
- Detergents (liquid & powder)	tons	26500	—	26500
- Paste detergents	"	288	—	288
- Toilet soap	"	822	154	668
- Matches	"	10000	—	10000
- Petroleum refined products	"	2610000	—	2610000
- Rubber	"	52.5	—	52.5

- Plastic pipes	tons	5338	642	4696
- Plastic bags	"	5090	—	5090
- Plastic containers	"	6349	83	6266
- Polystyrene boxes	"	1625	—	1625
- Agriculture plastic houses	"	625	60	569
- Ball pens	"	408	—	408
- House ware goods	"	6783	196	6587
- Brushes	"	1037	15	1022
- Mattresses	"	2011	—	2011

Building materials industries

- Pottery	tons	3272	3240	32
- China tiles	"	9228	7760	1468
- Earthenware				
- Glass sheets	"	2616	2113	503
- Glass products	"	915	—	915
- Portland cement	"	1880000	1880000	—
- Cement tiles	"	186600	181800	4800
- Cement blocks	"	95250	95250	—
- Cement poles	"	9371	8711	660
- Concrete pipes	metres	119351	119351	—
- Ready-mix concrete	tons	178000	178000	—

Sources : Industrial Survey Questionnaires 1984 - Ministry of Industry and Trade as well as companies' yearbooks and information.

TABLE 9 : PRODUCTION AND EXPORTS OF SOME SELECTED COMMODITIES 1984

JD thousand

Commodities	Production	Exports
Food industries		
- Dairy products	8136	291
- Fruit & vegetables	2583	1051
- Fats & oils	1902	1123
- Grain mill products	17350	1672
- Bakery & biscuit products	12821	229
- Other sugar products	221	171
- Chocolate	6397	247
- Other foods	965	180
- Animal feed	14765	7013
- Liquors	3411	12
- Beer	715	--
- Soft drinks	13070	556
- Cigarettes	43459	4004
	Total: 125795	16549
Textile industries		
- Cotton & cotton blended yarn	3032	2919
- Woollen worsted fabrics	5169	1982
- Schoolboys' & girls' uniform fabrics	481	--
- Wool mixed blankets	80	--
- Acrylic blankets	127	--
- Head dresses	90	--
- Towels & bed sheets	66	--

- Under & outwear	1415	200
- Socks	352	--
- Wool carpets	104	--
- Acrylic carpets	42	--
- Pray carpets	122	--
- Wearing apparel	8568	6309
	Total: 19648	11210

Chemical industries

- Phosphates	78900	65000
- Potash	14900	14900
- Gases	360	--
- Chlorine, caustic soda and hydrochloric acid	980	650
- Polymer intermediates	1540	540
- Pesticides	290	100
- Diammonium phosphate	44700	44600
- Phosphoric acid	3980	3980
- Aluminium fluoride	120	--
- Paints	6900	2100
- Thinners	200	--
- Wall pastes	100	--
- Human drugs	12500	9500
- Veterinary drugs	1100	700
- Detergents (liquid & powder)	10870	6480
- Paste detergents	140	--
- Toilet soap	540	140
- Matches	4950	2850
- Petroleum refined products	225700	--
- Rubber	87	--
- Plastic pipes	4900	500
- Plastic bags	2000	--
- Plastic containers	4300	2400
- Polystyrene boxes	1600	--

- Agriculture plastic houses	2600	1300
- Ball pens	300	300
- Houseware goods	4100	1200
- Brushes	600	--
- Mattresses	1500	100
Total :	430757	157340

Building materials industries

- Pottery	68	--
- China tiles	1042	--
- Earthenware		--
- Glass sheets	115	--
- Glass products		--
- Portland cement	43945	2244
- Cement tiles	6238	989
- Cement blocks	317	--
- Concrete poles	935	--
- Concrete pipes	1409	--
- Ready-mix concrete	1235	--
Total :	55304	3433

Source: Industrial Survey Questionnaire 1984 - Ministry of Industry and Trade.

TABLE 10 : INVESTMENTS 1984

BY TYPES OF CAPITAL GOODS

Establishments engaging 5 and more persons

JD thousand

Kind of industry	Land	Buildings & constructions	Machinery & equipment	Transport vehicles	Others	Total
Food manufacturing	—	10	1017	15	286	1328
Beverages	—	332	501	235	496	1564
Cigarettes & tobacco	—	185	48	29	4	266
Textiles	—	1	263	32	123	419
Clothing	—	2	102	17	17	138
Chemicals & chemical products	—	1320	3217	132	495	5164
Petroleum refining	—	138	428	259	252	1077
Plastics & plastic products	86	77	668	38	226	1096
Building materials	251	781	2626	989	2448	7095
Subtotal	337	2846	8871	1746	4347	18147
Other kinds of industry	223	4007	10971	616	18829	34646
Total manufacturing sector	560	6853	10842	2362	23176	52793

Source : Industrial Census 1984 -
Department of Statistics, December 1986.

TABLE 11 : INVESTMENTS 1984
BY SOURCES OF FINANCING

Establishments with 5 and more persons

JD thousand

Kind of industry	Private	Public	Other a/	Total
Food manufacturing	1245	83	—	1328
Beverages	1564	—	—	1564
Cigarettes & tobacco	266	—	—	266
Textiles	187	205	27	419
Clothing	93	26	19	138
Chemicals & chemical products	4232	443	489	5164
Petroleum refining	635	75	367	1077
Plastics & plastic products	1096	—	—	1096
Building materials	3000	3947	148	7095
Total manufacturing sector	12318	4779	1050	18147

Source : Industrial Survey Questionnaires 1984 - Ministry of Industry and Trade as well as companies yearbooks and information.

a/ Includes private institutions and societies as well as foreign sources.

TABLE 12 : VALUE OF FIXED ASSETS AT FACTOR COST AND DEPRECIATION 1984

Establishments with 5 and more persons

JD thousand

Kind of industry	Value of fixed assets	Depreciation	Depreciation ration
Food manufacturing	38 747	2 680	6.9
Beverages	18 783	1 363	7.3
Cigarettes & tobacco	6 150	521	8.5
Textiles	10 027	587	5.9
Clothing	2 714	174	6.4
Chemicals & chemical products	169 224	13 019	7.7
Petroleum refining	120 800	9 127	7.6
Plastics & plastic products	18 197	1 339	7.4
Building materials products	233 474	9 637	4.1
Subtotal	618 116	38 447	6.2
Other kinds of industry	480 385	26 518	5.5
Total manufacturing sector	1 098 501	64 965	5.9

Source: Industrial Census 1984 -
Department of Statistics, December 1986.

TABLE 13 : EMPLOYMENT 1984, BY ACTIVITIES

Establishments with 5 and more persons

Kind of industry	Production	Administration	Others	Total
Food manufacturing	3407	655	436	4498
Beverages	437	133	296	866
Cigarettes & tobacco	609	53	68	730
Textiles	726	144	136	1006
Clothing	1480	211	33	1724
Chemicals & chemical production	2129	652	607	3388
Petroleum refining	1699	492	424	2615
Plastics & plastic products	1090	253	114	1457
Building materials	3426	748	580	4754
Subtotal	15003	3341	2694	21038
Other kinds of industry	15274	3594	1967	20835
Total manufacturing sector	30277	6935	4661	41873

Source : Industrial Census 1984 -
Department of Statistics, December 1986.

TABLE 14 : EMPLOYMENT 1984, BY SEX

Establishments with 5 and more persons

Kind of industry	Males	Females	Total
Food manufacturing	4165	333	4498
Beverages	804	62	866
Cigarettes & tobacco	632	48	730
Textiles	683	323	1006
Clothing	1116	608	1724
Chemicals & chemical products	2821	567	3388
Petroleum refining	2541	74	2615
Plastics & plastic products	1420	37	1457
Building materials	4699	55	4754
Subtotal	18931	2107	21038
Other kinds of industry	20136	699	20835
Total manufacturing sector	39067	2806	41873

Source : Industrial Census 1984 -
Department of Statistics, December 1986.

TABLE 15 : EMPLOYMENT 1984, BY NATIONALITY

Establishments with 5 and more persons a/

Kind of industry	Jordanians	Non-Jordanians	Total
Food manufacturing	3703	795	4498
Beverages	670	196	866
Cigarettes & tobacco	716	14	730
Textiles	816	190	1006
Clothing	1170	554	1724
Chemicals & chemical products	2967	421	3388
Petroleum refining	2613	2	2615
Plastics & plastic products	976	481	1457
Building materials	4185	569	4754
Total	17816	3222	21038

Sources:

1 - Industrial Census 1984 -
Department of Statistics, December 1986.

2 - Survey Questionnaires 1984 -
Ministry of Industry and Trade.

a/ Only for four selected industries.

TABLE 16 : EMPLOYMENT BY SEX AND NUMBER OF ESTABLISHMENTS 1985

Establishments with 5 and more persons

Kind of industry	Number of establish-ments	Males	Females	Total
Food manufacturing	353	4730	512	5242
Beverages	18	890	95	985
Cigarettes & tobacco	4	712	42	754
Textiles	46	664	323	987
Clothing	128	1181	655	1836
Chemicals & chemical products	67	3018	783	3801
Petroleum refining	1	2746	16	2762
Plastics & plastic products	50	1509	33	1542
Building materials	259	4776	56	4832
Subtotal	926	20226	2515	22741
Other kinds of industry	893	21216	720	21936
Total	1819	41442	3235	44677

Source: Statistical table 1985 - Department of Statistics, 1987.

TABLE 17 : PAID-UP CAPITAL 1984

Establishments with 5 and more persons

Kind of industry	Number of establishments	Paid-up capital JD thousand
Food manufacturing	314	20 624
Beverages	16	4 150
Cigarettes and tobacco	4	2 520
Textiles	45	7 934
Clothing	117	3 371
Chemicals & chemical products	56	77 410
Petroleum refining	1	32 000
Rubber & rubber products	0	0
Plastics & plastic products	50	8 041
Building materials	248	103 447
Subtotal	851	259 497
Other kinds of industry	835	221 050
Total	1686	480 547

Source : Industrial Census 1984 -
Department of Statistics, December 1986.

TABLE 18 : DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS EMPLOYEES AND VALUE ADDED 1984, BY GOVERNORATES

Governorate	Number of establishments	Number of employees	Value added JD thousand
	Establishments with 5 and more persons		
Amman	1243	28 329	171 233
Irbid	253	2 422	8 184
Balqa	57	2 431	36 834
Karak	30	4 504	47 132
Ma´an	102	2 189	5 455
Total	1 686	39 875	268 838
	Establishments with less than 5 persons a/		
Amman	4 730	4 721	11 169
Irbid	1 464	1 526	4 418
Balqa	254	277	765
Karak	183	818	4 328
Ma´an	216	238	646
Total	6 847	7 580	21 326
	Total establishments		
Amman	5 974	33 050	182 403
Irbid	1 717	3 948	12 602
Balqa	311	2 708	37 599
Karak	213	5 322	51 460
Ma´an	318	2 427	6 101
Total	8 533	47 455	290 164

Source: Industrial census 1984 - Department of Statistics, December 1986.

a/ Figures under "Establishments with less than 5 persons" have been modified according to the figures given under "Total establishments".

TABLE 19 : NUMBER OF ESTABLISHMENTS, BY KIND OF INDUSTRY in 1984 and 1985

Establishments with 5 and more persons

Kind of industry	1984	1985
- Food manufacturing	314	353
- Beverages	16	18
- Cigarettes & tobacco	4	4
- Textiles	45	46
- Clothing	117	128
- Chemical & chemical products	56	67
- Petroleum refining	1	1
- Plastics & plastic products	50	50
- Building materials	248	259
- Subtotal	851	926
- Other kinds of industry	835	893
- Total	1686	1819

Source: 1) Industrial Census 1984 - Department of Statistics, December 1984.

2) Statistical Table 1985 - Department of Statistics, 1987.

TABLE 20 : LIST OF PROJECTS UNDER IMPLEMENTATION

Title of the project	Starting year of implemen.	Expec. year of comple.	Total investment costs JD	Annual: Gross production	Annual: Value of exports JD	Annual: Imports demand in quant.	Annual: New employees
Food industries							
- Dairy products - yougurt, UHT milk, ice cream, goats, cows & sheep cheese :							
	1985	1987	500 000	600 tons	—	183 tons	7
- Meat and meat products - luncheon chicken meat and frozen chicken :							
	1986	1987	1 960 000	2410 tons	783250	—	120
- Bakery products - pastries and bread :							
	1985	1987	600 000	680 tons	—	—	32
- Other food products - ready-to-eat meals :							
	1986	1987	50 000	500 tons	150000	300 tons	16
- Fruits and vegetables - frozen vegetables and pickles :							
	1986	1987	100 000	1130 tons	—	...	46
- Sugar products - candy, chewing gum and halva :							
	1986	1987	325 000	770 tons	35000	770 tons	57
- Carbonated drinks :							
	1986	1987	200 000	9000 tons	—	900 tons	20
- Fruit juice concentrates :							
	1986	1988	1 500 000	46000 tons	150000	—	123

Textile industries

- Curtain strips :

1985	1986	20 000	21 tons		21 tons of cotton & polyester yarn	10

- School uniform fabrics, curtain strips and canvas :

1985	1987	150 000	35 tons	50 000	25 tons yarn	8

- Dyeing, printing and finishing of woven fabrics:

1986	1987	150 000	400 tons	1500 000 reexport	1 000 000 metres	8

- Pullovers and underwear :

1986	1987	350 000	80 tons	100 000	60-100 tons cotton and acrylic yarn	30

- Socks :

1986	1987	...	30 tons	75 000	30 tons of man-made yarns	10

Chemical industries

- Sulphoric acid:

1983	1986	12 000 tons	

- Amides :

1983	1986	4 000 000	2000 tons		772 800	30

- Loral ethyl sulphate :

1983	1986	8000 tons

- Silicate :

1983	1986	15000 tons

- Wool and wall paste :

1985	1986	2[illegible]000	6000 tons	12 000	91 000	12

- Mixed fertilizers :						
1984	1987	225 000	7560 tons			18
- Varnishes and paints for shoes :						
1986	1987	50 000	750 000 units	56 250	64 190	12
- Shoes and tiles polishing materials :						
1985	1986	350 000	160 tons			
- Shoes polishing materials :						
1986	1987	30 000	155 tons	5 000	24 000	5
- Car lacquers, pastes and thinners :						
1984	1987	160 000	343000 JD	70%	245 300	14
- Salts, liquids and creams extraction from the Dead Sea :						
1987	...	450 000	130 tons			8
- Eye drops (expansion) :						
1986	1987	1750 000	12 mill. bottles			
- Soap factory (expansion) - local soap :						
1985	1987	35 000	300 tons		49 900	6
- Different cleaning products :						
1985	1987	185 000	398000 JD		194 400	43
- Glues and silicon sealant :						
1986	1987	50 000	606000 lit. and 500 000 tubes	350000	253 400	5
- Antifreeze and glues :						
1986	1987	160 000	1262000 JD		107 500	21
- Tires :						
1985	1987	700 000	20 000 tires		300 000	12
- Polysterene boxes :						
1985	1986	350 000	2 mill. boxes		262 500	18
- Rubber rings :						
3/1986	11/1986	30 000	362 000 pieces	20 000	10 950	5

- Plastic heels :						
3/1986	6/1986	150 000	216 000 pairs		13 000	23
- Plastic heels :						
1986	1987	130 000	500 000 pairs	60 000	71 000	71
- Plastic rugs :						
1985	1986	75 000	60 000 pieces		79 000	26
- Plastic tubing :						
1984	1986	50 000	500 tons	87 000	79 200	23
- Plastic tubing :						
1986	1987	235 000	684 tons		183 800	37
- Plastic handles and wheels :						
1985	1986	20 000	37 000 JD		13 950	7
- Plastic handles and belts :						
1/1986	10/1986	32 000	70 tons		23 100	10
- Plastic furniture :						
1984	1987	140 000	408 000 JD		300 000	19
- Plastic houses :						
1985	1986	1800 000	6 000 tons	1314 300	1557 850	47
- Plastic doors and windows :						
1985	1986	15 000	135 000 m3		120 000	13
- Plastic rolls and bags :						
1984	1986	100 000	107 500 JD		60 000	8
- Mattresses:						
1984	1986	22 800	1160 tons	311 900	589 130	20
- Car mats and decoration pieces :						
1985	1986	35 000	218 400 pieces		20 000	6
- Plastic threads for agriculture use :						
1984	1986	30 000	120 tons	40 000	50 160	14

Building materials industries

- Granite production :

1986	1987	100 000	30 000 m2	50 000	—	8

- Sand glass and light stone production :

1986	1987	500 000	50 000 tons	1700 000	100 tons of citric acid	88

Source : Ministry of Industry and Trade -
List of licensed projects and direct contacts with the investors.

TABLE 21 : LIST OF PROJECTS UNDER CONSIDERATION OR STUDY

Title of the project	Total investment cost JD thousand	Annual gross production in quant.	New employees
Food industries			
Dairy products	1 500	1 500 tons	50
Fruits & vegetables	1 600	3 000 "	72
Sugar products	480	230 "	38
Animal feeds	30	10 000 "	10
Carbonated drinks	1 300	17 000 "	100
Textiles industries			
Acrylic & polyester spinning	45	165 tons	15
Gauze & grip bandage	10	5 " of cotton yarns	2
Chemical industries			
Blood derivates, enzymes etc.	202	110 000 units	25
Bioshofite from the Dead Sea	46.5	3 000 tons	15
Veterinary drugs	9 600	10 600 tons	
Cream & liquid detergents (medical)	60	150 000 units	8
Brake oil	170	250 000 litres	12
Asphaltic rolls	125	700 tons	13
Rubber mops	53.4	4.3 mill.units	25
Plastic ware for medical use	100	150 000 JD	14
Plastic pieces for furniture & windows	15	20 mill.pieces	4
Plastic lighters	273	7.2 mill.units	22

Polystyrene boxes	674	30 tons	644
Sulphate	5 500	200 000 tons	
Updating studies on by-product (potash)	2 000		
Sodium carbonate (soda ash)	77 000	300 000 tons	
Sulphuric acid production increase	2 500	800 tons	
Storage capacity increase of diammonium phosphate & aluminium fluoride	2 500		
Increase of phosphoric acid & cooling system	3 000		
Concentrated phosphoric acid, monoammonium phosphate and diammonium phosphate	404 000	(postponed for the time being)	
Bromine production	8 000	250 000 tons	
Magnesium & refactory bricks	14 000	5 000 tons	
Building materials industries			
Tiles & bricks	50	700 000 m^2 tiles 1 mill. bricks 15 000 street stones	23
Granite & similar decorative materials	20	170 tons	

Source : Ministry of Industry and Trade -
Lists of licensed industries and direct contacts with the investors.

TABLE 22: DOMESTIC COMMODITIES EXPORTS[a/]

JD thousand
(Values CIF Jordan clearing posts)

Commodities	1984	1985	1984=100.0
Food industries			
Products of the milling industry malt & starches, gluten, inulin	1 624.7	5102.6	314.1
Animal & vegetables fats & oils & their cleavage products, prepared edible fats, animal & vegetable waxes	1 122.9	175.7	15.6
Sugar & sugar confectionery	151.5	203.8	134.5
Cocoa & cocoa preparations	247.3	161.1	65.1
Preparations of cereals, flour or starch, pastry products	281.3	135.6	48.2
Edible preparations of vegetables, fruit or other part of plants	1 343.3	1 137.9	84.7
Miscellaneous edible preparations	214.9	83.3	38.8
Beverages, spirits & vinegar	261.0	211.5	81.0
Residues & waste from the food industries, prepared animal fooder	7 012.8	6 781.7	96.7
Tobacco products	4 004.0	1 725.6	43.1
Total :	16 263.7	15 717.8	96.6

Textile industries :			
Man-made fibres (continuous)	167.5	28.1	16.8
Wool & other animal hair	1 404.3	7 162.0	510.0
Cotton	3 092.0	2 577.8	83.4
Man-made fibres (discontinuous)	38.8	0.4	1.0
Other vegetable textile materials paper yarn	0.0	0.0	0.0
Carpets, mats, matting & tapestries, pile & chenille fabrics, narrow fabrics, trimings, tulle & other net fabrics, lace, embroidery	6.7	1.4	20.9
Wadding & felt, twine, cordage, ropes & cables, special fabrics, impregnated & coated fabrics, textile articles of a kind suitable for industrial use	265.9	170.8	64.2
Knitted & crocheted goods	3.9	0.9	23.1
Articles of apparel & clothing accessories of textile fabric, other than knitted or crocheted goods	12 494.8	11 544.1	92.4
Other made up textile articles	189.5	70.8	37.4
Old clothing & other textile articles, rags	2.0	5.3	265.0
Total :	17 665.4	21 561.6	122.1

Chemical industries

Mineral fuels, mineral oils & products of their distillation etc.	10.4	8.0	76.9
Inorganic chemicals, organic & inorganic compounds etc.	3 156.3	1 645.1	52.1
Pharmaceutical products	11 481.8	14 297.8	124.5
Fertilisers	58 949.3	61 480.1	104.3
Tanning & dyeing extracts tanning & their derivates etc.	2 128.6	1 469.3	69.0
Essential oils & resinoids, perfumery, cosmetics etc.	43.0	22.3	51.9
Soap, organic surface active agents, washing preparations	5 617.1	1 568.7	27.9
Albuminoidal substances, glues	193.2	73.5	38.0
Explosives, pyrotechnic products, matches, pyrophoric alloys etc.	17.5	70.0	400.0
Miscellaneous chemical products	118.1	287.8	243.7
Artificial resins & plastic material, cellulose esters etc.	8 072.2	5 681.4	70.4
Rubber, synthetic rubber, factice & articles thereof	10.1	9.7	96.0
Total	89 797.6	86 613.7	96.5

Building materials industries

Cement, lime & sim.	3 800.0	7 800.0	205.2
Articles of stone, of plaster, of cement & similar materials	4 438.4	2 325.9	52.4
Ceramic products	1 110.0	260.5	23.5
Glass & glassware	1 492.9	277.9	18.6
Total :	10 841.3	10 664.3	98.4
Grand Total :	134 568.0	131 693.1	99.0

Source : Foreign Trade Statistics 1984 and 1985 - Department of Statistics.

a/ Data include only manufactured exports; phosphates exports excluded from building materials exports data.

TABLE 23 : COMMODITIES IMPORTS

JD thousand
(Value CIF Jordan clearing posts)

Commodities	1984	1985	1984=100.0
Food industries			
Products of milling industry, malt & starches, gluten, inulin	2 124.1	2 987.3	140.6
Animal & vegetable fats & oils & their cleavage products etc.	10 521.9	10 156.1	96.5
Sugar & sugar confectionery	7 649.0	5 762.1	75.3
Cocoa & cocoa preparations	1 970.8	1 586.7	80.5
Preparations of cereals, flour or starch, pastry products	2 136.3	1 585.9	74.2
Edible preparation of vegetables, fruit or other parts of plants	3 619.5	2 378.1	65.7
Miscellaneous edible preparations	2 277.4	1 931.3	84.8
Beverages, spirits & vinegar	1 775.8	1 472.4	82.9
Resudies & waste from the food industries, prepared animal fooder	15 431.6	14 108.6	91.4
Tobacco	5 999.3	2 667.5	44.5
Total :	53 506.3	44 636.0	83.4

Textile industries

Man-made fibres (continuous)	17 503.5	14 426.9	82.4
Metallised textiles	21.0	38.0	181.0
Wool & other animal hair	659.7	531.4	80.6
Flax and ramie	40.5	26.4	65.2
Cotton	3 644.3	3 835.9	105.3
Man-made fibres (discontinuous)	913.1	3 981.8	436.1
Other vegetable textile materials paper yarn..etc.	155.7	145.2	93.3
Carpets, mats, matting & tapestries, pile..etc.	4 136.8	3 759.4	90.9
Wading & felt, twine, cordage, ropes & cables.. etc.	2 165.9	1 566.7	72.3
Knitted & crocheted goods	1 115.7	826.0	74.0
Articles of apparel & clothing accessories of textile.. etc.	19 9.2.7	20 142.2	101.1
Other made up textile articles	2 956.2	2 302.5	77.9
Old clothing & other textile articles, rags	2 670.8	2 463.9	92.3
Total :	55 905.9	54 046.3	96.7

Chemical industries

Mineral fuels, mineral oil & products of their distillation, etc.	213 445.6	223 186.5	104.6
Inorganic chemicals, organic & inorganic compounds etc.	22 290.0	10 101.5	45.3
Pharmaceutical products	12 377.3	13 170.2	106.4
Fertilisers	3 075.5	3 172.6	103.2
Tanning & dyeing extracts, tanning & their derivates etc.	2 409.6	2 355.5	97.8
Essential oils & resinoids, perfumery, cosmetics etc.	2 573.6	2 759.6	107.2
Soap, organic surface active agents, washing preparations	1 935.8	1 971.1	101.8
Albuminoidal substances, glues	1 297.9	1 419.4	109.4
Explosives, pyrotechnic products matches pyrophoric etc.	191.1	696.9	364.7
Miscellaneous chemical products	9 619.1	10 549.8	109.7
Artificial resins & plastic materials, cellulose esters etc.	22 471.1	19 132.7	85.1
Rubber synthetic rubber, factice & articles thereof	12 645.2	12 851.7	101.6
Total:	304 331.8	301 367.5	99.0

Building materials industries

Salt, sulphur, earth & stone, plastering materials, lime & cement	12 783.8	11 947.1	93.5
Articles of stones of pflaster of cement of asbestos of mica & of similar materials	2 623.6	2 103.2	80.2
Ceramic products	6 784.3	5 545.1	81.7
Glass & glass ware	7 883.7	8 454.3	107.2
Total:	30 075.4	28 049.7	93.3
Grand Total :	443 819.4	466 543.3	96.5

Source: Foreign Trade Statistics 1984 and 1985 - Department of Statistics.

Annex II

SOURCES OF DATA

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- Twenty second annual report 1985, Central Bank of Jordan.

Annex III

RECOMMENDATIONS FOR THE FOUR SUBSECTORS

A. Food industries

Based on the analyses in the second chapter of the main subsectoral report (food industry), and the problems elaborated in the third chapter, the following recommendations are made for the improvement of the position of the food processing industries in Jordan.

Capacity utilization

1. Due care and accuracy should be exercised when assessing the needs of local and export markets for the purpose of establishing new industries. A measure which could help achieve the objective is to establish local consulting firms which could assign national experts on the teams preparing feasibility studies when foreign consulting companies prepare such studies.

2. The assessment of the production capacity of new food-processing projects should be based on two- or three-shift operation instead of on one. Export markets should be carefully assessed and there should be less reliance on exports when planning new projects. Export markets should be supplied with the production of the second and third shifts.

3. The possibility of joint ventures with other Arab countries should be studied (conversion of present national into regional projects). The Jordanian contribution would be the existing idle production lines in Jordan.

4. No new licences should be granted in the following areas, except those specified later: dairy industries; biscuits and wafers (except danish-type cookies); grain mills; animal feed (except concentrates); canned chickpeas and broad beans; ice cream, ice-cream biscuit cones; corn flakes; and packaging of spices. This list should be reviewed and updated periodically according to the needs of the country.

5. Specialization in the production of certain foodstuffs should be encouraged. This might lead to the withdrawal of licences for the production of some out-of-place products. For example, the production of ice-cream in dairy plants should be reduced, and chocolate candy be produced in chocolate plants instead of chocolate-covered biscuits and wafers.

Size

1. Study the possibility of establishing industrial co-operatives.

2. Study the nature and economic viability of small and cottage industries.

3. Train small-scale producers in such areas as management, production, quality control, hygiene, and specific technical subjects in their respective fields.

Increase of value added

1. Increase the agricultural output of crops that can be further processed.

2. Limit imports of half-processed foodstuffs and establish industries for their production from imported raw materials.

3. Increase the local input in the areas of machine production and packaging materials.

Quality, raw materials and regulatory issues

1. Require establishments with a certain paid-up capital, number of employees, or gross output (to be decided) to establish in-plant quality control departments.

2. Establish a separate and independent department for standards and measures.

3. Establish a food and drugs administration at the governmental level to regulate all official activities in the field of food processing, and to assume such responsibilities as food inspection.

4. Assist the food processors in establishing an association for food processors and technologists.

5. Give more attention to sensory appeal when formulating food standards.

6. Facilitate the importation of high-quality raw materials that are not available locally in the desired quality.

7. Encourage the production of high-quality raw materials by improving existing technologies, e.g. better purifiers and roller systems in the milling industry, and de-odorizers in the dairy industry.

8. Encourage the establishment of independent quality-control laboratories with the ultimate goal of accrediting those which show accurate work and integrity.

9. Study the feasibility of growing the following crops in Jordan: soybeans, sugar beet, cotton, corn, hybrid corn, peanuts, and increase the production of dry chickpeas, broad beans, peas and sesame.

Production cost

1. Lower the price of energy for food-processing establishments (as it has been done for other industries) and grant tax holidays.

2. Train processors in good management practices, and find new ways to lower the production costs.

3. Re-evaluate the agricultural marketing policies and adopt policies which help to reduce production cost.

Marketing

1. Extend protection to those industries which produce high-quality products, and support exports of processed food. This can be attained by improving the quality of the commodities produced as well as the advertising for and packaging of the processed foodstuffs.

Expertise

1. Study the viability of a local production of machinery for the food industry, by surveying the available expertise and human resources.

2. Increase scientific research in food processing.

3. Study the issue of education in food technology in Jordan to determine the country's needs for graduates in this field in terms of quality and quantity.

Packaging

1. Study the area of food packaging in more depth and detail, with emphasis on its interrelationship with other industrial sectors.

2. Establish new industries for the production of packaging materials.

Other issues

1. Increase the percentage of females in the work force in the food industries, through education and training programmes carried out in co-operation with the Jordanian Women Association.

2. Establish new food-processing projects in the rural areas, and in urban centres other than Amman and Zarqa.

3. Encourage Arab and other foreign investment in the local food-processing industries.

4. Increase the trade (in both directions) with the neighbouring Arab countries.

Project ideas

1. Dairy products: Jamead powder and non-dairy creamers.

2. Meat and poultry products: egg drying and freezing; dehydrated chicken soup.

3. Fruits and vegetables: processing of fresh local raw materials into canned soups, canned green beans, pickles, jams, ketchup, spaghetti and pizza sauces, hot sauce, marmalades and pectin. Freezing and dehydration of potatoes and other vegetables (if production increases as expected), and olive oil pressing.

4. Oils and fat products: extraction of oil from soybeans, corn, palm, cottonseed and sesame. Salad dressing and mayonnaise; sulphur oil extraction from olive cake; peanut butter; utilization of olive cake as animal feed.

5. Milling industries: dry and wet milling of corn, malt production. Cake mixes, all-purpose flour and air classification of flour.

6. Sugar and chocolate products: high-quality chocolate bars and high-quality toffees and candy.

7. Bakery products: frozen cakes and pastries, danish-type cookies, salt crackers and pretzles.

8. Animal feeds: feed concentrates from by-products of slaughter houses and other sources.

9. Other foodstuffs: vinegar and citric acid.

10. Drinks and beverages: distilled drinks and wine.

11. Food packaging: glass bottles and jars, cardboard products, Cellophane sheets, aluminium foil and cans, aluminium pouches, and lacquered tin sheets for can production.

B. Textile industries

The Jordan Spinning and Weaving Company has an annual production capacity of 1,800 tons of cotton and cotton blended with polyester yarns. The local market consumes about 120 tons and the remainder is exported to Iraq. It is recommended to expand the production by adding a weaving factory to produce dyed, printed and white cotton woven fabrics. In 1984-1985 the company completed a study concerning weaving, finishing, printing and dyeing, and in that study the kinds of fabrics which are suitable for the local market were suggested, such as: fabrics for sheets (100% cotton or cotton-polyester mix); shirting

fabrics (cotton-polyester mix); flannel fabrics (100% cotton); and dress fabrics (100% cotton, cotton-polyester mix or polyester-viscose blend).

The importance of this project stems from the fact that the Jordan Spinning and Weaving Company should not depend to such a great extent on exporting its production. To develop a local industry, quick and effective measures should be taken; government support of such a vital project is very important for the development of the textile industry in Jordan.

In the light of the present survey it is recommended that the Jordan Spinning and Weaving Company should establish a weaving factory and also utilize the facilities available at the local Karimtex finishing, printing and dyeing factory which has a productive capacity for the dyeing of woven fabrics of 3.5 million metres length in light colour, 4.5 million metres in dark colour, and 1 million metres in dark-light colour on a one-shift basis. The production capacity of Karimtex in printing on a one-shift basis is 7 million metres length of woven fabrics. The finishing factory has a finishing machine with a width of 3.2 metres and a productive capacity of 5.5 million metres length annually on a one-shift basis. If such a project is realized with government support, the clothing industry can use those fabrics instead of importing similar ones.

In addition, the Jordan Spinning and Weaving Company should also establish a special unit for the dyeing of imported raw fibres used in the production of coloured yarns in order to satisfy the demand for coloured yarns by local factories producing school uniform fabrics, the consumption of which is estimated at 400 tons annually, and girls school uniform fabrics estimated at 130 tons annually, half of them of coloured cotton and cotton mixed with polyester yarns.

Furthermore, there is a demand for coloured cotton and cotton mixed with polyester yarns in the knitting industry estimated at approximately 150 tons annually. Therefore, the establishment of such a dyeing unit by the Jordan Spinning Company will ensure the supply of coloured yarns to the local market and at the same time enhance the export potential of the Company.

With regard to the knitting industry, it is recommended to support projects for the dyeing, printing and finishing of knitted fabrics, as these items differ from what is available at Karimtex. Factories which produce raw knitted fabrics and carry out the dyeing and printing operations should specialize in specific items for which there is a demand on the local market as, for example, sport-suits and other kinds of fabrics used in pyjamas, shirts and dresses requiring particular types of colours and printing.

The knitted underwear production in Jordan is very limited. At present an estimated 370,000 dozen of underwear are imported which is equivalent to 300 tons annually of cotton and cotton blended yarn, which can be produced by the Jordan Spinning and Weaving Company.

The woollen blankets factory is studying the possibility of constructing an additional unit to produce woollen yarns from the wool of local sheep. The factory needs an estimated half ton of woollen yarns daily. The completion of this project would enable the factory to use exclusively local raw materials which would result in a better quality of the products and lower prices thus making the locally produced blankets more competitive vis à vis similar imported blankets. Such project should be supported and encouraged specially in view of the fact that the textile industry in Jordan needs a spinning factory for yarns, particularly for producing woollen yarn from local wool. Statistics available at the University of Jordan (Animal Environment Department) indicate that there are one million

sheep capable of producing 2 kg/head of wool, equivalent to 2,000 tons of woollen fibres annually. Such production could be used for making blankets, carpets and rugs.

As for the projects under study, the one concerning the construction of a spinning factory for non-continuous acrylic staple yarns is considered viable and would support the production of knitted outer wear, acrylic blankets and acrylic carpets. The consumption of flat knitted fabrics is estimated at 180 tons in the knitting industries, 140 tons in the blanket factories which can be increased to 150 tons, and 75 tons in the carpet factories. Efforts should be made to ensure an early realization of this project.

The raw cotton used in the production of cotton, cotton yarns and blended yarns at the Jordan Spinning Company is entirely imported from the Syrian Arab Republic. There is scope for growing cotton in Jordan in conjunction with the projects which have been constructed north-east of Zarqa where 40 million cubic metres of sewage are gathered. This area is surrounded by free land of about 200,000 dunums which is available for the plantation of cotton. Also, another sewage disposal site at Irbid, where 4 million cubic metres of sewage water are gathered, is surrounded by about 20,000 dunums of land; this land can be utilized for cotton plantation as indicated in a study undertaken by the Water Authority. An experiment carried out by the Department of Agriculture of the University of Jordan, where 4 dunums of land along Alia International Road were planted with cotton, demonstrated that approximately 25 kg of raw cotton can be produced per dunum. The local plantation of cotton would encourage the development of cotton industries in Jordan which would produce different types of cotton fabrics needed in the textiles and clothing subsectors. The plantation and cultivation of cotton should, therefore, be seriously considered and pursued.

The Jordanian carpet industry, especially the Jordan Carpet Company, needs government support in their efforts of selling their products to the Civil and the Military Consumers Corporation. The decline in the use of the installed capacity in 1984 to 44% for wool Kashan, 11% for wool Tabris carpets, and 17% for acrylic carpets was due to the shrinking demand on local and foreign markets. The only item for which the production capacity was maintained in 1984 at 92% was prayer carpets, but in 1985 and 1986 it declined to 72% and 30% respectively, which shows that the carpet companies need strong support in promoting their products on the local and export markets, including the establishment of export quotas in other Arab countries.

The above-mentioned projects are vital for the development of the clothing industry. As stated in the main report, in addition to the capability of the factories and establishments in the textile subsector to produce several imitated brands of clothing for which there is demand on the local market, they need to catch up with the changes in technology, design and trends in developed countries. The practical knowledge and experience of Jordanian industrialists should be broadened by sending them abroad for specialized training under government scholarships or other suitable funding arrangements.

Also, the operators and technicians working on sewing machines in the clothing subsector should keep abreast with the latest technological developments by participating in suitable programmes or events in their respective fields.

Local industrialists should also be encouraged to keep abreast with changing fashions and designs of clothing and dresses and adapt their products to the emerging taste and demand of the consumers in Jordan and in the countries to which they export.

C. Chemical industries

The importance of the chemical industry within the manufacturing sector warrants that particular attention be given to the existing industries and any new ones. The small local market, the limited financial resources and the fact that the chemical industry is a capital-intensive one have been taken into consideration when formulating these recommendations.

General recommendations

1. A law should be issued (instead of the existing instructions) by the Ministry of Industry and Trade to govern all activities in the manufacturing sector.

2. Feasibility studies submitted to the Ministry of Industry and Trade for licences should be studied and reviewed from the technical viewpoint by the Department of Industry. Issues to be studied should include capacity utilization, technology employed in manufacturing and the diversity of machines which will be used.

3. As an alternative to the above, the Ministry could make use of local consulting companies and institutions to carry out the technical studies. These companies should be accredited by the Ministry of Industry and Trade.

4. A law should be issued that will encourage manufacturing establishments with a paid-up capital of JD 40,000 and more to employ chemical engineers who would assist in improving the quality of products and in reducing production costs.

5. The data on different industries available at the Ministry of Industry and Trade should be updated annually at the time of renewing the licenses or when import licenses are being requested.

Meanwhile, an evaluation of the status of these industries should be undertaken so as not to allow any problems to accumulate.

6. Industries should be classified according to the International Standard Industrial Classification (in four digits) at the time of issuing the licence. Also, each sub-subsector of the chemical industry should be assigned to a specific person in the Ministry of Industry and Trade who should handle all issues associated with the sub-subsector(s).

7. The Standardization Department should focus on developing and implementing standards for all subsectors in order to ensure minimum quality requirements of the products. This requires more funds to be allocated to that Department.

Capacity utilization

1. The problem of low capacity utilization in the different sub-subsectors should be resolved before issuing any new licence in the concerned sub-subsector.

2. Marketing problems should be resolved by imposing custom tariffs for the local market and seeking bilateral agreements or introducing regional planning for the export market.

3. In order to increase competitiveness in the market through better quality and lower prices, the availability of qualified technical staff in the concerned industries is indispensable.

4. The possibility of using existing equipment - with or without modification - to diversify the product range should be studied.

5. The formation of working groups for each sub-subsector (as in the case of the polystyrene group), where the total production is divided up between different manufacturers in each group, should be encouraged.

6. The low capacity utilization of the refinery should be looked into on a high managerial level, bearing in mind that the third expansion project has just been completed.

Natural-resources related industries

These industries represent the backbone of the manufacturing sector and of Jordan's exports. The importance of these industries is going to increase with any future development. Accordingly, special attention should be given to them. Below, recommendations for existing and proposed future projects are listed.

1. Establish research centres with the necessary personnel, funds and laboratories.

2. Co-operate with academic institutions in development projects and in solving any eminent production difficulties.

3. Stress the quality issue of products and see to its implementation in order to facilitate international marketing.

4. Diversify the export market which is largely dependent on Asia and long-term agreements with different countries. This requires conducting scientific marketing studies.

5. Overcome existing difficulties before starting any new projects. This will give the technical departments more experience which could be employed in the planning of new projects and, secondly, it will not add old problems to the difficulties usually associated with new projects.

6. Discuss new projects on a regional level to avoid duplication of projects in neighbouring Arab countries.

7. Upgrade phosphate rock in a cheap way so as to be able to compete on the international market on a price and quality basis.

8. Study the possibility of uranium recovery from phosphate ore or from phosphogypsum which is a by-product of the phosphoric acid unit in the fertilizer industry.

9. Seriously study the possibility of using hydrochloric acid, which could be produced from the Dead Sea brine, instead of sulphuric acid in the acidulation of phosphate.

10. Recover sulphur in the refinery from crude oil or from gases, which would reduce the amount of sulphur imported for the fertilizer complex at Aqaba.

11. Produce mixed fertilizers as a joint project with neighbouring Arab countries which have nitrogeneous fertilizers while Jordan will provide the phosphorous and potash ones.

12. Plan for the production of soda ash from the Dead Sea brine. The possibility of using CO_2 evolving from the calcination of phosphate in soda-ash production should be investigated.

13. Plan for the production of potassium sulphate from the Dead Sea brine. The possibility of using phosphogypsum produced at Aqaba as a source of sulphur should be investigated.

14. Study the recovery of magnesium salts in the form of magnesium oxide from the Dead Sea brine.

15. Plan for the production of caustic soda and chlorine if bromine is going to be produced from Dead Sea brine. With the prevailing trend of reduced usage of ethylene bromide as antiknocking agent, the bromine-production project should be studied carefully because it would not seem to become a success at this stage.

16. Investigate the production of lithium from the Dead Sea brine within the technological development concept for this field and, as for other projects, consider the marketing issue.

17. Study the possibility of copper recovery from Jordanian ores.

Energy

Since the existing and the proposed projects need energy which is largely dependent on imported oil, measures should be taken to reduce oil imports. This could be achieved by the following:

1. Investigate the possibility of using alternative energy sources, particularly oil shale, keeping in mind its positive socio-economic impact on Jordan's economical plans, notwithstanding the cost of its processing as compared with crude oil.

2. Implement energy-conservation measures in all existing industries.

3. Reduce the granting of licenses for energy-intensive industries and use alternative technologies if available.

4. Encourage and promote the usage of solar-energy systems for industry and housing, if applicable.

5. Promote the use of biogas as a source of energy mainly among farmers and animal breaders. The production of biogas from sewage effluents and municipal wastes should also be investigated.

Petrochemicals

There is only a limited interest in the petrochemical industry because Jordan is not an oil-producing country. For the time being, only few companies are producing intermediates for which the basic materials are imported. To increase the share of that industry in the chemical industries sector, the following is recommended:

1. Study the possibility of joint ventures with Arab oil-producing countries, whereby these countries would provide the raw materials and the needed funds, and Jordan the technical experience and marketing expertise.

2. If the above recommendation is implemented, a possible choice of commodities would be such which are not produced in these Arab countries and which have a potential export market.

3. A preliminary list of commodities which should be produced under this scheme is given below. That list needs further study to determine the suitability and economical feasibility of the recommended products.

(a) Acetic acid from ethanol which is produced in Saudi Arabia;

(b) Propylene oxide and propylene glycol;

(c) Cyclohexane, followed by caprolactam for nylon production;

(d) Dimethyl terephthalate which needs paraxylene and methanol for its production (both are produced in Saudi Arabia);

(e) Polyester which needs dimethyl terephthalate proposed in (d) above and ethylene glycol produced in Saudi Arabia;

(f) PVC monomers.

4. From recommendation 3 above it follows that Saudi Arabia will be a potential country to start contact with regard to joint venture.

Other industries

1. In the plastic products subsector new licences could be issued for the production of:

(a) Household items which are being imported; a/

(b) Frames for spectacles, a/

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a/ The Ministry of Industry and Trade indicated that new licences have been issued recently for the production of these items.

(c) Recycling of plastic waste material;

(d) Mould production for the plastic industry.

2. New licenses should be issued in the medicine and drug sub-sector to encourage the manufacture of new products in order to boost the export of existing and new products and not to lose markets in neighbouring Arab countries which already started production lines similar to those in Jordan.

3. New licenses for the production of common soap could be issued with emphasis on the quality of the products.

4. The problems of low capacity utilization and marketing should be resolved before any expansion in the existing industries is permitted by the Ministry of Industry and Trade.

Employment

1. Non-Jordanians can easily be replaced by Jordanians as far as qualification is concerned; however, the issue of wages and salaries should be studied and analysed.

2. Any future survey should contain the following information:

(a) Number of engineers, their specialization and their academic qualifications;

(b) Number of university graduates, their specialization and their academic qualifications;

(c) Number of engineers and other university graduates involved in research activities;

(d) Number of polytechnic graduates and their specialization.

D. Building-materials industries

Because Jordan is a small country, its local market is limited and its labour force is rather large; it therefore experiences difficulties which are similar to those in other small developing countries. The following recommendations aim at improving the situation of the building materials industry in Jordan.

1. Unlike the cement and glass industries which require big establishments, medium and small industries are appropriate for other subsectors in the building materials industries. Big factories for bricks, tiles and lime have not succeeded and suffered most following the decline on the export market.

2. Most of the commodities in the building-materials industry do not require highly advanced technologies. Increased efficiency and proficiency of the employees through training, and selected new technologies will improve the quality of the commodities produced, thus enabling the establishments to compete with similar products in the local and foreign markets. This can be achieved by:

(a) Training of the employees in technical aspects, marketing, accounts auditing and administrative matters, and also in keeping their information about the domestic industry up to date;

(b) Encouraging research, studies and the establishment of laboratories and allocating a sufficient budget for those activities.

3. The Government should encourage the establishment of building-materials industries in different regions of the country and provide them with the facilities and services required. Industries, such as ceramics and earthenware, should be located in existing industrial estates or in those planned to be erected in different regions of Jordan.

4. The Government should identify and recommend projects in the building-materials industry for private-sector investors.

5. The use of products of the Jordanian building-materials industry should be propagated by mass media. The cost of advertising for domestic products should be reduced by offering manufacturers preferential rates.

6. The methods of collecting, recording and providing statistical information required for the study of any domestic industry, whether existing or under consideration, should be improved, so as to guarantee the soundness of the findings and to avoid discrepancies between actual and planned investment costs.

7. Statistical data on the building-materials sector are scarce, inaccurate, out of date and unreliable. As any planner and decision-maker has to rely on facts and figures, a statistical survey of the industry should be undertaken forthwith and be updated every year. Industrial information is an important resource which is often unavailable to many small- and medium-size establishments. The lack of data on products, production planning, equipment, machinery, raw materials, quality control, standardization, labour and skill requirements, is often the reason why such establishments are inefficient and not competitive. The service of a national industrial information network would therefore greatly assist these establishments.

8. The information system needs to be strengthened in order to ensure the monitoring of the development and performance of the industry; methodologies should be elaborated for action-oriented studies and programmes with regard to priority sectors; and a mechanism should be established for the co-ordination of activities of the ministries involved in the industrial sector, the business, banking and relevant supporting institutions for the development and promotion of the building-materials industries.

9. Most Jordanian building materials are exported to Arab countries. Therefore Jordan should keep encouraging industrial co-operation at the Arab level and expand the scope of the export market in Arab countries for Jordanian ceramic products, glass, tiles, and white and Portland cement.

10. The capability of domestic expertise in the preparation of feasibility studies, project evaluation and marketing should be strengthened. Good pre-investment and feasibility studies should be prepared. Institutions promoting industrial projects should be given greater autonomy and should develop closer relationships with professional organizations.

11. Efforts should be made to decrease the cost of domestic inputs and services.

12. The imports of goods which are similar to domestic products should be regulated.

13. The establishment of industries for products substituting imports should be encouraged as much as possible.

14. Priority should be given to industries depending mainly on local resources.

15. Exporters should be given incentives.

16. A better co-ordination within industries in marketing, training, research and maintenance should be achieved.

17. Efforts should be made to decrease the cost for shipping and transportation of Jordanian exports.

18. The co-operation between the Government and the Amman-based Chambers of Industry and of Trade should be improved, as these Chambers are well acquainted with all matters concerning trade and the market for industrial products.

19. The Government should review laws and regulations concerning the industry with a view to abolish any harmful laws, and to enact such laws that will be beneficial for the industry.

20. As many small- and medium-scale entrepreneurs do not have the capacity of digesting the technical information supplied, the services of a national technological information network would help these establishments to select the proper technology and equipment.

21. The quality control of products needs to be improved in order to protect consumers and to ensure that these products can compete with foreign products. Domestic industries should also meet market standards in terms of packaging.

22. Marketing agencies specialized in exporting the products of the building-materials industry should be established.

23. The limits and methods of state intervention in this industrial sector, in general, should be clearly defined, having in mind the existence of a public sector, in particular for strategically important areas which could not attract the private sector.

Projects for study

Most of the needs of the local market for building materials are being met, both, in terms of quantity and quality.

In the china tiles and earthenware industry some improvement in the quality of products is needed, as well as diversification of the range of products. The same holds true for the glass industry, which is new in the country and far from being self-sustaining.

In the cement industry (Portland and white) the installed capacity is almost double the need of Jordan.

The production of cement tiles and bricks, concrete poles and pipes and ready-mix concrete should not be increased even if the demand on the export market for cement tiles regains the level of previous years.

Feldspar is the most promising commodity to be developed. It is available in Jordan and there is a local as well as an export market for it.

Feldspar is used in the production of ceramic and glass products. At present Jordan imports this raw material for its existing industries. Feldspar is also in demand in other Arab countries. It constitutes about 30-50% of the total value of raw materials used in the ceramic and glass industries in the Arab countries.

Recent explorations have proved that feldspar exists in big quantities on the land surface in the mountains north and north-east of Aqaba. In a feasibility study it is recommended to establish a factory for the production of feldspar in Jordan with an installed capacity of 10,000 tons per year. This is based on a price for imported feldspar of $US 190, delivered to the Arab ports in the region.