7-2 Development of Economic and Social infrastructures

7-2-1 Water Supply

(1) Water demand analysis

In estimating municipal water demands, including domestic and industrial demand but excluding private waterworks, allowance must be made for leakage in municipal networks. The current leakage is estimated as being 30% of water production and metering errors and illegal connections reaches 25% of water production. Only 45% of water production is recorded as being sold. WAJ is concerned about the high amounts of leakage in Jordan, and have set targets to reduce leakage as shown following table.

Leakage Reduction Targets

Year	Leakage (%)
1995	30
2000	25
2005	20
2010	18
2015	15
2020	15
2030	15

Note: Leakage reduction targets are according to WAJ officials.

WAJ's target persentage of leakage is 15% in 2015 and it is appropriate target values. In this case, water selling ratio is only still 60%. Because it is generally preferable that the water selling ratio is 70% or more, it is necessary to reduce metering errors and illegal connections from current 25% to 15% or less. The reduction of this metering errors and illegal connections is not considered in the following water demand forecasts.

In general, the tendency of increase in per capita demand is 1 to 2 litres per year. In suppressed cases, one litre increment in per capita municipal demands in Jordan is appropriate. Table 7-2-1 shows projected per capita water demands in each governorate which are based on the above criteria for current demand, demand increment and leakage targets. The current per capita demand in the southern districts varies from 120 litres/day in Karak to 475 litres/day in Aqaba. The high per capita demand in Aqaba is due to the industrial and touristic demands.

Based on projected per capita water demands and projected population, projected municipal water demand in each governorate is shown in Table 7-2-2. The total current municipal and industrial water demand in the southern districts in 1994 was about 30 million m^3/year. Municipal water demands in the southern districts will increase to 36

million m^3/year in 2000 and 50 million m^3/year in 2010.

(2) Priority water supply project

1) The Disi-Amman Water Supply project

Based on above mentioned water demand analysis and preliminary assessment of the large-scale projects, the water demand and all major water resource development schemes for the northern districts are shown in Figure 7-2-1. Even if all water resource development plans are executed, the Disi-Amman Water Supply project would be needed. The main points of each plan are as follows.

- 45 million m^3/year of water from the Yaroumouk River will be supplied to Amman by 2000.
- The Disi-Amman Water Supply project will provide Amman with 100 million m^3/year of potable water by 2000.
- Israel may provide 10 million m^3/year of desalinated water.
- Brackish groundwater desalination in Jordan Valley may be provide 36 million m^3/year of desalinated water by 2006 and 60 million m^3/year by 2010.
- Unity Dam in the Yarmouk River will be needed to meet the demand from 2005. The Dam may provide 50 million m^3/year of water.

The Disi groundwater is the last undeveloped water source in Jordan. The safe yield of Disi groundwater in the Disi-Mudawara area is estimated at 125 million m3/year for 50 years. On the other hand, the Disi-Amman Water Supply project will provide 100 million m3/year of drinking water for the first stage by the year 2000, and 150 million m3/year for the second stage by the year 2020. Additionally, current and future water supplies to southern districts should be considered. It is clear that Disi groundwater will be used excessively according to the current development plans as shown following table.

Water Balance of Disi Groundwater in 2010

Unit: million m^3/year

Items	Volume
Current Domestic and Industrial Uses in 1994	12
Current Irrigation Use in 1994	63
Water Demand for Population Increase of Ma'an and Aqaba from 1994 to 2010	13
*1) Water Demand for IEs and other Industrial Uses in 2010	28
Disi-Mudawara to Amman Water Supply	100
Total Estimated Use of Disi Groundwater in 2010	216
Safe Yield from Disi Groundwater	125
Water Balance	-91

Source: UK ODA(1996) and Estimation by the Study Team

*1): According to the estimation by the Study Team

This 91 million m3/year of excessive yield from Disi groundwater should be canceled from the plans. As a result, trial calculation for Disi groundwater development have been formulated in consideration of the southern districts development as following table.

Trial Calculation for Disi Groundwater Development in 2010

Unit: million m^3/year

Component	Alternative Plan A	Alternative Plan B	Alternative Plan C
Planned Water Supply Area	Amman	Amman and Southern Districts	Aqaba and Ma'an
(1) Planned Supply Volume to Amman	72	41	9
(2) Current Disi Groundwater Use	75	75	75
(3) Additional Disi Groundwater Supply to the Southern Districts for M. and Ind.	41	41	41
(4) Additional Irrigation Use in Disi-Mudawara Area	-63 (should be drastically reduced)	-32 (should be gradually reduced)	0 (maintain the existing state)
(5) Future Use in the Southern Districts: (2)+(3)+(4)	53	84	116
(6) Total Future Use of Disi GW: (1)+(5)	125	125	125

Alternative C is not practical because of small amount of the water supply to Amman. Alternative A is suitable plan in consideration of both of the serious shortage of water in Amman and industrial development of the southern districts. But, irrigation use should be completely stopped. Considering the agriculture in Disi-Mudawara area, alternative B is recommended.

Supposing that the water demand in the Grater Amman will be fixed at current level, then 45 million m3/year of water from the Yarmouk River will satisfy the water demand

in Amman. On the other hand, because Aqaba is unique governorate which fronts the sea in Jordan, there is a possibility of sea water desalination in Aqaba. However, the water production cost of the sea water desalination is presumed to be about 1.0 JD/m3 or more high.

2) The Southern Ghors project

The Southern Ghors project was first identified in the early 1980's by the Jordan Valley Authority of the Ministry of Water and Irrigation(JVA) as part of an ongoing planning effort for the systematic development of Jordan's irrigation potential. JVA has complete authority over the allocation and use of all surface and groundwater supplies in the valley. The primary objective of the Southern Ghors project is to develop available water resources south and east of the Dead Sea to permit additional supplies for:

- the Arab Potash Company,
- municipal use in Safi township,
- expansion of tourism facilities on the eastern shores of the Dead Sea and
- maximum production in the JVA's Southern Ghors Irrigation project.

Both the irrigated 4,600 hectares and the Arab Potash Company complex depend on the base flows of the side wadis, Wadi Mujib and Wadi Hasa, and groundwater resources which are now fully developed. The Arab Potash Company has well laid expansion plans. Its production facility at Safi currently receives about 9 million m3/year of groundwater from a severely over exploited shallow aquifer. Additional water supplies for the Southern Ghors Irrigation project, expansion of the APC complex and municipal use in Safe township can come from the base and flood flows of the Mujib basin and the flood flows of Wadi Hasa by this project.

The project will include the construction of Mujib weir and conveyor, three dams and additional infrastructure for irrigation as follows.

(a) Mujib weir and conveyor

To use the Wadi Mujib base flow, which is currently lost to the Dead Sea, a concrete weir would be constructed across the wadi just below the Wala and Mujib confluence. An intake at the weir would divert the flow through a 3 km tunnel into a settling tank near the shore of the Dead Sea. Gravity would allow the water to flow from this tank through a steel pipeline to the Arab Potash Company complex, a distance of about 50 km. At that point, the water would be pumped into the irrigation areas at a maximum distance of 25 km. A northern conveyor would also be required to supply future tourism development on the Dead Sea north of the Mujib.

(b) Dams

Three dams, the Wala dam in the Wadi Wala, the Mujib dam in the Wadi Mujib and the Tannur dam in the Wadi Hasa would be constructed. Dam heights of Wala, Mujib and Tannur would be 45 m, 51.5 m and 62 m and reservoir capacities would be 9.3 million m3, 35.0 million m3 and 16.8 million m3, respectively.

(c) Infrastructure for irrigation

Additional infrastructure would be required to develop new irrigation areas. This would include pumping stations, pipe distribution systems, drainage works, flood protection and roads.

The project, which would be built over eight years, is estimated to cost about US$ 320 million, including inflation and interest during construction. The base case ERR(economic rate of return) would be 15 to 17%. Therefore, the project is sufficiently feasible. The Jordanian government expects to finance about 25%. Thus, this project represents an opportunity for donors and international financial institutions in the amount of US$ 240 million. There is a commitment in principle from Japan's Overseas Economic Cooperation Fund for ¥13.9 billion. The remaining US$90 million is being sought from the European Investment Bank and other international financial institutions. The government of Jordan is still seeking financing for this project. The project will be surely executed. However, this project is managed by JVA and water supply for irrigation is a main purpose of the project. In general, concerning the water resources development, it is necessary to give priority to domestic and industrial water supply project much higher than irrigation project. If funding beings without delay, the project would be complete at the end of 2001.

3) The Al Hasa water project

The main objective of the scheme is to supply additional domestic water to the Tafila town from the Al Hasa wellfield.

WAJ has already constructed three boreholes in Al Hasa for this project. The amount of yield is 150-200 m3/hr for one. About 10,000 m3/day groundwater can be produced. As for the frame of this project, like the planned water supply volume, has not decided yet and the study of six months concerning the designs such as the pipelines, the pump stations, and the power transmission facilities was just begun recently.

In information which turns out at present, the pipeline of 45 km long would be constructed through Al Hasa-Jurfed Darawish-Eth Thuwana-Al Qadeseya. The pipeline would be laid along the Desert Highway between Al Hasa and Jurfed Darawish and would be laid along RN60 and near the T-1 site between Jurfed Darawish and Eth Thuwana. From Eth Thuwana to Al Qadeseya, the pipeline would be laid in the mountains zone because there is no road. The water would be pumped to the existing reservoir at Al Qadeseya. The flow from Al Qadeseya gravitates through the existing pipeline to Tafila.

The estimated project cost is about ECU 12 million for two years construction. This is equivalent to about US$ 16 million. This project is in the study stage by EU now. The economic cooperation of EU is expected to implement the project. If the project is feasible as a result of this study, there is a good possibility that this project will be realized by EU. The water source for the project has already been secured by WAJ. The water supply facilities of the project might be completed at about the end of 1998 when the project progresses smoothly.

This project is likely to provide if implemented about 3 million m3/year of groundwater to Tafila through the existing reservoir at Al Qadeseya by year 1999. When the project will be completed, the current Shawbak supply from Ma'an governorate will be stopped. The Shawbak supply to Tafila was 0.986 million m3/year in 1994. Therefore, about 1 million m3/year of water can be additionally used in Ma'an Governorate.

(3) Available water in each governorate

1) Water supply strategy for Karak governorate

The municipal water demand and major water supply plans for Karak Governorate are shown in Figure 7-2-2. The increse in available water supplies and the main points of each plan are as follows.

- The water supply from Sultani wellfield could be increased by about 2 million m^3/year.
- The groundwater development at Lajjun wellfield will provide 5 million m^3/year. However, the Lajjun wellfield is to be preserved for the future development of the oil shale.
- The Arab Potash Company and Safi town shall be supplied water by the Southern Ghors project.
- The Disi-Mudawara to Amman water conveyance system will possibly fill a

shortage of water supply for Karak Governorate.

2) Water supply strategy for Tafila governorate

The municipal water demand and major water supply plans for Tafila Governorate are shown in Figure 7-2-3. The increse in available water supplies and the main points of each plan are as follows.

- The Construction of the Al Hasa-Al Qadeseya water conveyance system will provide Tafila with about additional 2 million m^3/year by the year 1999.
- Groundwater in the South Al Hasa new wellfield can be developed up to 10 million m^3/year.
- 5 million m^3/year of the Al Hasa phosphate mine consumption will be used after closing the mine of 2007.

3) Water supply strategy for Ma'an governorate

The municipal water demand and major water supply plans for Ma'an Governorate are shown in Figure 7-2-4. The increse in available water supplies and the main points of each plan are as follows.

- About 1 million m^3/year at Shawbak station will be used into Ma'an Governorate after construction of the Al Hasa-Al Qadeseya water conveyance system in 1999.
- The construction of the six recharge dams in the Western Highlands will provide 8.4 million m^3/year of groundwater.
- It is possible to use Disi groundwater for Ma'an.

4) Water supply strategy for Aqaba governorate

The municipal water demand and major water supply plans for Aqaba Governorate are shown in Figure 7-2-5. The increse in available water supplies and the main points of each plan are as follows.

- Additional conveyance volume will be 5.5 million m^3/year by using fully existing Disi-Aqaba pipeline capacity by 2000.
- The construction of a new Disi-Aqaba pipeline will provide 17.5 million m^3/year by 2005.
- Additional groundwater from Disi-Mudawara will be supplied to Aqaba by reduction of the planned conveyance volume to Amman.
- In the far future, the sea water desalination should be considered.

Disi groundwater is essential for the development of the Aqaba region. Therefore

the Disi-Amman water supply project should be implemented in consideration of overall development of the Southern Districts.

7-2-2 Transportation Network

(1) Strategy

The strategies of transport development are:

- to reinforce the transportation network within the Southern Districts that will strengthen industrial linkage and function of distribution service,
- to formulate development axes/economic sub-regions in the Southern Districts and to reinforce the linkage with the Northern/Central Districts which are the high-growth areas as well as the industrial centers in Jordan,
- to reinforce the function of Aqaba gateway by road, air and sea transportation development in order to contribute to economic development for the country, and
- to establish international artery function focusing on industrial cooperation, trade/physical distribution and tourist attraction.

(2) Development of road network

The development plan for the road network is made by three term periods based on its necessity and a possibility of realization. The detailed contents for the development plan are illustrated in Figure 7-2-6.

1) Short-term period (1996 - 2000)

(a) Strengthening Desert Highway: (Ras an Naqab - Aqaba: 4-lanes)

The project includes the reinforcement of the Desert Highway as a national artery road that runs from Aqaba to Syria through Amman. The complete 4-lane highway will be provided in the section of Amman - Aqaba by implementing the project for expansion between Ras an Naqab and Aqaba, which is under construction and expected to be completed by middle of 1998. This will greatly contribute to the formation of Aqaba - Ma'an development axis/sub-region.

(b) Upgrading Aqaba By-pass Road: Aqaba Back Road

This road provides direct access from the Desert Highway to Aqaba container port and the A-1 Industrial Zone near Saudi Arabia border as a detour to avoid traffic congestion within Aqaba City. However, steep slope segments are observed in some parts of the section, which is not suitable for industrial vehicle (trucks) traffic

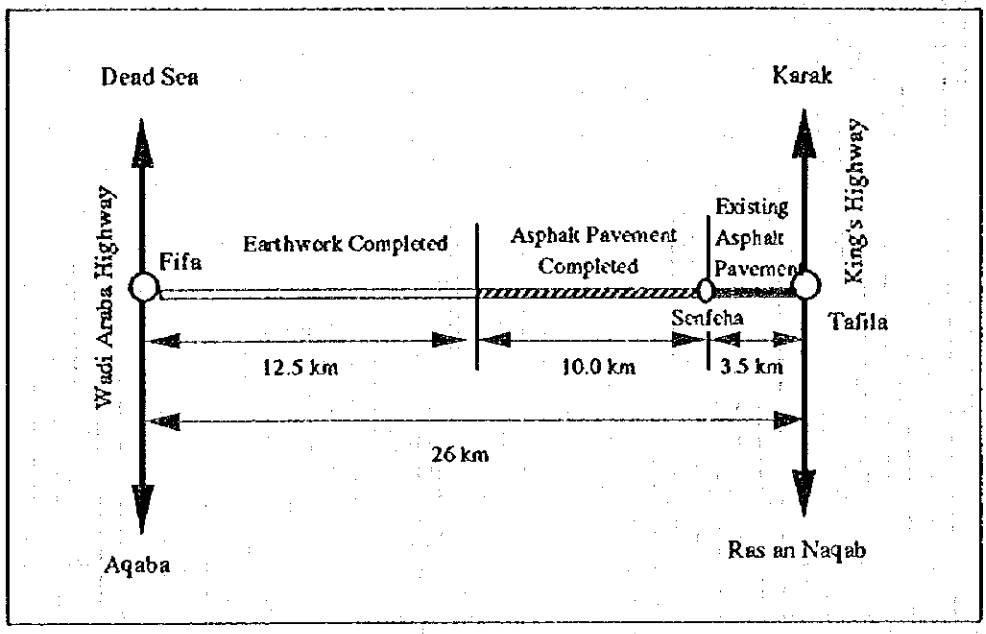
use. In this regard, the vertical alignment should be substantially improved or horizontal alignment should be changed so that the road should function efficiently as an industrial road.

(c) Improving Aqaba By-pass Road: Safi Back Road Link

The Aqaba By-pass Road is a part of Aqaba - Eilat - Taba Ring Road Link. The road development plan includes new construction of 2-lane road that diverges from the Desert Highway to the north of Aqaba City and links to the Wadi Araba Highway to the north of the Aqaba International Airport (AIA). This new road will provide direct connection between both highways without penetrating into the Aqaba City and also provide improved access to the AIA. Furthermore, the access from A-2 Industrial Estates to Wadi Araba Highway and Aqaba City will be upgraded. Considering above-mentioned aspects, it is recommended that the implementation of this section should be made in a short-term period.

(d) Strengthening East-West Link: Tafila-Fifa Road

Senfeha-Fifa section (22.5 km) is under construction at present, while Tafila-Senfeha section maintains existing asphalt-paved road with about 10 km out of the total Tafila-Fifa section with 26 km length as illustrated below. The new construction of first segment of about 10 km from Senfeha toward Fifa has already been completed with 2-lane asphalt pavement. In addition, the rest segment of 12.5 km has been completed earthwork except asphalt pavement. The whole construction is expected to be completed by 1998. When completed, this road could provide another east-west link running parallel with RN 50 in the Southern Districts. Furthermore, the extension road can be connected with proposed Fifa-Israel road which can provide international linkage to the Ashdod Port in Israel of the two Governments so decide.



2) Mid-term period (2001 - 2005)

(a) Formulation of Karak - Tafila sub-region

The section of Karak - Tafila of the King's Highway should be upgraded to reinforce a linkage between the two governorate capitals. Along with this, road development in the section of Karak - Qatrana and new road construction in the section of Tafila-Al Hasa are recommended to formulate the efficient network together with the Desert Highway and the RN 60. As the result of these road projects, road network will be strengthened for both directions to promote the formulation of sub-regional zone between Karak and Tafila.

(b) Industrial roads

In order to fully exploit the industrial potential in the Southern Districts, the production and processing sites of mineral and agricultural resources should be efficiently connected with the international trading seaport and major cities through artery roads.

The concrete plans are shown below:

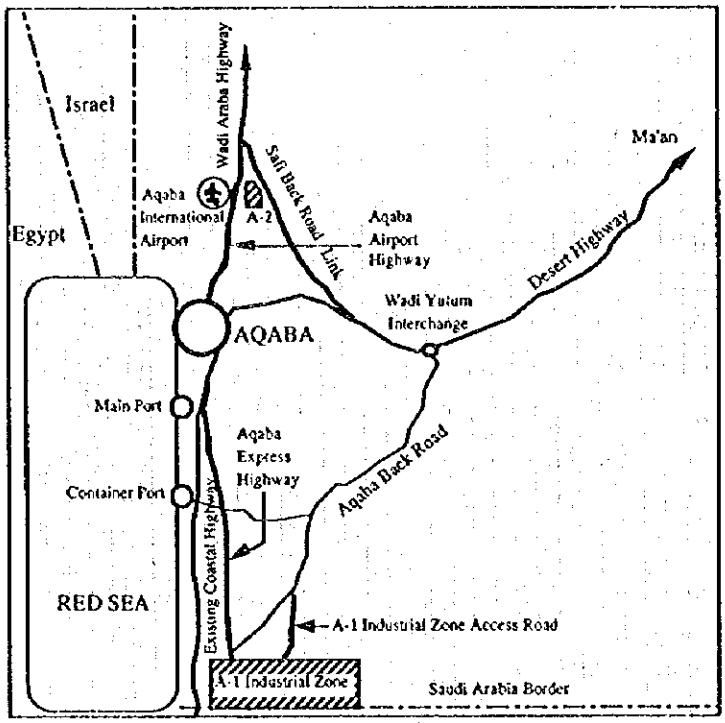
a) Upgrading of the Wadi Araba Highway (Potash City - Aqaba: 220 km)

The section of Potash City - Aqaba with 220 km long as a segment of the Wadi Araba Highway should be upgraded including vertical alignment and new pavement to play a stronger role in transportation to the Aqaba Port for currently

produced potash and for meeting incremental transportation demand for expected new mineral products from the Dead Sea during the period of 2000 - 2005.

b) Aqaba Express Highway

The new construction of 4-lane road starting from the Aqaba City up to the Saudi Arabia border with 10 km length is recommended, running parallel to the east of the existing Coastal Highway. The proposed Aqaba Express Highway would serve for industrial and daily trip purposes by linking A-1 Industrial Zone near Saudi Arabia border to the Aqaba Port / Aqaba City, while the existing Coastal Highway will be used for mainly tourism purpose as illustrated below.



c) A-1 Industrial Zone (A-1 IZ) Access Road

The project comprises the new construction of direct A-1 access road (5 km) leading to the Desert Highway. The A-1 IZ has rectangular shape with 14 km long toward east-west and 4 km long toward north-south. The traffic of the A-1 IZ may cause congestion for cargo distribution activity to access the Desert Highway through the Aqaba Port/City under the existing road network. The development of A-1 IZ access road will contribute to easing the traffic congestion in Aqaba City/Port area by providing direct access to the Desert Highway from the A-1 IZ as shown above.

(c) Development of international roads and improvement of access roads

The development of international roads and improvement of access roads are recommended to promote international cooperation for industries and tourism between Jordan and the neighboring countries.

a) Fifa - Israel Road

In order to promote the economic and industrial cooperation between Jordan and Israel, construction of a new road is recommended from Fifa, located south of the Dead Sea in Karak Governorate, to Israeli border with about 5 km length. This road could be connected with the existing Israeli road by about 10 km extension from the border.

If this international linkage is provided, the direct access to Ashdod Port, the largest port in Israel, will be possible via Beer Sheva from the Wadi Araba Highway. This link will greatly enhance the industrial potential of the Southern Districts. It should be noted, however, that whether or not this road should be implemented depends on the policy of the Government of Jordan as well as Israel.

b) Aqaba Airport Highway

This plan is to expand the section of Aqaba City - the Aqaba International Airport (AIA) of the Wadi Araba Highway from the existing 2-lanes to 4-lanes for 7 km. If this section is implemented, the road will meet the future traffic demand between Aqaba City and AIA.

c) Aqaba - Eilat - Taba Ring Road

An international ring road development that connects Aqaba region to Taba in Egypt by way of Israel is recommended as an extension of the Safi Back Road Link to the west. This ring road will serve as international network to accelerate the international cooperation in tourism sector as well as distribution function among the three.

3) Long-term period (2006 - 2010)

(a) East-West Road in the northern part of the Southern Districts

The section of Karak - Qatrana on RN 50 is developed during the mid-term period. As its extension westward, the development for road expansion of the existing 2-lane

road between Karak and Potash City should be made to form 4-lane road. By implementing this road improvement, the sub-region of Karak and Tafila can secure linkage with the Wadi Araba Highway via two east-west roads and have good access to Israel by way of Fifa.

(b) Agricultural / International Road

The purpose of the road plan is to offer linkage from Ma'an to Saudi Arabia and other Gulf countries such as Kuwait by way of Mudawara that is a major agricultural zone in Ma'an Governorate.

The development plan includes the expansion of the existing road to 4-lane highway in the section of Ma'an-Saudi Arabia border via Mudawara. This will lead to a stronger international linkage with Saudi Arabia and other Gulf countries in terms of physical distribution as well as distribution of agricultural products from Mudawara.

(3) Development of Rail network

Four major railway development in the Southern Districts are proposed as follows:

- Dead Sea - Red Sea (New construction)
- Eshidiya - Batn El Ghul (New construction)
- Amman - Aqaba (Rehabilitation)
- Aqaba - A-1 Industrial Zone (New construction)

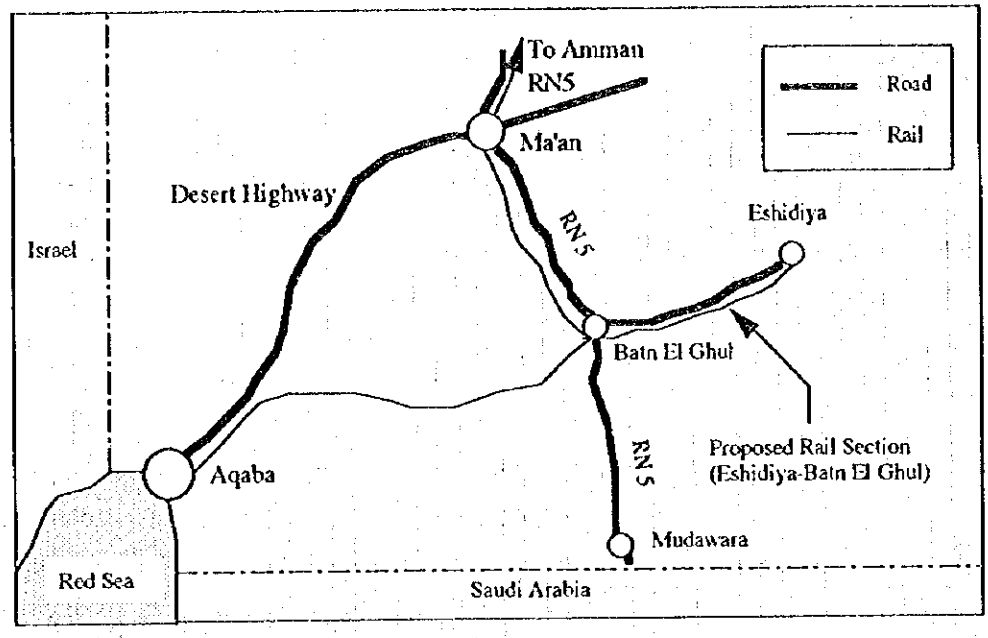
1) Dead Sea - Red Sea rail link

The main purpose of development of the Dead Sea-Red Sea railway is to meet the future demand for transportation of minerals from the Dead Sea that is expected to be increased from 2005. An alternative would be upgrading of the existing Wadi Araba Highway. Mutual use of the railway by both Jordan and Israel should also be looked into. All these taken into consideration, the feasibility of the Dead Sea - Red Sea rail link should be analyzed.

2) Eshidiya - Batn El Ghul rail link

The main purpose of this railway improvement is to provide direct access from the Eshidiya mine which will be the largest phosphate mine in the country in the coming years, to the Aqaba City / Aqaba Port only through rail link. As the railway already exists between Batn El Ghul and Aqaba Port, a provision of this link can make it possible to transport phosphate rocks from Eshidiya to the Aqaba Port only by railway

without loading/ unloading operation between trucks and rail as illustrated below. This also will reduce congestion by truck traffic between Batn El Ghul and Ma'an on RN 5 and on the Desert Highway between Ma'an and Aqaba.



3) Amman - Aqaba rail link

As the railway section of Amman - Ma'an runs in parallel with the Desert Highway, most of distribution services to the Southern Districts have been conducted by road transport mode. Although majority of phosphate products are transported from mines to Aqaba by railway, the railway link between Amman and Aqaba has old track and not in operation in Amman - Al Hasa section. The improvement of railway would strengthen the national artery along with the Desert Highway, which would bring about more efficient distribution service.

4) Aqaba Port - A-1 Industrial Zone (A-1 IZ) Rail Link

If this rail link is provided along with the implementation of Eshidiya-Batn El Ghul section, Eshidiya mine and the A-1 IZ will be connected by railway for transporting phosphate rocks for processing.

(4) Development of the Aqaba International Airport (AIA)

Aqaba City and its surrounding area, a core of the Southern Districts of Jordan, have an international airport that can accommodate Air-bus class aircrafts, as well as an international trading seaport. Currently, the Aqaba International Airport (AIA) has land

space for the future expansion of passenger/cargo terminals and runway.

The access of foreign investors to the Southern Districts would be easier by upgraded AIA. Tourists are also expected to be increased in the area. In the aspect of industrial development, the airport-based industry of light/high value-added type might be located in Aqaba region.

Currently, about 5 million guest/nights of tourists are recorded to visit Eilat in Israel per year. However, the existing Eilat Airport is located in the urban area, hindering the efficient urban land use and urban development within the Eilat City. Further, the Eilat Airport has only a short runway and can accommodate only small/medium aircrafts. The expansion of AIA could bring about benefits not only to Jordanian side but also to Israeli side by possible common use of the facilities if the two Governments so agree.

In addition to the expansion plan of the existing AIA to reinforce airport facilities in Aqaba region, new construction of an international airport, joint Araba International Airport, to be located to the north of the existing AIA (in either Jordanian side or Jordanian/ Israeli side) is proposed by Civil Aviation Authority (CAA) as an alternative plan of the AIA expansion.

It is recommended that decision be made on the airport development/ expansion in Aqaba considering the three options at the earliest opportunity.

(5) Development of the Aqaba Port

The Aqaba Port has space for expansion. The necessity and appropriateness of the Aqaba Port expansion have been evaluated through feasibility study of " The Study on the Improvement Plan of the Port of Aqaba in Jordan" conducted through Japanese technical cooperation. Based on the feasibility study, the expansion of the Aqaba Port has been proposed as follows:

The scenario of future development for the Aqaba Port has been prepared assuming nine different cases mainly considering the following two external factors.

- The possibility of lifting sanctions on Iraq
- The process of the Middle East peace

The possibility of lifting sanctions against Iraq has been evaluated by three levels : total lifting, partial lifting and status quo. Also, Middle East peace process has also been evaluated by three levels : comprehensive settlement, steady progress and slow progress.

Based on the assumption on the two factors above, nine cases has been made. Citing

the major cases, Case 1 is made on the assumption of comprehensive settlement of the Middle East peace process and total lifting of sanctions against Iraq. Case 5 is made on the assumption of steady progress of the Middle East peace process and partial lifting of sanctions on Iraq. Case 9 is made on the assumption of slow progress of the Middle East peace process and Iraq sanctions in status quo.

The future development plan for the Aqaba Port is summarized below. According to the plan, expansion project is scheduled to be completed by year 2010.

Future Development Plan of the Aqaba Port

Main Port	Container Port	Industrial Port
* In the scenario of Case (1) (Alternative 1) · Improvement of Berth - Quay-front reinforcement of grain berth located in general cargo No.1&2 berths (L=280/\ m) - New 2 quay construction of general cargo berth located Phosphate A berth (L=340 m) & others (Alternative 2) · Improvement of Berth - Construction of vegetable oil piping/ inlet of general cargo berth located in general cargo No.1 & 2 berth (L=110 m) - New 1 quay construction of grain berth located Phosphate A (L=310 m) , pavement & others * In the scenario of Case (5)&(9) · Improvement of Berth - Quay-front reinforcement of grain berth located in general cargo No.1 & 2 bert (L=280m)	* In the scenario of all cases · Extension of Berth - Berth construction (L=60 m) - Reclamation (0.6ha) - Retaining wall (L=120 m) · Construction of Outside Access Road (L=300 m) · Building for Office & Maintenance Shop (8,250 sq.m) · Yard Work (pavement: 50 ha)	* In the scenario of all cases · Expansion of Berth (for fertilizer & phosphate) - New construction of jetty, trestle, control & angle tower and cargo handling equipment * In the scenario of Case (1) · Construction of new oil berth (Capacity : 250,000 DWT oil tanker)

Taking into consideration that the function of the Aqaba Port has vital importance not only for Jordanian economy but also for the Middle East regional economy, it is desirable

that the expansion should be made basically following the above recommendations.

The annual cargo handling of the Port reached about 20 million ton in mid 1980s. However, the current handling volume is almost half of that of mid 1980s due mainly to the sanctions against Iraq.

Supposing that the road linkage is provided between the Northern/Central Districts of Jordan and Israel (the Haifa Port, the Ashdod Port) with the development of the Middle East peace process, a part of cargo handling volume of the Aqaba Port might be transferred to the Haifa Port or the Ashdod Port. On the other hand, there is a possibility that a part of cargo handling volume of the Eilat Port in Israel be transferred to the neighbouring Aqaba Port.

In conclusion, the decision for implementation schedule of expansion should be made based on the JICA Study on the improvement of the Aqaba Port, taking duly into consideration of external circumstances mentioned above.

7-2-3 Electricity and Telecommunications

(1) Electricity

Sustainable development of the electricity sector would be required to meet the growing demand for electricity so that Jordan can achieve the reasonable economic development.

The basic strategy for national electricity sector would be that electric power development projects and projects for transmission and distribution system should be implemented without delay.

Continuous and substantial expansion of the energy supply base will be of vital importance for industrialization in the Southern Districts. The followings are suggested for the development of the Southern Districts.

1) Numbers of old power generators that are used intermittently to cover the peak load will reach their economic life before 2010. Programs for inspection, rehabilitation and renovation of such existing power generators should be reinforced.

2) Rashadya substation is a main substation located in the 132 kV electric power system between the Aqaba thermal power station and the Amman South substation distributing electricity to Tafila Governorate. As the Rashadya substation is in a heavy air polluted area, its outdoor equipment is eroded by dust from the cement factory. Troubles of such

equipment will cause cutoff of the 132 kV system which could lead to drop in reliability of the entire power distribution system of Jordan as well as the power distribution system to Tafila Governorate. In order to prevent erosion, it is desirable that the outdoor equipment be replaced with indoor gas insulated switchgear.

3) Current demand for electric power transmission in the Southern Districts is satisfied with the existing 132 kV transmission line connected among the Aqaba Thermal Power Station - Ma'an Substation - Rashadya substation - Al-Hasa Substation - Qatrana Substation - Queen Alia Airport substation - the Amman South substation and existing 400kV transmission line directly connected between the Aqaba thermal power station and the Amman South substation. To satisfy the future demand that will be created in the Southern Districts by industrial development, a new 132 kV transmission line should be planned from The Aqaba thermal power station to Qatrana substation via Ma'an and Al-Hasa substation along the Desert Highway.

(2) Telecommunication

Since the 15-year plan for the telecommunication network development cover most of the areas and services for the Southern Districts, the basic strategy for national telecommunication network development would be that development projects be implemented without further delay.

Real time communication, in other words, real time interconnection is essential for investors and industrial firms. In other words, less-developed telecommunication services never attract foreign investors. It must be stressed that higher grades of telecommunication services are needed to support the industrial development. The followings are recommended for the development of the Southern Districts.

1) On-going 15-year plan should be completed without further delay. Such delay seems to obstruct the industrial development in the Southern Districts.

2) More attention of the on-going 15-years plan should be focused on the area along the Desert Highway which has not effectively been covered with on-going efforts.

3) Expansion of facilities and improvement of service quality should be carried out most rapidly after the 15-year plan. In general, a developing area has higher demand for such expansion and improvement of telecommunications to implement industrial projects than an ordinary area has. It is said that telephone density is proportional to per capita GDP.

4) Optical fiber cable should be installed from Aqaba to Amman along the Desert Highway, and main exchanges in the Southern Districts should be established to be linked with a national optical transmission network.

7-3 Profiles of the Priority Industrial Projects

7-3-1 Selection Criteria and Selected Priority Projects / High Priority Project

(1) Criteria and selected priority projects

In line with the industrial development strategies recommended in Section 6-2-5, priority projects have been identified as specific measures. Basic industrial infrastructures and policy / institutional / organizational measures / projects are brought into focus in compliance with the scope of the Study rather than the economic infrastructure projects. The identified projects can be classified into five categories as follows.

Technology improvement

1) Establishment of Southern Region Research and Technology Center
2) Establishment of Southern Region Small and Medium Industries Center

Manpower development

3) Establishment of a community college or a university in Aqaba
4) Establishment of an engineering department in Ma'an branch of Mu'tah University
5) Strengthening of the curriculum of the Mu'tah University
6) Strengthening of vocational training centers

Policy / Institutional / Legal measures

A: Strengthening of Investment Environment

7) Establishment of soft loans for subsistence and small enterprises
8) Strengthening of the Investment Promotion Law
9) Introduction of VAT (Value-added tax)

B: Strengthening of Implementation Bodies

10) Establishment of Southern Region Authority
11) Strengthening of the cooperation between the GIE and the FZ and study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF
12) JIEC capacity building
13) Extending financial assistance to NGOs and activation measures thereof

Promotion / Diversification of industrial activities / locational facilities

14) Promotion of industrial location in A-1 as heavy/chemical industrial zone

15) Establishment of a service center at M-1 (Near the junction between the Desert Highway and Road No. 5)
16) Provision of well-facilitated workshop apartments

Environmental conservation

17) Strengthening of GCEP
18) Strengthening of Aqaba Gulf environmental monitoring program
19) Improvement of urban living environment
20) Management of industrial wastes
21) Training of factory managers for environmental management

These identified industrial projects are assessed about their effects and impacts on the industrial development in the Southern Districts and screened to select priority ones.

The basic principle for setting up the selection criteria for the priority industrial projects is the degree of their contribution to the development of the Southern Districts either as a whole or of each district. Their contribution should include the upgrading of socio-economic conditions of the residents, enhancing the productivity of the small-to-subsistence enterprises as well as enhancing the potential of the target industries. The expected effects or kind/types of contribution of the projects are classified as follows:

Direct effects / Implementability

(a) Urgency for implementation
(b) Economic viability
(c) Social benefits
(d) Environmental conservation
(e) Project implementability

Indirect effects

(f) Regional development effects including the consideration for the distribution of the projects among the 4 governorates
(g) Multiplier effects among the projects

Items (a) - (e) above with direct impacts are given 10 points each as full score while items, (f) and (g) with indirect impacts are given 5 points each. These projects with the total score of 45 or above are rated as A and those with total of 40 to 44 are rated as B+. The projects rated as A or B+ are selected as priority projects. (Table 7-3-1)

The identified projects are assessed in the light of the criteria and 14 projects given 40 points or above are selected as priority projects as shown below.

1) Establishment of Southern Region Research and Technology Center
2) Establishment of Southern Region Small and Medium Industries Center
3) Establishment of a community college or an university in Aqaba
4) Establishment of an engineering department in Ma'an branch of Mu'tah University
5) Strengthening of vocational training centers
6) Establishment of soft loans for subsistence and small enterprises
7) Strengthening of the Investment Promotion Law
8) Introduction of VAT (Value-added tax)
9) Establishment of Southern Region Authority
10) Strengthening of the cooperation between the GIE and the FZ and study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF
11) JIEC capacity building
12) Promotion of industrial location in A-1 as heavy/chemical industrial zone
13) Provision of well-facilitated workshop apartments
14) Strengthening of Aqaba Gulf environmental monitoring program

(2) Selection of high priority projects

The industrial projects with high potential are selected among 14 priority projects based on the following selection criteria.

1) In principle, overall assessment of the projects should be A.
2) Their expected impacts on the industrial development in the Southern Districts should be of significant magnitude.
3) Sizable linkage / multiplier effects can be expected among these selected.
4) The characteristics and scopes of the projects should fit the objective and capacity of the Study.

These selected ones as high priority projects are as follows.

- Establishment of Southern Region Research and Technology Center
- Establishment of Southern Region Small and Medium Industries Center
- Strengthening of vocational training centers

Proposals of these projects are justified in the result of interview with subsistence and small and medium industries by the Study Team. In the interview, owners /managers of enterprises are seeking the following types of assistance. (Percentages are of total respondents: plural answers)

- Consultation on quality control: 60%

- Technical guidance on production: 60%
- Management consultation: 47%
- Technical training: 47%
- Marketing support: 43%

The relation between the priority project and organization & fund raising for implementation is shown in Table 7-3-2. Also, the implementation schedule of the priority projects are summarized in Table 7-3-3.

Functions and mutual linkages among the priority projects and expected effects on small and medium industries are shown in Figure 7-3-1 and these for large and foreign industries are shown in Figure 7-3-2. Further, the category and the location of the priority projects are shown in Figure 7-3-3.

7-3-2 Profiles of High Priority Projects

(1) Establishment of Southern Region Research and Technology Center (SRRTC)

1) Objectives

In order to develop research for fostering technological strength of small and medium industries in the Southern Districts, establishment of SRRTC should be proposed. It will conduct technical consultation and guidance, consigned testing, research and development, skill training and other pertinent activities through the local SRRTCs. In the initial stage, major activities of SRRTC may focus on provision of the technical consultation and information to the entrepreneurs in the existing industries or the ones who have plans to launch new businesses in the Southern Districts.

In addition, SRRTC will also serve as research and development strongholds in the Districts that are linked with universities and the R&D department of the private sectors.

2) Project description

(a) Programs

Programs to be conducted by the local SRRTCs will consist of technical consultation and guidance, consigned testing, R&D, skill training and so forth as discussed below. With regard to its operations, coordination with the proposed SRSMIC and vocational training centers is required.

Technical consultation and guidance

Consultation and guidance will be provided for new technology introduction, products and raw materials, development fund procurement, human resource introduction, and other problems of science and technology. SRRTC personnel and experts may directly visit the production sites if needed.

The consultation and guidance by SRRTC is a technology transfer to engineers and technician, and thus it differs from that of SRSMIC which targets management personnel in particular.

In consideration of small accumulation of industries in the Southern Districts at present, the technical consultation and guidance division will be a key in the initial stage.

Consigned testing

In response to the requests of small and medium industries, materials testing, performance testing, electric testing, precision measurements and other procedures will be conducted since most of them do not have equipment. The local SRRTCs undertake practical and technical works which are closely related to the actual needs in the site of the factory.

Research and development

In response to the demand from the governorates in the Southern Districts and private companies, SRRTC will conduct advanced research and development operations. The research will be concentrated on the applied ones and not basic ones. In addition to regular research efforts, specific research requested by companies and joint research between the industrial, academic and local governments may be conducted. The results of the research will be disclosed among the governorates, companies and other destinations, through lecture sessions, technical consultation, technological guidance, academic presentations, and research reports.

Technical training

Lectures, training sessions and research meetings for engineers and technicians in small and medium industries in particular will be conducted by SRRTC with regard to processing technology of raw materials, while industrial extension services including consultation in production control and quality control will be provided by the proposed SRSMIC. Major objective of the technical training by SRRTC is to transfer technology to engineers, technicians and others. Thus, it is

different from the training by vocational training centers, which train apprentice or semi-skilled labor in particular.

Others

- Open laboratories

In order to support spontaneous research activities, open laboratories, i.e., laboratories to be opened for users, will be prepared.

- Coordination with SRSMIC and vocational training centers

Through coordination with SRSMIC and vocational training centers, the local SRRTCs should promote the supply of venues for meetings between different industries, research activities between industries, universities and governments, information and publications.

- Information network for small and medium industries in the Southern Districts

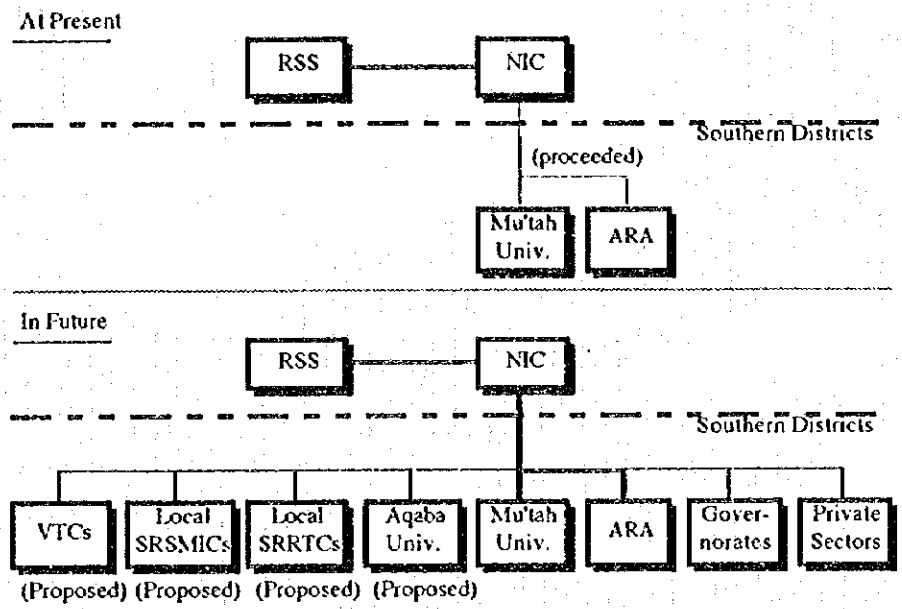
In addition to the cooperation with SRSMIC and the vocational training centers, the close cooperation with the Central Government, the four governorates, universities, and private sectors seems to be important to develop small and medium industries in the Southern Districts. In particular, the mutual exchange of technical information and launching of new businesses will be a basic prerequisite for the successful cultivation of small and medium industries.

This information network should provide: a) introductory and public relations information (description of businesses, events and such of related institutions, etc.), b) instructional and technical information (introduction of instructional cases that have been carried out by each institution, introduction of translations of research theses and other documents, etc.), c) information of companies (introduction of new products, introduction of companies seeking information exchanges and tie - ups, etc.), and d) personnel and employment information (presentation of list of technical advisors, engineers and introduction of employment opportunities. Overseas information, which is applicable to the characteristics of the Jordanian economy, should also be included.

In Jordan, the National Information Center (NIC) established in 1993 under HCST is making efforts to establish a nationwide information network, which links all the government sectors, universities and private sector through the Internet. Although the information stored on the network is very limited at present, the network system linked with sub-networks or clusters from all sectors is expected to expand and diversify in the future.

In the Southern Districts, a network is being prepared only between NIC as a center and ARA / Mu'tah University as a cluster. Thus, as shown below, it seems to be necessary to expand an information network to be connected with the proposed local SRRTCs, the proposed SRSMICs, the proposed Aqaba University, vocational training centers, the four governorates and private sectors in the Southern Districts as well as ARA and Mu'tah University only through dial up in the future.

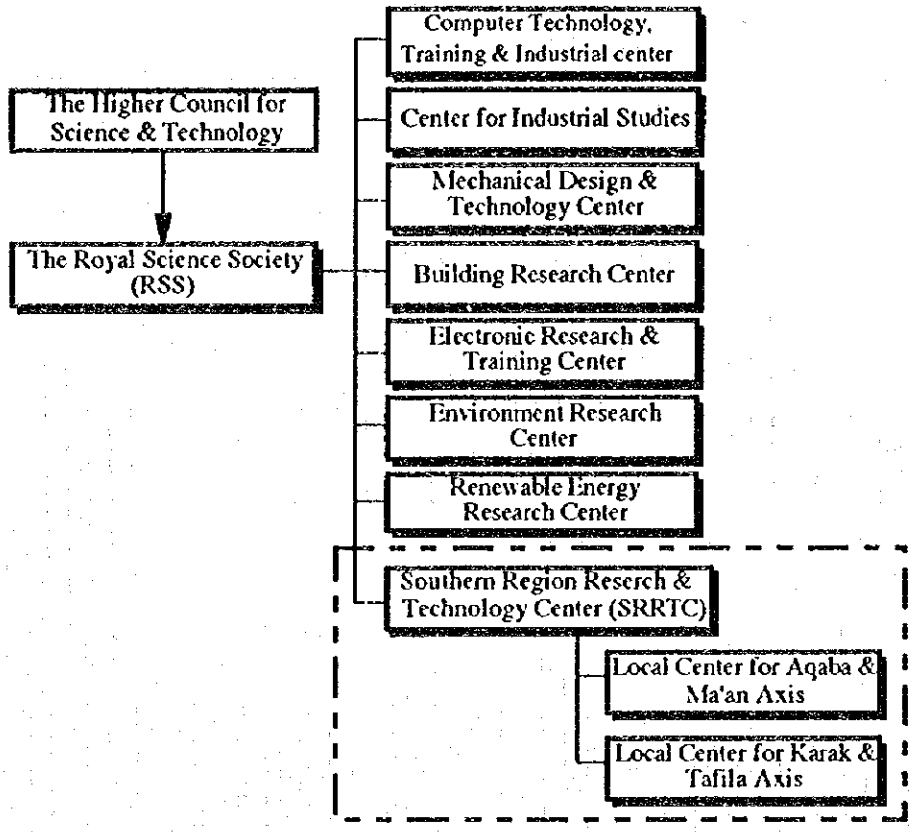
Information network in Southern Districts



Note: VTCs stands vocational training centers.

(b) Organization

A new center, SRRTC, should be set up within RSS as an central administration unit, and a few local SRRTCs as local centers, with necessary facilities, equipment and experts, should be established under this central center in order to focus on small and medium industries in the Southern Districts. The proposed organization is illustrated below. The new center should have the same power as the existing seven centers in RSS.



Proposed SRRTC

The second alternative is that existing seven centers within RSS will cope with the proposed programs and activities through establishment of a project unit or a task force in place of the proposed central center, although local centers with facilities and equipment should also be established.

Another option is that SRRTC also assumes the role of SRSMIC.

(c) Location

Basic concept on location

SRRTC should be established in the regional development axes between Aqaba and Ma'an in the short term, and between Karak and Tafila is the medium term, along the strategic growth scenario and the proposed plans for industrial estates by the JICA Study Team.

Candidate Location

In line with the above-mentioned concept, the candidate sites for the two local centers are selected as follows:

- A local SRRTC for serving industries in Aqaba and Ma'an
  - Location site: within proposed A-2 industrial site
  - Reasons for this location: to target mainly small and medium industries located in the proposed A-2 industrial estate (200 ha) and the now-fully-prepared crafts, services and light industrial estate (10.2 ha) in Aqaba and to cooperate with the proposed Aqaba University.
  - Expected categories of industries: fabricated metal, machinery, transportation equipment, food manufacturing, leather products, and so on.

- A local SRRTC for serving industries in Karak and Tafila
  - Location site: within Mu'tah University, or at a site adjacent to the university.
  - Reasons for this location: to target mainly small and medium industries in Karak, Mu'tah and Mazar area and to cooperate with Mu'tah University.
  - Expected category of industries: wearing apparel, beverage, food manufacturing and so on.

(d) Prototype of the local SRRTC buildings

As a prototype of local SRRTC, two office buildings, each having 3,000 m^2 of total floor space in two stories high, and a dormitory having 430m^2 floor area with around 20 rooms capacity in one story are planned on a land site of 20,000 m^2 as summarized below. Details are shown in Table 7-3-4. An image of a locational distribution of the buildings is shown below.

In the office building, there are several separate rooms for four divisions corresponding to the four programs in the local SRRTC and for the administrative division. Also, rooms for SRSMIC should be shared in the office building of SRRTC for smooth corporation.

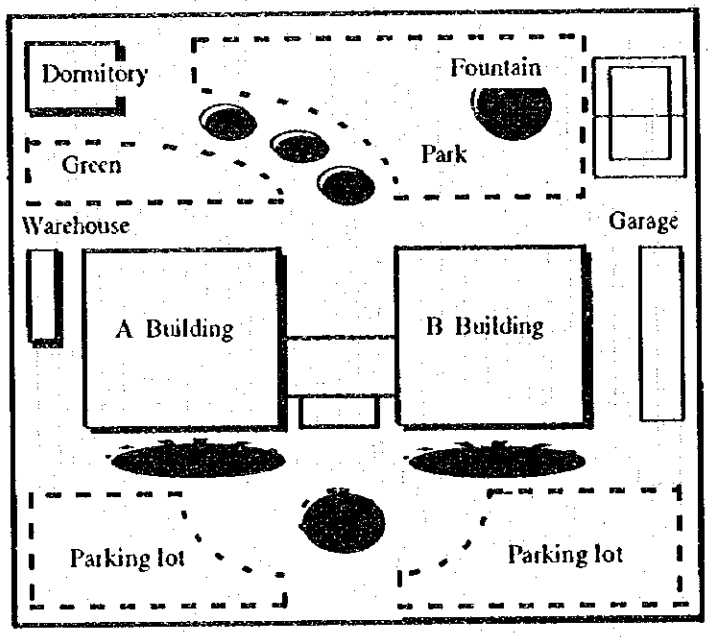
Since this is just a prototype model, the actual implementation will require detailed planning and design, taking into consideration the scale of demand, site conditions and other relevant factors.

Prototype of Building for Local SRRTC & SRSMIC

1. Land area	20,000 m2	
2. Building area	3,700 m2	
(1) A- Building (including SRSMIC)	1,500	
(2) B- Building (including Administration Division)	1,500	
(3) Dormitory	700	
3. Floor area	6,430	(* 4,180) m2
(1) A- Building (2 storied)	3,000	(* 1,950)
(2) B- Building (2 storied)	3,000	(* 1,950)
(3) Dormitory (1 storied)	700	(*455)

Note: 1. Building area ratio is 18.5%.
2. Mark* stands for floor area for business activities (The net ratio is set at 65%).

An image of a locational distribution of the buildings for SRRTC



(e) Operational organization and manpower deployment within SRRTC

In response to the four programs of the local SRRTC, there is a need to set up four divisions and an administrative division as shown below.

As for the manpower of the local SRRTC, each local center should have a total of 12 persons, one director class officer to serve as a chief, three managers, six technical staff and two administrative division officers. Staff in the consigned testing division and research and development division should consist of SRRTC's

own experts and the ones dispatched from the related existing centers of RSS, the various universities, private sectors and so forth.

Organization Chart and Manpower Deployment in a Local SRRTC

Name of Division	Director	Manager	Technical Staff / Officer
Technical Consultation & Guidance		1	2
Consigned Testing		*	2
Research & Development		*	*
Technical Training		1	2
Administration		1	2
Total	1	3	8

Note: Mark* stands for the lecturers/teachers invited from other organization. A manager will be deployed in each division and 2 to 3 technical staff will be in Research & Development Division.

3) Expected benefits / outputs

For small and medium industries in the Southern Districts, the local SRRTCs will foster the entrepreneurial spirit in terms of the technology improvement and increase of productivity, and expand business opportunities. Also, the center will stimulate the process of industrialization in the region. The target beneficiaries are owners/entrepreneurs and managers in small and medium industries in particular.

4) Implementation scheme

(a) Implementing and management body

Implementing and management body for this project should be RSS.

(b) Implementation time frame

SRRTC should be developed in line with industrial development, A-2 Industrial Estate and other new industrial estates in particular, as well as the progress of the linkages between industries / universities and the development of new businesses and information network in the Southern Districts.

From this viewpoint, the local SRRTC, which is planned to locate at A-2 Industrial Estate, should be established in the short term, and the other center within or adjacent to the Mu'tah University should be in the medium term.

(c) Fund raising

The initial capital investment should be covered by the national budget since SRRTC is a project for development of small and medium industries in line with the national policy to reduce the economic disparities between the Southern Districts and other districts in Jordan. Also, fund raising through foreign agencies or other schemes organized by the relevant agencies and private sector is conceivable. Foreign technical cooperation might be one option.

Moreover, on the management costs, since adequate demand is not anticipated for the local SRRTCs during the initial stage, it would be practical to introduce so-called "cross subsidization method" (the method of supplementing deficit in some centers/divisions with earnings from profitable centers/divisions, and thereby maintaining overall profitability) among two local SRRTCs, new central center of SRRTC and existing centers of RSS. Another option is to finance the management costs by the national budget.

(d) Subjects for implementation

Detailed plan on building, equipment, and machinery required for the above mentioned programs / activities should be decided based on the demand survey to users/industries.

(2) Establishment of Southern Region Small and Medium Industries Center (SRSMIC)

1) Objectives

The major objective of SRSMIC is to enhance managerial and technical ability and marketing promotion in small and medium industries. As a result, the center can contribute to increase of the living standard, alleviation of the poverty and development of the small and medium industries in the region.

2) Project description

(a) Programs

The center will mainly provide seven kinds of services. They are (i) industrial extension services, (ii) management consultation, (iii) support of establishment of new small industries (how to start business and incubation), (iv) marketing support, (v) provision of access points to the relevant agencies, (vi) provision of information

about the employment in the manufacturing sector, and (vii) provision of other information and strengthening of coordination.

Industrial extension services

SRSMIC provides industrial extension services including consultation and advice in production techniques, production control, and quality control through field visits and seminars by extension officers (industrial engineers).

Management consultation

SRSMIC provides management consultation and advisory services to small and medium industries through field visits and seminars by extension officers (industrial management experts). Major topics are business administration, business accounting, cost control, and so on.

Support of establishment of new small business (how to start business and incubation)

The center can provide the guidance for the entrepreneurs who try to expand the business and to improve productivity, and the ones who try to establish a new business.

Marketing support

The center will provide the assistance of marketing in the following ways:

- Advisory services of marketing

The experts of SRSMIC can give advisory services on market research, promotion of sales, after-sales services, product design and so on in order to expand the market.

- Development of sub-contract networking scheme

SRSMIC can facilitate subcontracting arrangements between "small and medium" and large industries as a means of expanding the former markets through the data base for sub-contract networking system of Jordan Export Development and Commercial Center Corporation (JEDCO).

- Access to government procurement

In order to gain the initial market access to government procurement, the center provide guidance and information.

- Opening of Industrial fair

The center can hold an industrial fair (small local exhibition) for local manufacturing products such as furniture to expand a market in cooperation with proposed Southern Region Research and Technology Center (SRRTC), Chambers of Industry/Commerce, vocational training centers and other relevant institutions.

Provision of access points to the relevant agencies

For manufacturers who do not know how to access various services provided by public and private sectors, the center provides "one window" access points to the proposed SRRTC, vocational training centers, financial institutions such as IDB and other relevant agencies.

Provision of information about the employment in the manufacturing sector

SRSMIC should provide information on the employment / job opportunities in the manufacturing sector in cooperation with the labor office. Information network through National Information Center (NIC), as discussed in the preceding section of SRRTC, should be utilized in order to exchange the information efficiently among other SRSMICs and the labor offices.

Provision of other information and strengthening of coordination

The center can provide information on the government policies, strategies, development assistance, loans and financing, and other subjects, which are related to small and medium industries. Information network through NIC is should also be utilized.

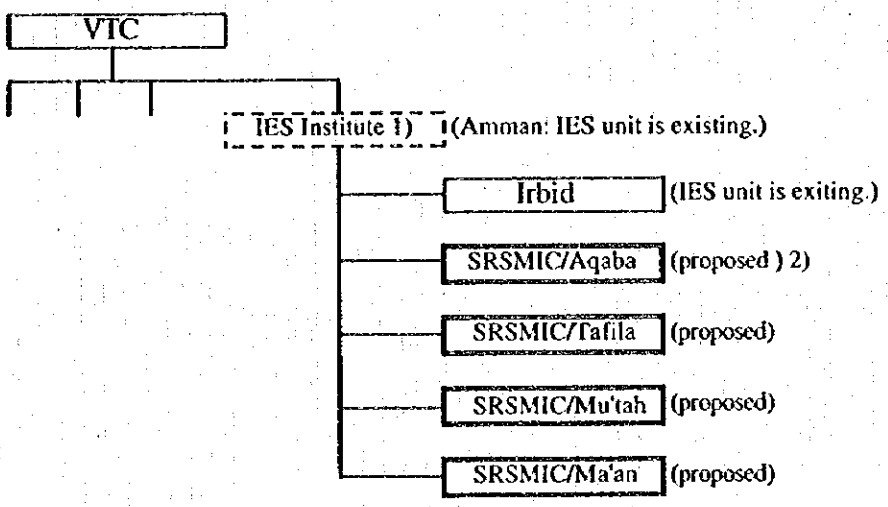
Moreover, in order to exchange the information in private sector, it is proposed to establish the Southern Region Industrial Promotion Committee that are composed of SRSMIC, the SRRTC, vocational training centers, and other institutions. This committee should be a standing one that meets monthly. In this committee, SRSMIC should be the coordinator and secretariat.

(b) Organization

SRSMIC should be established in each governorate in the Southern Districts as branch offices under the Industrial Extension Services (IES) institute, which will be developed by VTC in Amman as the head office of the IES program in the country. This institute should have a management and administration section for the program as a whole. The proposed organization scheme as a whole is shown below.

(c) Location

As for the candidate sites for location, the Aqaba center should be located at A-2 site of the proposed industrial estate together with the proposed SRRTC. The center of Tafila should be located within the Regional Directorate of VTC in the Southern Districts. The Mu'tah center should be adjacent to the proposed SRRTC and Mu'tah University and the Ma'an center should be established in the center of the municipality.



1) VTC has a plan to establish the IES institute with the main office in Amman.
2) Aqaba unit was proposed in the first phase of the IES program by VTC, but it was not implemented due to budgetary constriants.

Initially, the project should start from the minimum resources. Each center should have 5 - 6 personnel including extension officers (industrial management expert and industrial engineer), employment experts and supporting members. A example of the distribution of experts is shown below.

- Director / industrial engineer: 1
- Industrial management expert: 1
- Economist / financial expert: 1
- Labor / employment expert: 1
- Supporting staff: 2

3) Expected benefits / output

The establishment of this center as a part of package with the proposed SRRTC and the vocational training centers can upgrade institutional industrial base in the Southern

Districts and can contribute to the increase of output in small and medium industries through increase of the productivity, expansion of the markets, easy access to the loan and so on. Then, these benefits give forwards/backwards linkage effects to the region's economy.

Major target beneficiaries are entrepreneurs, owners or managers in local small and medium industries. Also, entrepreneurs in newly established industries and those who try to start industrial business can receive the benefit.

4) Implementation scheme

(a) Implementing and management body

SRSMIC should be implemented by VTC as discussed before. The cooperation with MOIT, RSS, IDB, Chambers of Industry/Commerce and other relevant agencies is essential for smooth implementation.

As another alternative for implementation, SRSMIC may be established under the Industrial Development Department of MOIT because the ministry plays a central role in the industrial development in the country, although the ministry is not involved at present in terms of the provision of consulting and advising services to small and medium industries.

(b) Implementation time frame

As for the implementation schedule, the centers of Aqaba and Tafila should be established in the short term frame and then centers of Mu'tah and Ma'an should be established in the medium term frame.

(c) Fund raising

VTC should be responsible for fund raising in this project. In some components of the project such as construction of facilities, provision of equipment and training of industrial extension officers, foreign assistance including technical cooperation program may be utilized.

(3) Strengthening of vocational training centers

1) Objectives

Industrial development in the Southern Districts requires various kinds and levels of laborers: from managers, engineers, technicians to accountants and secretaries. But

the Southern Districts has traditionally suffered from emigration of well educated people to the Northern and Central Districts, mainly due to scarcity of good employment opportunities in the Southern Districts. While the future industrial development in the Southern Districts might attract some of these emigrated people to come back to their home area, it is also necessary to produce skilled and semi-skilled laborers by training the young people living in the Southern Districts as well as by upgrading the existing workers' skill levels in order to meet the demand for human resources in industrial development.

At present, industries in the Southern Districts consist of a few big companies based on mineral resources (potash, phosphate, cement) and small workshops dealing with bakery, blacksmith, brick, concrete block, carpentry, car repair and maintenance, wearing apparel, etc. Since most of these small workshops do not require high-level production skills and knowledge, skilled and semi-skilled laborers are in a limited number and concentrated in big companies. But since the proposed plan for industrial development in the Southern Districts envisions to develop manufacturing industries such as metal fabrication, machinery, food processing, and apparel based on the comparative advantages of the Southern Districts, the demand for skilled and semi-skilled laborers to work in these industries is sure to grow and meeting this labor demand is the very urgent agenda for the Southern Districts.

Although in general VTC has stronger links and better communications with local industries and more practical training opportunities at the private companies than the vocational secondary schools run by the Ministry of Education, there is still some observations by the private sector that VTC's training courses sometimes do not reflect the actual needs from the private sector, training curricula are often too inflexible and specific to meet the changing demands from the private sector, and training courses are often designed from the traditional notions of vocational training (for example, sewing and knitting classes for women). The further industrialization in Jordan will require higher levels of workers with broad knowledge, and the skills which will be needed in the future might be different from what is needed today. So the World Bank recommended VTC to emphasize more on general subjects than on narrow practical training subjects in order to produce more flexible labor forces rather than to produce narrowly-specialized labor forces.

So the followings are the possible areas which will enhance VTC's functions to match the future demands from the private sector:

(a) updating instructor's knowledge and skills on recent technology development as well as new teaching methods which are interactive, participatory, problem-solving, and encouraging critical thinking,

(b) enhancing research and planning functions to assess the private sector's training needs and design relevant training courses, and

(c) institutionalizing the regular communication and collaboration with the private sector

Vocational training centers are already existing and well established in Karak, Tafila, Ma'an and Aqaba, so it is better to reinforce these existing centers through updating instructor's knowledge and skills, enhancing the research and planning functions, and strengthening the collaboration with the private sector, rather than to establish new centers in the Southern Districts.

2) Project description

(a) Program

To enhance VTC's functions, the following three programs should be conducted in the existing vocational training centers in Karak, Tafila, Ma'an and Aqaba.

a) Updating instructor's knowledge and skills

When the Southern Districts plan to promote rapid industrial development, it is necessary for VTC's instructors to be aware of recent technology development and the changing way of manufacturing at factories. So updating training of the existing instructors at VTC in the Southern Districts is highly needed and it should be done in collaboration with the private sector so that vocational training becomes more relevant to the needs of the private sector.

Another area of training for instructors is new teaching methods which are currently promoted in the ten-year Education Reform Program (1987 - 1996) financed by the World Bank's First and Second Human Resources Development Sector Investment Projects. The major objective of this reform is to train students to think flexibly and critically, to be open to and capable of processing new concepts and ideas, and apply in productive ways what has been learnt. The students are to be educated to keep socially active and responsible, to be more productive and work-oriented, and to take initiative and to be more self-reliant and independent in learning. This reform is under way in primary schools and secondary schools, so it is necessary for VTC to adapt the concept of this reform

in order to be consistent with the efforts by the Ministry of Education. VTC instructors should be trained on new teaching methods which encourage interactive and participatory learning, practical problem-solving experiences, and critical thinking.

Upgraded training of the existing instructors in the vocational training centers in the Southern Districts can be conducted not only in VTC's Training and Development Institute (TDI) at Amman as usual, but also in Royal Scientific Society's various centers which have advanced equipment and offer various training courses for the private sector as well as the public sector. The upgrade training program should include practical training at the large private manufacturing industries so that the VTC instructors become familiar with the current production process used in the these industries.

b) Enhancing the research and planning functions

To enhance the research and planning functions, each vocational training center in Karak, Tafila, Ma'an and Aqaba should establish a research and planning unit which can (i) conduct various surveys such as training needs assessments, labor force demand and supply surveys and follow-up surveys of VTC graduates and (ii) design relevant training courses based on the found needs from the research.

These researches can be conducted in collaboration with the existing research organizations such as Royal Scientific Society, Mu'tah University and the proposed community college or university in Aqaba.

c) Institutionalizing the regular communication and collaboration with the private sector

To strengthen the collaboration with the private sector, each vocational training center in Karak, Tafila, Ma'an and Aqaba should institutionalize the mechanism to communicate with the private sector regularly and assess their human resources demands by establishing a private sector coordination unit within each center. This unit can conduct the following activities:

- to recruit more representatives from the private sector in the vocational training center's training planning committee,

- to conduct regular consultative meetings with the local Chamber of Commerce and Industry in each governorate to discuss the private sector's labor demands and training needs,
- to seek donations or scholarships from the private sector which can be utilized to buy new equipment or finance the training of needy students,
- to arrange more training in industry where specialized equipment is involved,
- to temporarily hire one full-time technical adviser in each vocational training center for the term of two or three years from the proposed Southern Region Research and Technology Centers (SRRTC) or the big industries which have a variety of technical experts, in order to advise the training curricula in the centers as well as to advise to small and medium-scale industries, and
- to temporarily hire the ad-hoc or short-term (one to six months) lecturers from the proposed SRRTC, the proposed Southern Region Small and Medium Industries Centers (SRSMIC), universities, or the private sector, in order to make their up-to-date knowledge and valuable work experiences available to the students as well as to provide upgraded training for existing instructors in vocational training centers to make them keep up with the recent technology development

To enable vocational training centers recruit the above-mentioned personnel temporarily from the private sector, the Government of Jordan should set up a compensation scheme to the private companies as well as offer the competitive salary to the recruited experts.

Since industries such as food manufacturing, apparel, plastics, glass and non-metal minerals, metal fabrication, electrical machinery, transport equipment are planned to be developed in the Southern Districts, training courses in vocational training centers should include skill development in these manufacturing industries as well as training on accounting (including special training for introduction of VAT), bilingual secretary and personal computer (word processing, spreadsheet, database management, etc.).

(b) Organization

Each vocational training center should establish a research and planning unit to implement the program b) and a private sector coordination unit to implement the program c).

(c) Location

First priority sites are Karak and Aqaba, then the second priority sites are Tafila and Ma'an.

3) Expected benefits/outputs

If the above measures are taken, vocational training centers can offer the more up-to-date, relevant technical training, produce necessary skilled and semi-skilled laborers based on the needs from the private sector, and contribute to the future industrial development in the Southern Districts. The new training opportunities for the VTC instructors will become a big incentive for them, because gaining new knowledge and skills is always a key to the promotion in VTC, and will improve VTC instructor's performance at the vocational training centers in the Southern Districts.

As for target beneficiaries, the following can be pointed out.

(a) young people (males and females) who have finished 10 years of basic education and live in the Southern Districts,
(b) technicians and engineers currently working in the private companies in the Southern Districts,
(c) the unemployed people living in the Southern Districts,
(d) existing instructors in vocational training centers in the Southern Districts, and
(e) private companies operating or planning to operate in the Southern Districts

From the view point of the project linkage, the proposed SRRTC which will have technical experts and some research equipment may dispatch their technical experts for training courses in vocational training centers as well as allow vocational training centers to utilize SRRTC's equipment for their training.

The proposed SRSMIC which will have industrial and managerial experts and strong links with small and medium scale industries may also provide the experts for training courses in vocational training centers as well as facilitate their private sector coordination unit to assess training needs among small and medium scale industries.

Mu'tah University and the proposed community college or university in Aqaba can help vocational training centers to conduct labor demand and supply surveys.

4) Implementation scheme

(a) Implementing and management body

Implementing and management body should be Vocational Training Corporation (VTC). Relevant agencies to be considered are Ministry of Labor, Ministry of Industry and Trade and Royal Scientific Society (RSS). Also, Local Chamber of Commerce and Industries should be involved.

One alternative to vocational training in vocational training centers would be to increase on-the-job training opportunities in the big industries located in Amman which have high-level and up-to-date technical expertise. The Government of Jordan should ask the big industries in Amman to accept as many trainees (non-employees) as possible for one to two years under the condition that the Government will provide proportional tax exemptions to the number of trainees accepted by the companies. Although vocational training centers already have the apprenticeship training programs which offer one- or two-year off-the-job training in the classroom and workshop and one-year on-the-job training in the enterprise, these enterprises are mainly small and medium scale industries. So it is important for vocational training centers to explore the possibility to find the on-the-job training opportunities in the big industries in Amman in collaboration with the Amman Chamber of Industry.

(b) Implementing time frame

The program in vocational training centers in Karak and Aqaba should be started in the short term frame, and the program to vocational training centers in Tafila, Ma'an and other necessary places should be extended in the medium term frame.

(c) Fund raising

This program should be financed largely by the Government budget and partly by the donations from the private sector who can benefit from vocational training. It is important to raise as much fund as possible from the private companies currently operating in the Southern Districts as well as the private companies planning to invest and operate in the Southern Districts.

7-3-3 Profiles of Priority Projects

(1) Establishment of a community college or a university in Aqaba

1) Objectives

Although Aqaba has the biggest potential to become another industrial center in Jordan, it lacks higher education institutions. To meet the future demand for high-level manpower such as managers and engineers for industrial estates and other industrial complexes in Aqaba, it is urgent to establish a higher education institution in Aqaba. In addition to meeting the training demand for specific engineers from the private companies for the proposed industrial estate, industrialization needs training on some management skills such as quality control and productivity enhancement, as well as basic and applied research and development.

Aqaba is the only port in Jordan and can become an international trading center by fully utilizing its airport, port and road network. Therefore, there is a need to develop manpower specialized in international trade, transport, shipbuilding and transport machinery.

Since Aqaba is also a resort city facing the beautiful Red Sea, Aqaba needs to harmonize industrial development with environmental protection with careful planning and monitoring. It is necessary to train people on how to protect natural environment in harmony with industrial development. The environmental impacts of all proposed industrial projects should be assessed carefully before their implementation, and necessary measures should be envisaged to minimize their environmental impacts. For this purpose, the projects should be monitored regularly so as to assure that they do not damage the fragile environment of the Gulf of Aqaba.

2) Project description

Based on the needs described above, it is proposed to establish a community college in Aqaba which can be upgraded to a university at a later stage. The Aqaba Region Authority (ARA) has already set a site for a university in their town plan, and the Ministry of Higher Education considers that if the demand for higher education is high there, it will consider to establish a new institution. Since the proposed Industrial Estate Project will cause a significant population increase in Aqaba, there will be a growing demand for higher education.

But for the time being, the population of Aqaba may not be big enough to establish a new university, so it is better to take a gradual approach which means that first, a community college should be established to serve a small population between 2000 and 2005 and then it should be upgraded to a full-scale university when the population increases and the demand for a university becomes bigger between 2006 and 2010. A proposed community college or university can integrate the activities of the Marine Science Station in Aqaba which is currently managed jointly by the University of Jordan and Yarmouk University.

The Ministry of Higher Education is also interested in establishing a regional academic center of excellence in Aqaba, because Aqaba is located in the middle of the Arab world and has an easy access to and from the neighboring countries. This idea will further facilitate the establishment of a university in Aqaba by targeting not only the population in Aqaba but also that in the neighboring countries.

The proposed community college should start with the following programs at least:

A) international trade and business

B) marine science and environmental studies

These programs leading to intermediate diplomas are intended to offer the general introduction to these subjects and train students to the technician level. Program A) can admit 100 to 200 students and Program B) around 50 to 100 students every year.

The proposed full-scale university in Aqaba should offer at least the following programs which include the upgraded programs of those offered in the previous community college:

a) international trade
b) business administration and management including accounting and auditing
c) mechanical engineering
d) industrial management including quality control and productivity enhancement
e) land and sea transportation including ship-building and transport machinery
f) environmental protection of ocean resources and eco-tourism development
g) environmental impact assessment for industrial projects and environmental management and monitoring of industrial waste disposal.

Community college students in program A) can proceed to either program a) or b) above, and community college students in program B) can proceed to either program f) or g), if they want to continue the study and are admitted for the bachelor-level

classes. Programs a), b), c) and d) can admit 50 to 100 bachelor-level students annually, and 10 to 20 master-level students annually when the university starts the master-level program later. Programs e), f) and g) can admit around 30 - 50 bachelor-level students annually, and around 10 master-level students annually when the university starts the master-level program.

The proposed community college or university should not offer only traditional academic courses leading to intermediate diplomas, bachelor and master degrees, but also short-term mid-career training for civil servants and managers, engineers and technicians in the private sector.

The community college or university should also conduct applied research and development activities in close collaboration with private industries. They can be conducted in several forms such as a contract with private companies, a research financed by the government, or a joint research and development between the university and private companies.

3) Expected benefits/outputs

A community college or university in Aqaba can become the center for high-level training and research. It can allow Aqaba to realize its potential for industrial development and at the same time preserve its natural resources and environment.

Target beneficiaries will be the following:

(a) people who finished secondary education in Aqaba Governorate
(b) civil servants in Aqaba Governorate
(c) managers, engineers and technicians in the private sector in Aqaba Governorate
(d) private companies in Aqaba Governorate which can benefit from research and development activities by the university

As for project linkage, the proposed community college or university in Aqaba will not only produce highly skilled managers and engineers for industrial development, but also conduct scientific researches such as environmental impact assessment (EIA) for industrial development projects in Aqaba and monitor environmental situation in Aqaba City and the Gulf of Aqaba.

4) Implementation scheme

(a) Implementing and management body

The implementing body and management body should be the Ministry of Higher Education. Relevant agencies to be considered are ARA, the Ministry of Industry and Trade, the Ministry of Rural Affairs and Environment. As a possible alternative, the Ma'an Branch of Mu'tah University may cover not only Ma'an Governorate but also Aqaba Governorate, but when considering the big potential of industrial development in Aqaba, it is much wiser to plan a separate and new community college or university in Aqaba as early as possible.

(b) Implementation time frame

In the medium term, the Ministry of Higher Education should establish a community college in Aqaba which offers courses leading to intermediate diplomas, and in the long term should upgrade the said community college to a university which offers bachelor-level programs and master-level programs.

(c) Fund raising

The Ministry of Higher Education should seek to raise funds from the private sector which operates and plans to operate in Aqaba Governorate. The donations from the private sector can be utilized to finance some of its programs and researches, or if enough donation can be collected, the community college or university can be established as a semi-public and semi-private institution, which means the joint venture between the government and the private sector. In this case, both parties can share cost and management responsibility for the community college or university.

At the same time, ARA is looking for a private investor who might have interest in establishing a private community college or university in Aqaba. These efforts should be continued and the Ministry of Higher Education should give every possible assistance to ARA's efforts.

(2) Establishing Engineering Department in Ma'an Branch of Mu'tah University

1) Objectives

The Southern Districts are well equipped with a good number of primary and secondary schools, and each governorate has at least one vocational training center.

With regard to higher education, Karak Governorate has a four-year governmental Mu'tah University at Mu'tah which has established a new branch at Ma'an in September 1996, and there are two-year governmental community colleges in Ma'an, Tafila and Shawbak.

The Mu'tah University has the Departments of Science, Arts, Economics and Administration Sciences, Law, Educational Sciences, Engineering and Agriculture. In 1994, the Department of Arts started to offer Tourism Specialization Program which is the first bachelor course specializing in tourism in Jordan. Students of the Mu'tah University come from Karak Governorate (38%), Amman Governorate (22%), Irbid Governorate (9%), Ma'an Governorate (7%), Zarqa Governorate (6%), Tafila Governorate (6%) and other places (data on the first semester in 1994-1995)[1].

Although Ma'an Governorate has two community colleges, they offer mainly Academic Program (Ma'an College) and Agricultural Program (Al-Shubaq College). And the recently opened Ma'an Branch of Mu'tah University primarily aims at developing female teachers, because Ma'an Governorate suffers from shortage of female teachers for local communities.

But since Ma'an is located in the middle of the transportation network between Amman, Aqaba and Saudi Arabia, it has the potential to become the commercial, trade, distribution and machine maintenance center in the future. Ma'an also has the potential for agro-industry such as food processing, canned food, and dairy products (milk, cheese, butter, yogurt, etc.) using its livestock and agricultural resources.

To realize these potentials, Ma'an needs a higher training institution in the fields of physical distribution system, machine engineering and agro-industry, so it is proposed to establish a new Engineering Department in the existing Ma'an Branch of Mu'tah University in the medium and long terms, that is between 2000 and 2010.

2) Project description

Programs offered by the proposed Engineering Department in the Ma'an Branch of Mu'tah University should be decided in accordance with the scope of the proposed industrial development projects for Ma'an Governorate. But, the Engineering Department should provide the following programs at least:

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[1] Governorates used here are the old 8 governorates which means Ma'an Governorate includes Ma'an Governorate and Aqaba Governorate; Irbid Governorate includes Irbid Governorate, Ajlun Governorate and Jarash Governorate; and Amman Governorate includes Amman Governorate includes Amman Governorate and Madaba Governorate.

a) land transportation and physical distribution system
b) mechanical engineering including machine maintenance and repair
c) agro-industry including food processing, canned food and dairy products (milk, cheese, butter, yogurt, etc.)
d) mining engineering

Each program should accommodate 30 to 50 bachelor-level students annually.

The proposed Engineering Department should also offer short-term lecture-and-practice programs for the general public, especially for the unemployed women and Bedouins in Ma'an Governorate to enhance their knowledge and skills so that they can participate in a variety of income-generating activities. These kinds of programs for communities can be arranged in collaboration with non-governmental organizations (NGOs) such as the Queen Alia Fund for Social Development, because they know the needs of the community people through their income generating programs.

3) Expected benefits/outputs

The proposed Engineering Department in the Ma'an Branch of Mu'tah University will boost the industrial development through production of necessary labor force, if its programs are closely linked with employment opportunities in the proposed industrial development projects.

In addition, it will help women and Bedouins to gain the necessary knowledge and skills to start their own income generating projects (small-scale) using locally available agricultural and dairy products.

Target beneficiaries will be the following:
a) people who finished secondary education and lives in Ma'an Governorate
b) people who finished vocational training (apprenticeship training program) and live in Ma'an Governorate
c) the general public, especially unemployed women and Bedouins, living in Ma'an Governorate

As for project linkage, the proposed Engineering Department in the Ma'an Branch of Mu'tah University will not only supply necessary labor force to the proposed industrial development in Ma'an, but also enhance the status of Ma'an as a regional distribution and industrial center.

4) Implementation scheme

(a) Implementing and management body

The implementing and management body should be the Ministry of Higher Education. Relevant agencies to be considered will be the Ministry of Industry and Trade. Also, the Ma'an Chamber of Commerce should be involved.

(b) Implementation time frame

The project should be implemented in the medium and long term frame (2000 - 2010).

(c) Fund raising

The Ministry of Higher Education should secure the national budget to establish and operate this new Engineering Department in the Ma'an Branch of Mu'tah University, but the Engineering Department can generate income by charging fares to its open lectures, if they are practical enough to attract the general public. It may also be possible for the Engineering Department itself to organize women's groups or Bedouins to start income generation projects and gain some incomes by selling their products in collaboration with some NGOs.

(3) Establishment of soft loans for subsistence and small industries

1) Objectives

The objective of this project is to develop the industrial sector in the Southern Districts through provision of soft loan to the new individual business undertakers, small and medium industries locating in the Southern Districts and relocation projects of factories to the Southern Districts.

2) Project description

(a) Establishment of soft loans

A new soft loan system should be established for the industrial development in the Southern Districts. Besides this new system, adoption of the revised scheme of "Small Scale Industry and Handicarft" (SSIH) can be an alternative. This soft loan system is so-called "policy-based finance" by the Government initiative, which directs fund toward particular business activities being in line with the government policy.

(b) Lending scheme for the private sector

The lending conditions of the above loan should be, at least, equivalent to or softer than those of the SSIH scheme of IDB. This is because the loans are directed to developing industries in the less developed Southern Districts. The interest rate should be set in the range of one third to a half, at most, of the prevailing one applied by private banks. At present, the interest rate for SSIH is almost two thirds of it. Since the economic useful life of machinery and equipment is usually 5 to 7 years, the lending term of the loans should also be 5 to 7 years with a grace period. The loan extension should not require collateral from subsistence and small industries. Therefore, the loan guarantee for small industries should be taken into consideration by the central government.

(c) Priority projects for the loans

a) Subsistence & small and medium industries in the Southern Districts

Small and medium scale enterprises should be assigned high priority for the loans, since the development of small industries is crucial for the development and job creation in the Southern Districts.

b) Relocation / expansion projects to the Southern Districts

As it is anticipated that the number of existing small scale enterprises and potential projects in the Southern Districts is rather limited, enterprises in the Central and Northern Districts planning establishing factories in the South or relocating to the South ("Relocation projects to the South") should be eligible for this soft loan system. For relocation projects to the South, large scale enterprises should also be eligible for the loans.

c) Joint ventures with foreign investors in the Southern Districts

Joint ventures with foreign investors should be eligible for this soft loan system.

(d) Venture capital function

This project should also have a venture capital function, where project finding and creation of projects, using comparative advantages such as natural resources, should be conducted. This function can incubate subsistence and small industries that have entrepreneur spirit but face a shortage of fund.

3) Expected benefits / outputs

This soft loan system will contribute to the development of small and medium scale industries in the Southern Districts. For subsistence and small industries, the loans can promote the renewal of old or obsolete machines and equipment and then increase productivity.

Target beneficiaries would be small and medium scale companies and enterprises in the Southern Districts, companies and enterprises of any size relocating to the South or establishing factories in the South, and joint ventures with foreign investors locating in the Southern Districts.

This project should be linked with the project of Value Added Tax (VAT). One of the conditions for a successful implementation of VAT is to establish a proper accounting practice in companies and enterprises.

4) Implementation scheme

(a) Implementing and management body

The Industrial Development Bank (IDB) would be the most appropriate implementing and executing agency because it has already implemented the SSIH scheme. However, other eligible banks should also be involved in the project as intermediary banks, because IDB has only three branches in Irbid, Amman Industrial Estate and Aqaba, although IDB is conducting weekly visits to Karak. As a candidate, branches of Housing Bank in the Southern Districts can be utilized for this project.

(b) Implementation time frame

Study of this project should be started in a short-term frame and implemented in two phases. The first phase is a pilot scheme phase, and the second phase is the full implementation.

(c) Fund raising

In consideration of the size of SSIH, the size of this soft loan scheme in the first phase should be rather modest, ranging from JD 5.0 million to JD 10.0 million even considering that loans should be provided to large scale companies for the relocation projects to the Southern Districts. The size of the loan scheme in the

second phase should be determined after analyzing the results of a post-evaluation of the first phase of the loan scheme.

It would be practical to introduce the so-called "Two Step Loan (On-lending loan)" for this project, where fund obtained from the financial corporation by a foreign country is used, in consideration of the current budgetary constraints of the Jordanian Government. Banks as management body are also to be involved in this scheme.

(4) Strengthening of the Investment Promotion Law and JIEC Law

1) Objectives

The movement of the foreign direct investment (FDI) in the world from 1982 to 1992 is shown in Table 7-3-5. FDI in the world more than doubled in the last 6 years from US$67,526 million (82-87 average) to US$158,413 million in 1992. Dynamism of the world economy has been brought about by the remarkable increase of FDI.

However, contrary to the FDI trend in the world, FDI in Jordan did not increase in these years. FDI in Jordan from 1988 to 1991 was 0% or negative. Although FDI in Jordan in 1992 increased to US$41 million, this was only a return to the same level as the average of the period from 1982 to 1987.

The movement of FDI in the surrounding countries (Israel, Egypt, Syria, Lebanon) shows, somewhat, the same trend as Jordan, though the stagnation of FDI in these countries from 1989 to 1992 was slightly less serious than that in Jordan. FDI in this region in 1992 was only 78% of the 1982-1987 average, while it was 541% and 364%, respectively, for other MENA countries and other developing countries.

This FDI statistics tells us that this Region has completely been left outside the trend of global growth of the brisk FDI. Therefore, Jordan should take every possible measure to attract more FDI and to catch up with the globalization of the world economy. FDI is the key to enhance the international competitiveness of Jordanian products in the international market and to grow the national economy of Jordan.

A comparison of the FDI regime and investment incentives between Jordan, Jordan's surrounding countries, Israel, Egypt and Syria, and 3 countries of ASEAN, Singapore, Malaysia and Thailand, is given in Tables 7-3-6 to 7-3-8. For promotion

of FDI, the incentives for FDI should be further strengthened and become more favorable for foreign private investors in comparison to other countries. When setting up a set of investment incentive measures, it should always be noted that the government administration, as well as the private sectors, is being faced with the international competition.

To produce internationally competitive products, enterprises must generally have the following factors in their organization:

- Manufacturing facilities (machinery and equipment)
- Products of international standards and quality
- Market information for internationally competitive new products
- Knowledge and skills for management of enterprises
- Well-trained working force for production of products, for development of new products and for administration of enterprises
- Funds, including foreign currency funds, to purchase manufacturing facilities, to develop products, and to market these products.

Enterprises in Jordan are generally lacking of the most of these factors. As these factors are held by private sectors in the advanced countries, the only solution to this problem would be to attract foreign private investments into Jordan. Foreign investments would be the "spring-board" to make the Jordanian economy more self-supporting.

The objective of this project, therefore, is to win the competition, against the surrounding countries of Jordan and other countries, in attracting more foreign investment, and strengthening the international competitiveness of Jordanian products by capital, machinery, market information and other know-how brought to Jordan by FDI.

2) Project description

(a) Necessity for further strengthening of tax incentives for FDI

à) Tax holiday rather than tax reduction

The Investment Promotion Law provides certain reduction, not 100% exemption, of taxes to eligible industries located in the designated areas for 10 years from the start of actual production. The tax reduction rates are as follows:

-25% for projects in the development Zone A

-50% for projects in the development Zone B
-75% for projects in the development Zone C

However, tax holiday, i.e. total exemption of taxes, would be more powerful incentives than a reduction of taxes for investors. In order to attract them in the less developed areas such as the Southern Districts and to win the competition against the other countries, it is necessary to create a new Zone D where 100% tax exemption is granted, or to increase the tax reduction rate for Zone C to 100% and adjust the reduction rate for Zone A and Zone B accordingly. Thus, it is proposed to create a new Zone D covering Karak, Tafila and Ma'an Governorates, in which tax will be 100% exempted.

b) Timing of start of tax reduction/exemption period

The Investment Promotion Law gives a 10 year tax reduction period starting from the date of actual production. In addition to this reduction, a 2-year tax holiday also from the date of production is granted to investors in JIEC operated industrial estates, under the Jordan Industrial Estates Corporation Law. It would be more appropriate, however, to start the tax reduction or exemption period from the first profit year for income taxes such as corporate income tax, since tax reduction/exemption does not give any actual benefit to the investor during loss years. At present, however, it might be difficult to identify the first profit year since modern accounting standards are not fully established and proper recording of books is not maintained either. Therefore, it is proposed to amend the starting year of the reduction/exemption period to the first profit year from the first operation year in both Laws in the medium term frame. In the short term frame, the starting year of reduction/exemption period should be the first operation year as currently designated in both Laws.

c) Period of tax reduction/exemption

It is additionally proposed that (i) the tax reduction period specified in the Investment Promotion Law be extended from 10 years to 15 years by amending of the Investment Promotion Law, and (ii) the tax holiday period granted by the Jordan Industrial Estates Corporation Laws should be extended from 2 years, which is considered to be too short in comparison to that appied in other countries, to 5 years in the short term frame. In the medium term frame, the same extension should be applied.

Losses are allowed to be carried forward to the subsequent 6 years in the current tax regulations. It is considered that this carry forward period is appropriate.

d) Tax incentives to financial sectors

At this moment, the financial sectors, such as financial institutions and insurance companies, are not eligible for the tax incentives by the Investment Promotion Law. However, the financial sectors are considered to be strategically important for the economic development of Jordan. Therefore, the tax incentives should also be given to the financial sectors.

e) Tax incentives to investment

Tax incentives for investment should be strengthened by introducing of an investment tax credit. The investment tax credit allows investors to claim tax credit (direct reduction of tax payable) for a certain portion of the investment amount. Alternatively, an allowance of tax deduction of a certain portion of the capital investment amount should be considered.

f) Accelerated depreciation

Accelerated depreciation should be allowed for specific projects satisfying certain conditions. Accelerated depreciation is one of strong tax incentives, as it allows investors to claim higher depreciation than that of the normal depreciation whereby investors can reduce taxes and lessen investment risk by earlier collection of capital investment.

g) Double tax treaties

Jordan should have tax treaties with the countries considered to be significant for Jordan's industrial development such as East Asian countries. Furthermore, tax treaties, including those existing and those to be concluded with other countries from now on, should have clauses recognizing income tax incentives so that the reduced taxes by the tax incentive system of Jordan may not be taxed in the home countries of investors when dividends are paid, and providing reduced withholding rates for dividend, interest and royalty.

(b) Necessity for further transparency of procedures relating to foreign investments

The "quality" of the foreign investment environment in Jordan, in terms of the legal regime of policies and procedures, is considered to be one of the obstacles for promotion of foreign investment into Jordan. The investment Promotion Corporation (IPC) should have a real and full "One window facility" for appraisal of investment proposals, which is contemplated in the Investment Promotion Law, to overcome this problem.

(c) Tax incentives for promotion of export

Tax concession measures similar to those discussed in the preceding paragraphs , such as tax holiday and investment tax credit should be provided to exporters meeting specific criteria. Tax concession for overseas market development costs, such as allowing double tax deduction of specified export development market expenses, should also be considered.

3) Expected benefits / output

The tax holiday period of the other countries is 5 years from the start of project in Egypt, 5 to 7 years from the start of production in Syria, 5 to 10 years in Singapore, 5 years from the start of production in Malaysia and 8 years in Thailand. Thus, the proposed amendment of corporate tax systems in the Southern Districts of Jordan, namely 15 years tax exemption/reduction and additional 5 years tax holiday in the industrial estate managed by JIEC, would be more attractive incentives for investors than ones of the above mentioned countries. In addition to the amendment of corporate tax systems, if introduction of investment tax credit, accelerated depreciation and double tax treaties, and transparency of procedures relating to foreign investment and tax concession for overseas market development costs are materialized, the investment environment of Jordan would be superior to the competing countries.

The expected benefit would be an expansion of export of Jordan by strengthening the international competitiveness of Jordanian products by capital, technology, market information, etc. brought by increased FDI.

Target beneficiaries would be foreign investors to Jordan and Jordanian companies / enterprises participating in joint venture projects with foreign investors, and Jordanian companies / enterprises exporting overseas.

4) Implementation scheme

(a) Implementing and management body

New legislation and / or changes of current laws are needed to implement this project. Drafts of the new laws or changes of existing laws should be prepared by the implementing body. In this respect, the Ministry of Finance, Investment Promotion Corporation and Ministry of Industry and Trade should form the implementing body. The management body should be the Investment Promotion Corporation.

(b) Implementation time frame

This project should be started in a short-term frame.

(5) Introduction of Value Added Tax (VAT)

1) Objectives

As the General Sales Tax (GST) is imposed on the sales amount rather than the value added, costs of goods are taxed more than one time when they are sold from one person to another in the production process. Therefore, GST increases costs of domestic products, and consequently competitiveness of domestic products against foreign goods in the domestic market is deteriorated.

GST has a very serious bad impact on Jordanian products in the international market, too. Refund of GST at an exporting point can make only for GST that was paid in the immediate preceding transaction of the exporting point. Other GST paid in the whole distribution channel can not be refunded and, therefore, is being left in the product costs of the exporting products. Therefore, GST deteriorates the competitiveness of Jordanian products in the international market as well.

GST is not taxed in cases where goods are transferred between the divisions within a company. If certain production function is separated from the company for specialization, goods have to be transacted between the "mother" company and the "child" company. In this situation, GST will be taxed to these transactions resulting in higher costs, since the tax rebate system or tax refund system does not work properly in GST. Thus, GST is preventing the development of the division of labor system.

The objective of this project is to strengthen the international competitiveness of Jordanian products by removing bad impacts of the current GST on costs of Jordanian products by replacing GST with VAT.

2) Project description

The Government is going to introduce VAT in place of GST. The Study Team agrees that VAT should be introduced to replace GST in a medium term when certain prerequisite conditions, such as establishment of modern accounting standards and maintenance of proper recording of books, are met.

An immediate introduction of VAT may not be realistic nor practical, as these prerequisites are still not met at this moment. In the transitional period to VAT, it is recommended to amend the current GST in the following respects:

- Significant reduction of the current list of goods exempted from GST,
- Unification of tax rates and lowering of the current level of 20%, and
- General inclusion of services in the tax base rather than specifying services subject to GST

When introducing VAT, it should be noted that the VAT system should be rather a simplified system in the initial stage. It is worthwhile to study VAT systems in various countries before finalizing the VAT system in Jordan.

3) Expected benefits / output

Expected benefits are the strengthening of competitiveness of Jordanian products in the domestic market and the international market by reduction of costs of Jordanian products.

However, it should be noted that a significant reduction of the government revenue by replacing GST with VAT should be avoided so that the current serious deficit of the government budget may not be even worsened. For this purpose, details of the VAT system, for example tax rates and products and services to be subject to VAT, should be carefully studied and determined. On the other hand, it will be necessary to strengthen the tax collection system in this respect.

4) Implementation scheme

(a) Implementing and management body

The implementing and management body should be the Ministry of Finance.

(b) Implementation time frame

A study of the VAT system should be started immediately. However, implementation of VAT should take place only after basic conditions for VAT are satisfied.

(6) Establishment of the Southern Region Authority

1) Objectives

The levels of current economic development in the four governorates are alike compared to the level in the Amman Capital Region though the level in Aqaba seems a little bit higher than that in the three other governorates. This is the reason why the four governorates in the Southern Districts are taken up as a single area for development.

Since there are no strong economic ties within the Southern Districts at present, the economic gap among the four governorates may widen as development proceeds. Moreover, in order to promote development in the Southern Districts as a whole, which are left economically behind from the Northern and Central Districts, it is necessary to strengthen the ties with these districts.

Under such circumstances, it is strongly desirous that the "Southern Region Authority (SRA)" should be established to formulate and implement development plans, including the establishment of economic development axes (economic development bases) and constructing infrastructure from the viewpoint of the four governorates in the Southern Districts.

2) Project description

This project is to establish SRA that is capable of promoting development in the four governorates in a unified manner. This Authority should be a governmental organization like ARA that is equivalent to the ministries in power and status and should formulate and implement development plans for the four governorates in line with Jordan's social and economic development policies. Power to be granted to SRA should be similar to that of ARA but the area under its jurisdiction should encompass the whole Southern Districts. The head office of SRA should be located in Aqaba, and branch offices in the capitals of the respective governorates as well as in Amman.

Furthermore, in order to clarify the national policy for the development in the Southern Districts, a new law should be formulated. The law should empower SRA

to secure its own budget for the development in the Southern Districts to achieve a comprehensive and consistent development in the districts.

3) Expected benefits / outputs

The following can be expected through the establishment of SRA:

- Strengthening coordinated socio-economic development of the four governorates of the Southern Districts and the ties within the region, and economic linkage between the Central, Northern and Southern Districts,
- Buoying the economy of the Southern Districts for narrowing the economic gap with the Central and Northern Districts,
- Promoting economic development through making the best use of Aqaba as a gateway to the Middle East and Asian countries and mineral and tourism resources in the Southern Districts,
- Attracting domestic and foreign investment through the clarified economic policy for the Southern Districts, and
- Implementing public works effectively and efficiently since the budget for the development in the Southern Districts will be secured for SRA.

4) Implementation scheme

(a) Implementing and management body

The implementation and management body should be the central Government itself. Relevant agencies are ARA, MOP, MMRAE, MOF and four governorates in the Southern Districts.

(b) Implementation time frame

Although the establishment of SRA by enacting a new law is of urgent need, it is desirous that the project be implemented in a medium term frame since there is a need to make adjustments and coordination among relevant ministries and agencies and local governments, and to implement proper legislation.

(c) Fund raising

The fund source required for the new organization to fulfill its tasks should be the following:

- Earnings from leasing or selling of national lands which will be owned by SRA in the four governorates, and
- Government budget.

(7) Strengthening of cooperation between general industrial estates and free zones and study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF

1) Objectives

To promote the export processing function of the country, a stronger cooperation between the free zones (FZs) under the Free Zones Corporation (FZC) and the general industrial estates (GIEs) under the Jordan Industrial Estates Corporation (JIEC) seems to be essential.

FZC has been promoting the manufacturing sector in the zones. However, so far the investment for the sector has been limited. It is also noted that some parts of the regulations of the corporation are not suitable for development of full scale export processing zones. It is therefore worth studying the appropriateness of transferring the authority over EPZ from FZC/MOF to JIEC/MOIT.

2) Project description

(a) Strengthening of cooperation between GIEs and FZs

New GIEs should be located close / adjacent to FZs though they must be separated by barriers because free zones including EPZs need to check the traffic in and out of the zones.

Functional coordination between the two corporations should be kept from the planning stage to the operation and management stage.

(b) Study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF

The scope of the study for transferring the authority over EPZs should include:

- Organizations in charge and roles of EPZs in other countries and contribution thereof to the development of the economies;
- Current legal and institutional framework in Jordan relevant to the function and authority over EPZs; and
- Comparison of the merits and demerits of the current system and a possible new system (transferring the authority over EPZ from FZC to JIEC or to the new integrated organization) in the light of accelerating export of manufactured goods.

Further, the study may cover the following.

- Possibility of permission to the factories with 100% ownership and control of their manufacturing facilities, which are not located in EPZ; and
- Introduction of incentives in proportion to the share of export of the final products.

3) Expected benefits/outputs

The following benefits are expected from the strengthening of cooperation between GIEs and FZs:

- Integrated development of infrastructure and facilities
- Industrial linkage and exchanging and sharing of services
- Better operational environment for export oriented industries

Target beneficiaries are the industries (export-oriented industries in particular) located in GIES and EPZs.

4) Implementing scheme

(a) Implementing and management body

The implementing and management body should be JIEC and FZC. Relevant agencies to be coordinated are MOIT and MOF.

(b) Implementation time frame

Short and medium term implementation is recommended in proportion to the development of GIEs and EPZs.

(c) Fund raising

Own fund (JIEC and FZC) and/or technical assistance from other countries are expected for the Study. In addition to the two corporations concerned, the private sector like the Chambers of Industry/Commerce may participate in the study.

(8) JIEC Capacity Building

1) Objectives

JIEC now operates two IEs, Amman (Sahab) and Irbid (Al Hasan). In addition, JIEC has already purchased the land or started negotiation for land acquisition in some sites for industrial estates. Assuming that the four IEs proposed in this master plan will all be established, JIEC will be managing more than 10 IEs within a long-term frame. Thus, the provision of efficient and environmentally sound IEs will be an important task for JIEC from the viewpoint of social and economic need in the country as a whole. Strengthening of JIEC's planning ability is, therefore, needed.

The capacity building of JIEC aims at (i) increasing the ability in industrial estate planning, (ii) strengthening the ability in investment promotion, and (iii) increasing the ability in environmental management.

2) Project description

(a) Planning capacity enhancement

It is recommended for JIEC to enhance the following planning capacities:

a) Site selection planning

The Study and Research Section in the Investment Division should enhance the site selection planning capacities through conducting a national scale study that points out the best available sites in Jordan and their preferences and priorities jointly with the Ministry of Planning, with technical assistance of foreign specialists. The governorates and the regional agencies such as ARA can participate in the study by providing detailed information on local needs and resources.

b) Industrial estates planning (site planning)

The Planning Section in the Engineering Division should strengthen industrial estates planning capacities through on-the-job training with the relevant agencies

as well as intensive training and IE site visits in foreign countries under technical cooperation programs. The major items for industrial estates planning are as follows.

- Scale of IEs and characterization of each IE (e.g. for the national economic growth and/or the regional development)
- Industrial classification of targeted industries and lot size of industries
- Analysis of domestic and foreign markets for industrial products
- Development phasing and implementation schedule in consideration of competition among all IEs in Jordan.

c) Infrastructure planning

The Planning Section and the Supervision & Construction Section in the Engineering Division should enhance the infrastructure planning capacities such as planning of water, electricity, telephone, road and other facilities in and out of IEs through on-the-job training in cooperation with WAJ, NEPCO, TCC and MPWH. For the training purpose, the temporary transfer of staff to relevant agencies in a certain period should be taken into consideration.

d) Financial planning

The Study and Research Section in the Investment Division and the Finance Section in the Financial Division should strengthen the financial planning capacities through on-the-job as well as intensive training in banks such as IDB and CVDB. Financial planning includes (i) study on availability of own fund and/or possibility of introduction of foreign assistance, and (ii) setting of sales prices and/or lease prices in terms of the competition among IEs in Jordan and IEs in Southeast or South Asian countries, and financial viability and soundness of each IE and all IEs as a whole in the country.

(b) Strengthening of investment promotion activities

It is recommended to strengthen investment promotion activities in JIEC. The Investment Division should hold investment promotion seminars in Jordan and also dispatch missions to foreign countries to attract investors in cooperation with the Investment Promotion Corporation (IPC), MOIT, Chambers of Industry/Commerce, and other relevant agencies.

(c) Strengthening of environment management

Environmental considerations are necessary in every step of the IE development. The Environmental Section is expected to play the leading role for strengthening of the actual management of the environment in IEs.

Training courses on strengthening of environment management should be prepared for the relevant staff such as those in the Environmental Section and Laboratory Section, in cooperation with GCEP, RSS and other agencies/private sector. The topics of training are (i) environment management, (ii) pollution prevention, (iii) monitoring, (iv) laboratory analysis, and (v) maintenance. A part of training courses should be planned on on-the-job basis.

Emphasis will be given to those fields related to air pollution and waste management, since there are few specialists in such field yet in Jordan. The course on pollution prevention should also include practical study of production process of industries. Among various industrial sectors, priority should be given to those that are strategically promoted in Jordan, and those that are economically promising.

The managers or environmental staff of the enterprises in the IEs are encouraged to attend all the training courses. Environmental concern and knowledge of the private sector shall ensure cooperation in the JIEC management activities. The enterprises are expected to take leading positions in environmental management movement in their respective fields of production.

The relation between the proposed training courses and the sections in the Engineering Division, which should participate in the courses, is as summarized below.

Environment Courses	Planning	Construction & Supervision	Environment	Lab.	Maintenance	Enterprise managers
Environment Conservation	X	X	X	X		X
Pollution Prevention	X	X	X	X	X	X
Monitoring			X	X		X
Laboratory Analysis			X	X		X
Maintenance			X	X	X	X

Recruitment of the environmental staff is necessary as the JIEC opens new IEs. Most environmental situations of the IEs will be peculiar to each site, and the

environmental administration and mix of industries in the IEs will differ from each other. To manage daily activities in the IEs and to prevent unexpected disasters by daily monitoring, at least a minimum staff consisting of environmental specialists and technicians must be stationed in each IE. The team should include at least one water quality specialist, one waste and hazardous materials specialist and one laboratory technician. Air quality specialists may be added if the condition of the sites requires this specialist.

Since JIEC bears the power of municipality within its IEs, it is responsible for enforcement of environmental standards within the IEs. The staff of the Environmental Section should work with the enterprises for securing a better environment, but at the same time, they should enjoy the power of free inspection of enterprises.

3) Expected benefits/outputs

With stronger capacities in planning, investment promotion and environmental management, JIEC will be able to perform better industrial management and make more sound decisions in their future industrial development projects such as the development of the A-2 site.

The training project for environmental management will contribute to improving the JIEC ability in project implementation and reducing problems of pollution in the industrial estates in advance. In a long term, it is expected that environmental managers of JIEC transfer the knowledge and techniques of environmental management to all the managers of enterprises in IEs of JIEC. The transfer should eventually contribute to higher standards of environmental performance of industries in Jordan. Target beneficiaries are enterprises in IEs and residents around the IEs.

As for project linkage, establishment of a university in Aqaba and an engineering department in the Ma'an branch of Mu'tah University will benefit this project by providing graduates in environmental science for the Engineering Division of JIEC. The knowledge, technique and the systems of environmental training implemented under this project could subsequently be adopted on a national scale, as well as in the private sector.

4) Implementation scheme

(a) Implementing and management body

The implementing and management body should be JIEC. Relevant agencies to be coordinated are: MOP, MOIT, MOT, WAJ, and the Investment Promotion Corporation for enhancement of planning capacity and strengthening of investment promotion activities; and GCEP, MMRAE, MOH, the Occupational Safety and Health Institute, WAJ and RSS for strengthening of environment management.

(b) Implementation time frame

The project should be realized in the short-term time frame along the development of IEs. Regarding the training programs for environmental management, it is necessary to revise the curriculum based on the course evaluation made by the participants, and to periodically conduct update workshops.

(c) Fund raising

Own fund of JIEC and the related government agencies should be earmarked. Technical assistance from foreign countries can also be utilized.

For developing the environmental management capacity, each of the proposed IEs is recommended to employ core environmental experts as environmental protection staff and water supply and wastewater treatment staff.

In addition to the personnel cost for the experts, which constitutes a part of each estate's administration personnel cost, the requirements for the monitoring and laboratory equipment such as water sampling equipment should be estimated after specifying the equipment needed in each IE.

(9) Promotion of industrial location in A-1 as heavy / chemical industrial zone

The A-1 area with an area of an area of 56 km^2 is located about 17 km south of the center of Aqaba City. It is recommended to establish the industrial zone where heavy / chemical factories are built, for the following reasons:

- A huge amount of sea water is available as cooling media, since the site is close to the seaside.
- A large amount of products can be exported and raw materials can also be imported through the Port of Aqaba, if necessary.

- Manufacturing facilities or infrastructure such as the JPMC fertilizer complex, the NJFC NPK fertilizer plant, the Aqaba Thermal Power Station, which are existing or under construction near the site, will encourage the introduction of new factories.

The following three factories are recommended to be built as a part of the heavy / chemical factories in the zone, as an example. Needless to say, other categories of heavy / chemical industries also have possibilities to be introduced into this site.

- Liquefied Natural Gas (LNG) receiving terminal
- Phosphatic fertilizer complex
- Potassium sulfate / di-calcium phosphate complex

Promotion of industrial location in the A-1 site will contribute to industrial development in the Southern Districts by generating both direct and indirect job opportunities for Jordanian work force, increasing foreign exchange earnings through product exportation, and spreading effects to the related industries such as those utilizing cold energy of LNG effectively.

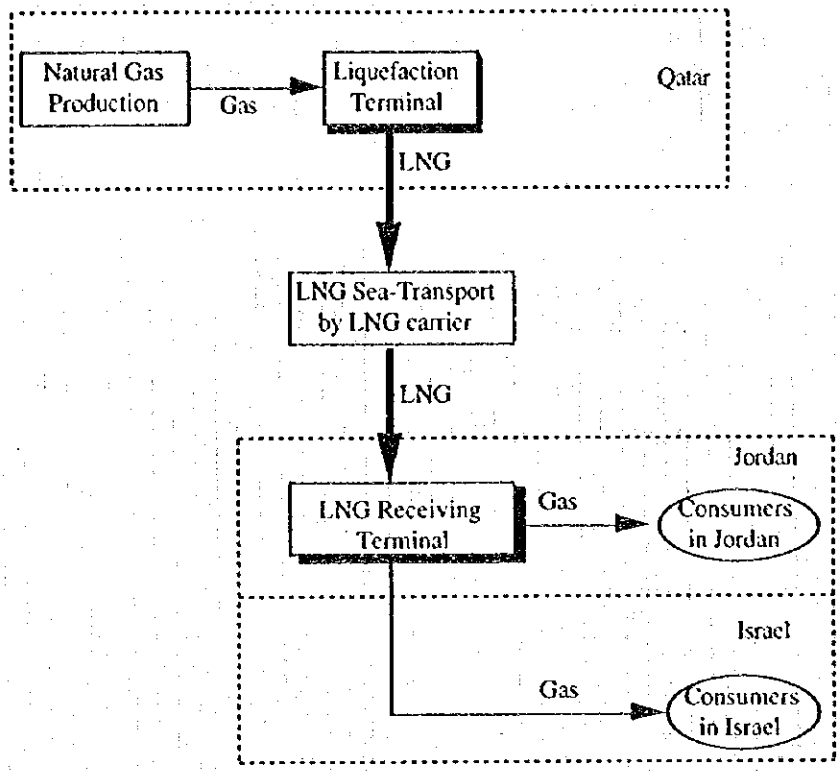
On the other hand, Aqaba is quite important place from the viewpoints of tourism and ecology. Therefore, a particular care must be taken not to cause any damage to the ecological system of the Gulf of Aqaba and inhabitants in this area during design, construction and operation stages. Moreover, these activities should be accessed before commencement.

Each of the three above-mentioned industrial facilities is described below.

1) LNG receiving terminal

(a) Objectives

This plan is to build a LNG receiving terminal at the A-1 site for vaporization and supply of natural gas to Israel and Jordan. This project is a part of the concept of a LNG project according to which natural gas produced in Qatar is liquefied, transported and vaporized to be used mostly in Israel and partly in Jordan. The concept is illustrated below.



Concept of the entire LNG Project

Israel is interested in diversifying the present mix of its energy resources by importing natural gas in large amounts. Until recently, such imports were considered politically unrealistic. However, the ongoing peace process has changed this situation. Two potential suppliers, Egypt and Qatar, have expressed interest in supplying natural gas to Israel in large quantities and on a long-term basis. Natural gas will be transported in gaseous form via a new gas pipeline in the case of Egypt, while it will be transported in liquid form by LNG carrier in the case of Qatar.

Under the above circumstances, Aqaba is considered to be the most promising site for the LNG receiving terminal to provide natural gas to Israel from the Gulf states such as Qatar, for the following reasons:

- The Gulf of Aqaba has an advantage over the Mediterranean Coast in that LNG carriers can transport LNG without passing through the Suez Canal and with a shorter distance of voyage.
- Aqaba has wider hinterland required for the LNG terminal, compared with Eilat that is another seaport in the Gulf of Aqaba.

- The Port of Aqaba is deep enough for the construction of a new berth that needs 13 - 14 meter water depth for large-class LNG carriers with a capacity of 125,000 m^3.

(b) Project description

Capacity of the LNG receiving terminal

The terminal is planned with a capacity of 2.5 million tons per annum, which includes 2.0 million tons to Israel and the rest 0.5 million tons to Jordan. This capacity corresponds to a half of the planned capacity of the liquefaction terminal in Qatar.

Major elements of the project

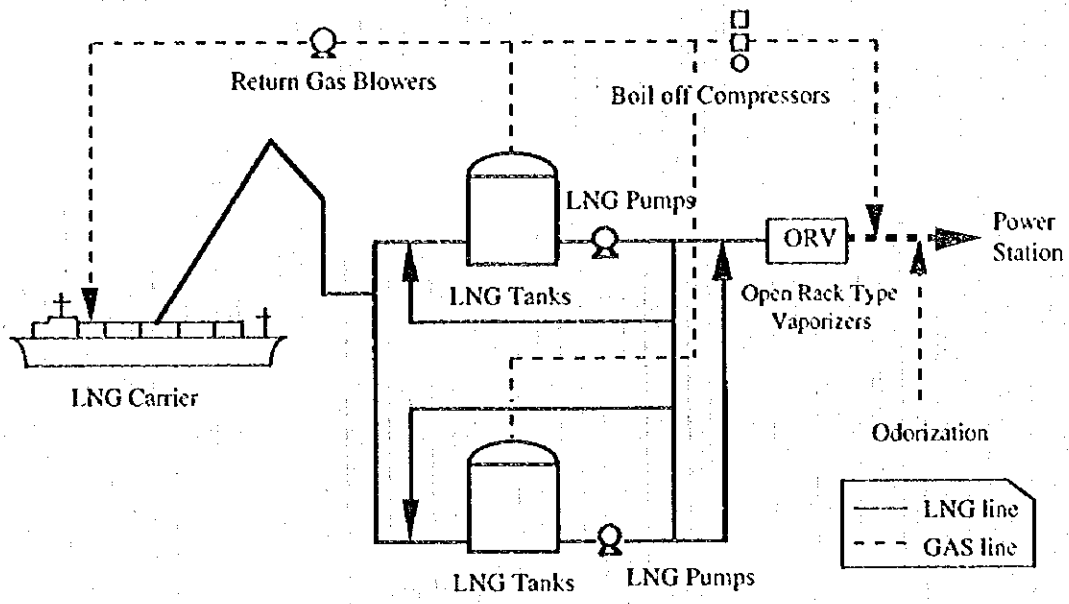
The LNG receiving terminal includes;

- LNG carrier berth
- LNG tanks
- Boil off gas compressors
- Open rack type vaporizer
- Sea water pumps for LNG vaporizers
- Office and control center
- Cold utilization plant (optional)

Flow chart of the LNG receiving terminal

The major functions of the LNG receiving terminal are receiving, holding, and regasification of LNG. The gas is boiled off by heat transferred into the LNG storage tanks and piping from atmosphere due to a large temperature difference between LNG holding condition and ambient condition. Such boiled off gas is compressed for sending to the natural gas line for delivery together with the regasified natural gas, in the LNG receiving terminal.

A typical flow chart of the LNG receiving terminal is shown below to illustrate the general functions of the terminal:



Typical Flow Chart of the LNG Receiving Terminal

Effective utilization of LNG cold energy

LNG that is a fluid of minus 160 degrees centigrade has a cold energy of approximately 200 kcal/kg. Utilization of the LNG cold energy is quite important for effective utilization of energy, being realized in the following fields:

- Power generation utilizing LNG cold energy
- Producing liquid-oxygen and liquid-nitrogen by an air liquefaction separation process
- Producing liquefied carbon dioxide
- Refrigeration warehouse to store frozen food
- Manufacturing dry ice
- Freezing food
- Cryogenic crushing processes for powdering used tires
- Separating non-ferrous metals from metal products

Required site area

The required site area for the LNG receiving terminal varies widely depending not only on the capacity of the LNG receiving terminal, but also on how cold energy should be utilized, the transportation schedule by LNG carriers, and required stockpile. The required site area for the project is roughly estimated in the range between 70 and 120ha.

(c) Expected benefit / outputs

The project of a LNG receiving terminal will generate both direct and indirect job opportunities for the Jordanian work force and will increase foreign exchange earnings. The target beneficiaries of this project are private sectors of Jordan, Israel, Qatar, and the United States of America.

This project will provide Jordan with natural gas as a clean fuel for power generation. Moreover, it would create opportunities for the industrial development in the fields of air separation, cold storage for food, manufacturing of liquid carbon dioxide and dry ice, manufacturing of frozen foods, etc., in the Aqaba area through utilization of LNG cold energy.

On the other hand, a large amount of hydrocarbon will be handled at the project site that faces the Gulf of Aqaba. Cold sea water will be returned to the Gulf of Aqaba after it has been used as heating source. Therefore, design should be made not to give any damage to the ecological system of the Gulf of Aqaba, particularly to the ecologically important Yamanich coral reef close to the site, and inhabitants nearby as well. Any construction and operational activities at the site must be carefully reviewed before commencement and environmental impacts must be fully prevented. In addition, environmental monitoring should also be made for the Gulf of Aqaba after the start of operation. In this way, this project should have a link with the priority project on the Gulf of Aqaba environmental monitoring program.

This project should also have linkage with the road construction project around the A-1 site.

(d) Implementation scheme

Implementing and management body

A joint venture company may be established among Jordanian and Israeli private companies, and Enron Corporation of the USA. This joint venture company will become the implementation and management body of the project. Besides, the following agencies should be coordinated for project implementation:

- Ministry of Energy and Mineral Resources of Jordan
- Ministry of Industry and Trade of Jordan
- Aqaba Region Authority
- Aqaba Port Authority
- National Electric Power Company (NEPCO)
- Ministry of Energy and Infrastructure of Israel

• Israel Electric Corporation

Implementation period

The entire project includes natural gas production, construction of a liquefaction terminal, shipbuilding of LNG carriers, construction of LNG receiving terminals and construction of a natural gas network. This LNG receiving terminal project should be implemented as a part of the entire project.

A long period may be needed to conclude all agreements necessary for this project and for establishing joint venture companies, because of the large investments involved and complexity of this project.

Then construction of a liquefaction terminal, building of LNG carriers, construction of LNG receiving terminals and construction of a natural gas network will be implemented in parallel. The construction of the liquefaction terminal needs the longest period among them that is about 7 years including ITB preparation and international bidding, FEED, detailed engineering, procurement, construction and commissioning.

It is expected that the start of operation of the LNG receiving terminal may start after the year 2005.

Fund raising

The LNG receiving terminal may need an investment of US$ 300 - 500 million for investment, which would be raised by equity from the joint venture partners and debt borrowed from the international money market.

2) Phosphatic fertilizer complex

(a) Objectives

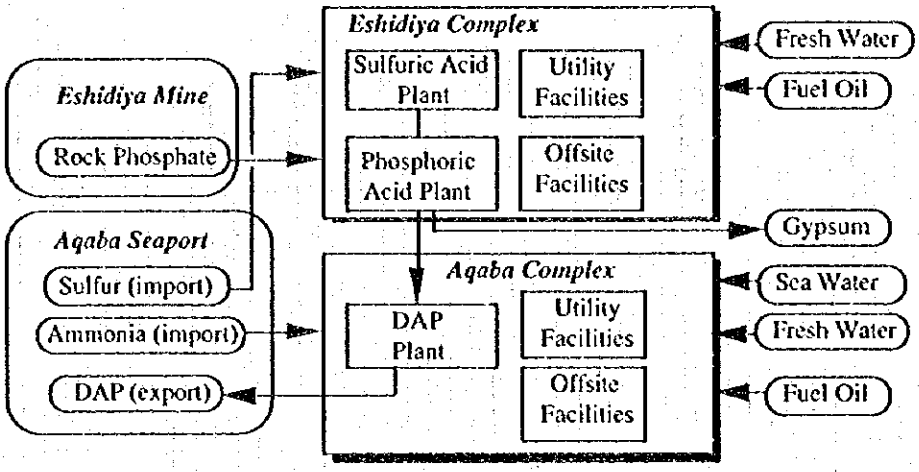
The phosphatic fertilizer complex that includes a sulfuric acid plant, a phosphoric acid plant and a phosphate fertilizer plant is recommended as a priority project in the Southern Districts. The objective of the project is to increase value added of rock phosphate available in the Southern Districts. JPMC is discussing this project with Norway's Norsk Hydro.

This project belongs to the rock phosphate-based chemical industry that is very promising in the Southern Districts as mentioned in section 7-1.

(b) Project description

DAP, which is popular in the world market and has already been produced by the JPMC industrial complex in Aqaba, is assumed provisionally as a finished product for this project. It is necessary to decide the type of finished products carefully, considering the market status with partners.

The figure below illustrates the structure of the phosphatic fertilizer complex to produce DAP. Sulfuric acid is produced from imported sulfur and sent to a phosphoric acid plant to react with rock phosphate transported from the Eshidiya mine. In the DAP plant, phosphoric acid reacts with imported ammonia to produce DAP. Gypsum is also produced in the phosphoric acid plant as a by-product.



Structure of the Phosphatic Fertilizer Complex

Sulfuric acid and phosphoric acid plants are planned to be constructed in Eshidiya, in consideration of the stockpile area of gypsum and easy transportation of rock phosphate. Meanwhile the DAP plant is planned to be constructed in the A-1 area that is convenient for exporting DAP and importing ammonia. Phosphoric acid and sulfur would be transported between Eshidiya and Aqaba by railway.

Except the process plants, utility facilities are provided in both the Eshidiya and Aqaba complexes to treat fresh water, generate steam, distribute water for cooling, distribute electricity, pressurize and dry air for instruments, distribute fuels, etc. Offsite facilities are also provided to store raw materials, intermediate products and finished products and for other purposes such as sewage, effluent water treatment, product loading, raw materials unloading, fire fighting, etc. in both complexes.

Amounts of raw materials and products are estimated as follows;

Raw materials	Rock phosphate	1,500,000 tons per annum
	Ammonia	230,000 tons per annum
	Sulfur	450,000 tons per annum
Product	DAP	1,030,000 tons per annum
By-product	Gypsum	2,570,000 tons per annum

The total required areas of the complexes are roughly estimated at 20-30ha in Aqaba (A-1) and 40-60ha in Eshidiya except for a stacking area for gypsum.

(c) Expected benefit / output

The project would generate foreign exchange for Jordan. Annual turnover of 1,030,000 tons of DAP is estimated at US$ 185 - 206 million, assuming a f.o.b. Aqaba price of US$ 180-200 per ton of DAP.

The project would also create approximately 2,000 person-years of job opportunities during the construction of the complexes and about 1,000 persons of job opportunities a year during their operation.

In terms of environment, any construction and operational activities at the site must be carefully reviewed before commencement and environmental impacts must be fully prevented. In addition, environmental monitoring should also be made for the Gulf of Aqaba after the start of operation. This project should be linked with the priority project on Gulf of Aqaba environmental monitoring program.

This project should also be linked with the road construction project around the A-1 site and railway link between this site and Eshidiya.

(d) Implementation scheme

Implementing and management body

A joint venture company may be set up among JPMC and Norway's Norsk Hydro to operate as the implementation and management body of the project.

Besides, the following agencies should be coordinated for project implementation:

- Ministry of Industry and Trade
- Aqaba Region Authority
- Free Zones Corporation
- National Electric Power Company (NEPCO)

Possible alternatives

The following alternatives are possible for site location, production capacity and types of products:

- Site location: This alternative is to build in the A-1 site an integrated complex that includes plants for sulfuric acid, phosphoric acid and DAP instead of two separate complexes in Eshidiya and A-1 site.
- Production capacity: This alternative has the different capacity from the original plan, for example, 700,000 tons of DAP per annum.
- Types of products: This alternative has the different product from DAP, for example, NPK, MAP and their combination with DAP.

Implementation period

At least 5 years are necessary up to the commencement of commercial operation of the complex. The complex is scheduled to start operating from the first five years of the 2000s.

Fund raising

The capital cost of the project is roughly estimated to be in the range of US$ 300 - 420 million. The required fund may be raised by equity invested by the joint venture partners and debt borrowed from the international money market.

3) Potassium sulfate / di-calcium phosphate complex

(a) Objectives

APC plans to construct a complex for the production of potassium sulfate and di-calcium phosphate using locally available potassium chloride and rock phosphate as main raw materials.

(b) Project description

The complex will manufacture about 75,000 tons of potassium sulfate and 40,800 tons per of di-calcium phosphate per annum.

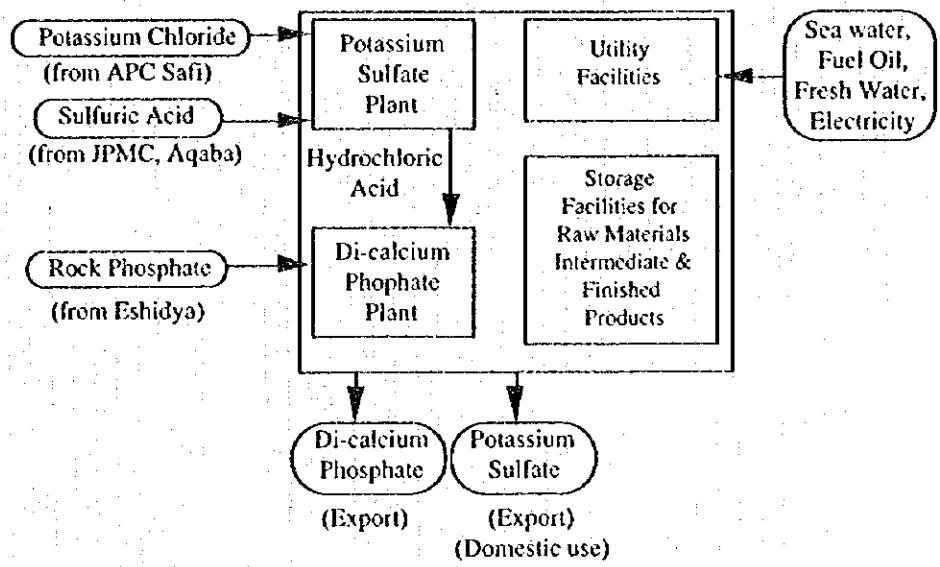
The complex has two process plants, potassium sulfate and di-calcium phosphate plants with the following capacities:

- Potassium sulfate plant : 75,000 tons per annum
- Di-calcium phosphate : 40,800 tons per annum

In the potassium sulfate plant, potassium chloride reacts with sulfuric acid to produce potassium sulfate and hydrochloric acid. Hydrochloric acid is sent to the di-calcium phosphate plant where it reacts with rock phosphate to produce di-calcium phosphate. Potassium sulfate is used for fertilizer, while di-calcium phosphate is used as a supplement for animal feeding.

Besides the process plants, utility facilities are provided in the complex to treat fresh water, generate steam, distribute sea water for cooling, distribute electricity, pressurize and dry air for instruments, distribute fuels, etc. Offsite facilities are also provided to store raw materials, intermediate products and finished products and for other purposes such as sewage, effluent water treatment, product loading, raw materials unloading, fire fighting, etc.

The structure of the complex is illustrated in the diagram below :



Structure of the Potassium Sulfate / Di-Calcium Phosphate Complex

The required area for the complex is roughly estimated at 5 to 10 ha.

(c) Expected benefit / output

The project would generate foreign exchange for Jordan. The project would also create job opportunities during the construction of the complex and during its operation. The target beneficiaries of this project are APC, JPMC and foreign partners of the joint venture.

From environmental viewpoints, any construction and operational activities at the site must be carefully reviewed before commencement and environmental impacts must be fully prevented. In addition, environmental monitoring should also be conducted for the Gulf of Aqaba after the start of operation. In this way, this project should be linked with the priority project on the Gulf of Aqaba environmental monitoring program.

This project should also be linked with the road construction project around the A-1 site.

(d) Implementation scheme

Implementing and management body

APC has set up a holding company, called the Jordan Dead Sea Industries Company (JODICO), with the following shareholders: APC (51%), Social Security Corporation (18%), Jordan Investment Corporation (10%), JPMC (6%), and banks and others (15%). JODICO's capital is about US$ 86 million.

A joint venture company may be set up among JODICO and global companies for fertilizer manufacturing, fertilizer dealing, grain dealing, animal feed supplement manufacturing. This joint venture company would be the implementation and management body of the project.

Besides, the following agencies should be coordinated for project implementation:

- Ministry of Industry and Trade
- Aqaba Region Authority
- Free Zones Corporation
- National Electric Power Company (NEPCO)

Implementation period

It is expected that a 30-month period is required from the effective date of construction contract up to the ready commercial operation. Therefore, if the construction contract is awarded early in 1997, the plant will be ready for commercial operation in 1999.

Fund raising

The fixed investment costs of the complex, interest during construction and working capital are estimated at a total of US$ 79 million at 1995 price level.

(10) Provision of well-facilitated workshop apartments

1) Objectives

In the Southern Districts, activities of subsistence and small industries are generally within small areas in urban settlements for purchase of materials and marketing the products. According to the interview with them, the following problems are indicated.

- No extra space available for expansion
- No parking space
- Costly individual location at a new site with sufficient provision of utilities
- Complaints on pollution such as untreated wastewater, noise and vibration

Therefore, major objectives of the project are (i) to provide the readily available and fully serviced industrial apartments within their financial reach, (ii) to lessen pollution such as untreated waste water, noise, smell and vibration in the residential area in the municipality through relocation of existing subsistence and small industries. Also, the project can improve the industrial infrastructure base in the Southern Districts.

2) Project description

The required proposed project will provide the following facilities.

- Industrial apartments and warehouse for subsistence and small industries
- Infrastructure such as road, parking lot, water supply system, waste water treatment plant, electric power system, lightning and fence
- Service facilities such as restaurant, shop, community center, mosque

The required site area is several hectares and should be within the range of 15 - 20-minute time distance from the existing sites in order to encourage smooth relocation. The standard lot size should be around 100 m^2 and the number of lots will be within 200. The facilities in the site should be fully maintained by the implementation body.

The apartments should be located in the vicinity of Karak (additional ones), Tafila, Ma'an and Aqaba municipalities. At present, the need in Tafila and Ma'an seems to be high based on the interviews of the Governorates and Chambers of Commerce.

3) Expected benefits/outputs

Workshop apartments can increase economic performance and social benefits through modernizing the existing subsistence and small industries. Also, the following benefits are considered.

- Lower individual cost for pollution control
- Lower individual operation costs by sharing common facilities
- Better corporate image to the people concerned
- Higher productivity

4) Implementing scheme

(a) Implementing and management body

The local council (municipality or village) is a key player for this project in terms of implementation and management. JIEC, MOIT, CVDB, Chambers of Industry / Commerce and other agencies can assist in the implementation.

(b) Implementation time frame

This project should be implemented in the short-term frame.

(c) Fund raising

Approximately, the construction cost amounts to JD 1.0 million to a few millions in total, based on the experience in the existing apartments. The initial investment could be financed by the Cities and Villages Development Bank. For smooth implementation of the project, it would be practical to introduce "the Two-Step Loan (On-lending loan)" to CVDB through foreign financial corporations. Depending on the feasibility of the project, the private banks can also be involved.

(11) Strengthening of the Gulf of Aqaba Environmental Monitoring Program

1) Objectives

The coastline of the Gulf of Aqaba is heavily used by industries and tourists. The World Bank conducted a research on the Gulf of Aqaba Environmental Action Plan (the Action Plan) in 1993 to curtail, contain, and prevent the environmental impacts and threats on the Gulf's natural resources. The establishment of the Environmental Unit in ARA was proposed in the Action Plan, and the Unit today employs two specialists. In addition, ARA itself is now preparing its own guideline for environmental impact assessment. The responsibilities and interests of environmental management in Aqaba, however, are now divided to many different agencies and institutions.

This priority project follows the direction of the Action Plan and aims to establish a concrete environmental monitoring system in the area to provide the data for relevant agencies for better management and control. The project also proposes an international committee for the environmental management of the Aqaba Gulf to prepare for environmental disasters of any scale and to establish a consensus on the future balance of nature conservation, tourism and other industries in the area.

2) Project description

(a) Environmental monitoring program

In the Aqaba region, many agencies and institutions have been managing and monitoring different environmental elements. The monitoring and data accumulation are not effectively coordinated to understand and record the environmental conditions of the area. Also, the environmental standards in Jordan are not fully enforced either by laws or institutions.

The agencies related to the environment of Aqaba are: General Corporation for Environmental Protection (legislation and database construction), Royal Scientific Society (air quality and effluent monitoring), Marine Science Station administered jointly by the Universities of Jordan and Yarmouk (marine environment monitoring), the Port Corporation (monitoring of port activities), Aqaba City (solid waste management), Ministry of Water and Irrigation (waste water management)

Also, the USAID conducts an Environmental Data Survey project, and IUCN together with the Royal Society for Conservation of Nature is proposing an institution for a marine reserve.

ARA is in the process of establishing a 12-person Environmental Unit and Laboratory. In order to commence monitoring activities effectively and as soon as possible, it is recommended that the Unit first defines itself as a coordinating body and organize active agencies under the environmental policy of ARA. The Unit would need good relationship with the active agencies, but also, it must be armed with enforcing power that ensures regular and accurate monitoring and reporting.

This program aims to give ARA the organizing power over those monitoring activities, then to transfer the technical capacity of monitoring to ARA from other agencies. In a long-term time frame, all the power and capacity of monitoring and enforcement should be transferred from ARA to GCEP staff stationed in the Aqaba Governorate office.

The monitoring program comprises three components as follows:

a) Effluent discharge monitoring program into the Gulf of Aqaba
- Design and implementation of a marine water quality monitoring program
- Ground water monitoring and assessment of the effects of waste water seepage on the quality and level of the ground water table

In cooperation with the Water Authority of Jordan, ARA should monitor the effluent discharge into the Gulf of Aqaba to take further steps to conserve the environment.

b) Air quality monitoring program
- Design and implementation of an air quality monitoring program

ARA, in cooperation with the Ministry of Health and GCEP, should utilize mobile monitoring stations to monitor general (non-point) air quality, and stack probes and ample trains to monitor industrial emissions.

c) Solid waste management
- Preparation and implementation of a solid waste management plan

ARA, in cooperation with Aqaba City and GCEP, shall design physical plans and operations of collection and receiving points, transportation and disposal of industrial wastes, produced, or likely to be produced in Aqaba. The study is necessary since the existing Final Disposal Site will reach the designed capacity around the year 2010.

As more medium to small scale industries accumulate in the region, a publicly prepared site for temporal deposit will be necessary. Without a confirmed time table for establishment of the Swaqa Hazardous Waste Disposal Site, and with its long distance from Aqaba, the Study Team proposes the formulation of a tentative local plan for hazardous waste management as short-term, effective action. With cooperation of JIEC, ARA, GCEP and RSS, a hazardous waste deposit site for industries in the Aqaba region will be established near the existing Final Disposal Site or in the designated heavy industry area. The project will be a test plant in every aspects. The technology to be implemented at regional stations can be tested. GCEP will be able to monitor the types and amounts of hazardous wastes brought to the site. Regional test cases are also effective to figure out the necessary arrangement of transportation of those wastes. Upon the completion of the Swaqa facility, and if it is found safe and feasible to transport hazardous material from

Aqaba, the local plant will continue to function as a regional collection and transfer station.

For air and water quality monitoring, the cost of establishment, operation and maintenance of monitoring stations is large and will limit the number of stations. Priority must be given to monitoring points where large quantities of polluting substances are released, and where an accident in the facilities may cause a serious environmental degradation. For air pollution from non-point sources, it is recommended to establish at least three air quality monitoring points in Aqaba. The stations must be located where the obtained data will illustrate representative conditions of the area. Proposed monitoring points and responsible agenices are summarized below.

Proposed Monitoring Points and Responsible Agencies

	Air quality monitoring	Water quality monitoring	Marine environment monitoring	Solid waste monitoring
Point source	Power plant Factories IEs, EPZs Port, Jetties	Treatment Plant Factories IEs, EPZs Power plant	Port, Jetties	Factories IEs, EPZs
Non-point source	Urban area	Ground water wells	Ocean station	Urban area
Responsible agencies	ARA (GCEP in long-term time frame)			
	RSS, Ports Corporation RSCN (marine life)	MWI WAJ	Ports Corporation Marine Science Station (water quality, marine life)	Aqaba City MMRAE GCEP

(b) Establishment of an international technical-level committee for the environmental management of the Gulf

At present, several international committees and meetings are organized with different in their interests and members. To name a few, there is the Upper Gulf of Aqaba Oil Spill Contingency Plan in which Jordan is represented by the Port Corporation, and the World Bank holds a conference on environment of the Red Sea every year in different countries which are attended mainly by academics and politicians.

The Development Options, submitted by the Government of Israel for the Amman Summit, proposes a permanent Joint Committee for the Environmental Management of the Aqaba Gulf by the Jordanian and Israeli Governments to develop a bilateral regional environmental protection program. The Joint Committee's suggested objectives are:

- To develop and direct a bilateral program of prevention of accidental and operational pollution of the marine environment;
- To establish a bilateral emergency response program in the case of chemicals or oil-spills in the ports of Eilat and Aqaba;
- To develop a coastal environment management plan based on the evaluation of the suitability and sensitivity of resources to impacts of development alternatives;
- To develop and operate monitoring programs of the Gulf environment; and
- To initiate and guide joint environmental and aquaculture research programs in the Gulf of Aqaba.

To achieve those objectives, this program proposes to establish two layers of committee, one for decision making and one for more practical information exchange and negotiation. Both committees must include a wide range of interest groups from environmental conservation, manufacturing industry to tourism, transportation, and investment. The latter technical-level committee should be open to include representatives from organizations with a different status. Organizations of private sectors and NGOs must have a chance to express their opinions.

The representatives from Saudi Arabia and Egypt must be welcomed to attend the committees as observers. As conditions grow, the two countries must be welcomed to join the committees for active involvement.

3) Expected benefits/outputs

The proposed monitoring program shall provide environmental data to relevant agencies and set the basis for legal and administrative environmental management to promote the environmental conservation in the Gulf of Aqaba and the surrounding area in particular. The good environment, as a result, can contribute to the growth of tourism and other economic activities. The systems for environmental protection implemented in this project could subsequently be adopted on a national scale, as well as international scale with the communications at the international Joint Committee. Target beneficiaries are the residents in and the tourists to the area surrounding the Gulf of Aqaba.

The need for environmental specialists will be answered by the establishment of the proposed Aqaba University. The teaching staff of the Environmental Department of the University shall conduct researches and monitoring activities on behalf of the ARA.

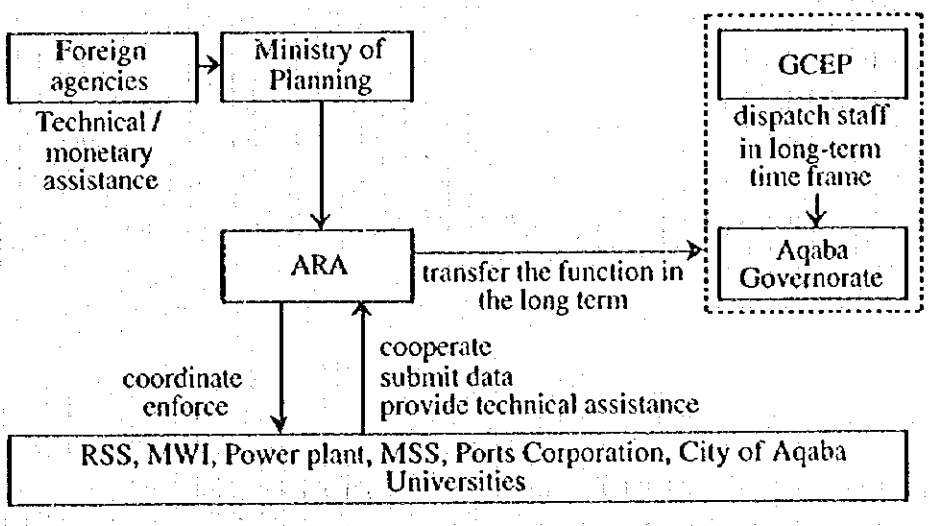
The University also contribute to ARA by training students to be qualified as environmental specialists at the Environmental Unit of ARA.

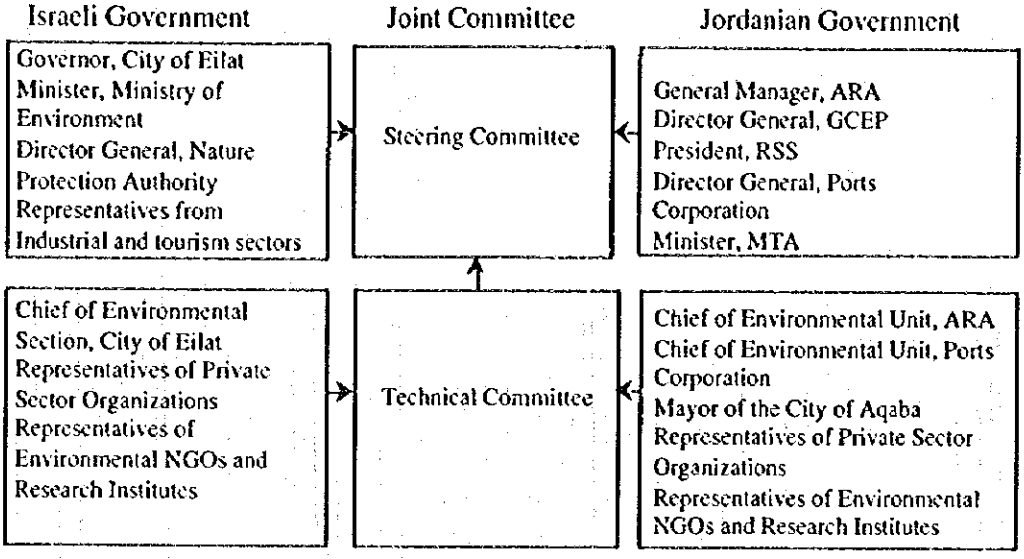
This project and the environmental management training at JIEC shall contribute each other to establish better industrial environmental management systems in Jordan. Also, establishment of a university in Aqaba and a technical college in Ma'an will benefit this project by providing graduates in environmental science for the Environmental Unit of ARA.

4) Implementation scheme

(a) Implementing and management body

The implementing and management body of the monitoring program will be the ARA Environmental Unit. For the international joint committee, the office of the General Manager of the ARA shall be responsible for organizing and coordinating the related agencies. When GCEP is fully staffed in the long-term time frame, the environmental database and the monitoring operations shall be transferred to GCEP, or to an environmental section of Aqaba Governorate as a branch of GCEP. Until then, the Unit shall be the highest organizing body on the environment of the Aqaba region. Relevant agencies to be coordinated for both programs are illustrated below.





(b) Implementation time frame

The monitoring program for air and marine water quality must be designed and initiated immediately. Ground water monitoring and preparation and implementation of a solid waste management plan shall take longer time for implementation. Therefore, the study and design of those two projects must be started immediately but the monitoring will be undertaken within a medium-term time frame.

(c) Fund raising

According to the Action Plan, investment requirements for the monitoring program is estimated at US$ 4.7 million as shown below. Considering the amount of investment, international assistance will be necessary in addition to the allocation of domestic budget.

a) Effluent discharge monitoring program : US$ 3.3 million
b) Air quality monitoring program : US$ 1.0 million
c) Solid waste management : US$ 0.4 million

Establishment of the Gulf of Aqaba Environmental Fund may be possible. The fund can be collected from existing and possible polluting industries and beneficiaries of the good environment of the Gulf of Aqaba, such as tourism industry.