THE ARAB REPUBLIC OF EGYPT

THE HIGH DAM LAKE AREA INTEGRATED REGIONAL DEVELOPMENT PLAN

SUMMARY FINAL REPORT

FEBRUARY 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

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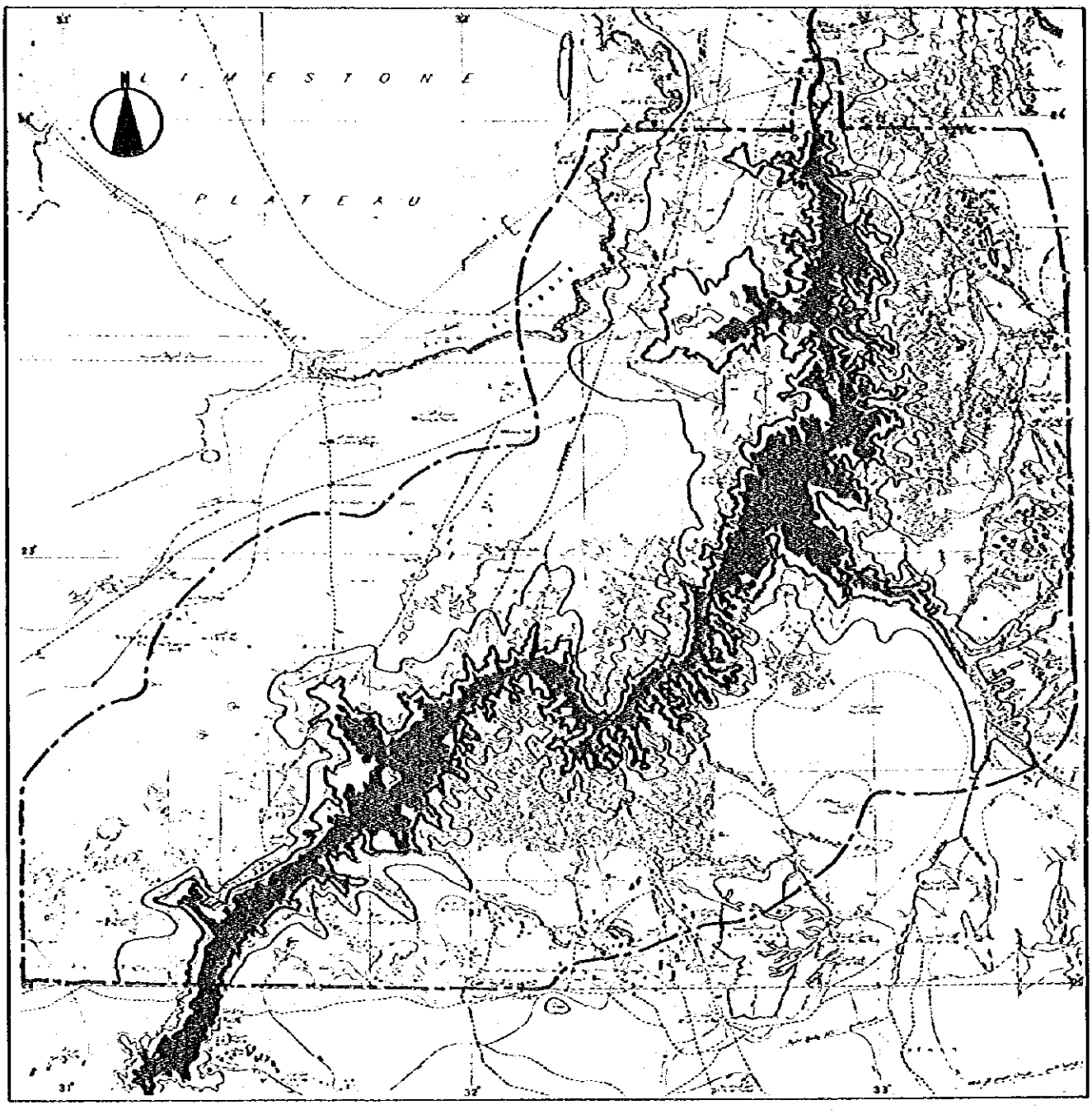

INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

The Project Area

0 10 20 30 40 50 60 70 80 90 100km

	Boundary of the Project Area
	180 m contour line
	220 m contour line

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1. Development Issues and Study Method

The population of Egypt is estimated to be about 40 million as of 1978, and has increased at an average rate of 2.3% per annum during the past decade. If the population continues to increase at this rate, it will be 47 million in 1985, and 66 million in 2000 A.D. Approximately 70% of this population is now concentrated in the delta area which includes the primate cities of Cairo and Alexandria, the rest being distributed along the narrow strips of land along the Nile Valley between Cairo and Aswan extending about 900 km. That is, almost all of the nation's population is concentrated in only 4.6% of the country's land area. In addition, the migration from rural areas to the large cities has been accelerating, and Cairo at present has the extremely high population density of 24,000 persons per square kilometer.

Under the circumstances, alleviation of overcrowding especially in the northern part of the country constitutes one of the major policy objectives of regional development in Egypt. The current Five-Year Plan (1978 - 1982) considers it one of the most important long-term national objectives to redistribute population and for that purpose to open up new inhabitable lands. The development of Aswan City and the areas around High Dam Lake is one important aspect of this policy orientation.

High Dam Lake is the Egyptian part of the reservoir created by the construction of the High Dam across the border between Egypt and the Sudan. The total length of this world's largest man-made lake is approximately 500 km at the high water level, of which about 350 km is in Egypt, with the rest, called Lake Nubia, in the Sudan. The completion of the High Dam has brought many kinds of benefit to the Egyptian society through the provision of flood control, perennial irrigation downstream, annual generation of electricity amounting 6,000 GWh, or 55% of the country's total output, and so forth. However, the utilization of High Dam Lake and its surrounding area has been to date minimal, due to the distant location from the national centers up north, harsh climatic conditions and low fertility of soils. In the largely undeveloped High Dam Lake area, it is deemed necessary to formulate an integrated regional development plan, with major emphasis on possibilities of irrigated agriculture along the lakeshore, exploitation of fishery resources in the lake, mining of mineral resources and effective marketing of tourism resources around the lake.

The objective of the present study, therefore, is to formulate a development strategy for Aswan City and the High Dam Lake area, with due consideration to the area's development potentials and constraints, and to identify suitable development projects and

programs in such a way as to contribute to the development of Southern Egypt as a whole. The major specific objectives of this Study are as follows.

(i) To formulate a regional development plan for the High Dam Lake area, or the Project Area hereafter, and policy measures for its implementation, on the basis of understanding gained over the relative socio-economic importance of the Area, and southern Egypt that encompasses it, in the national economy and society.

(ii) To identify development objectives and strategies for the Project Area which are in conformity to the national development plan.

(iii) To survey the natural resources in the Area, in order to evaluate their development potentials and examine the required transportation network and other social services and community facilities which would be required in relation to the development of those resources.

(iv) To select strategic projects, and formulate development programs by sector and by locality.

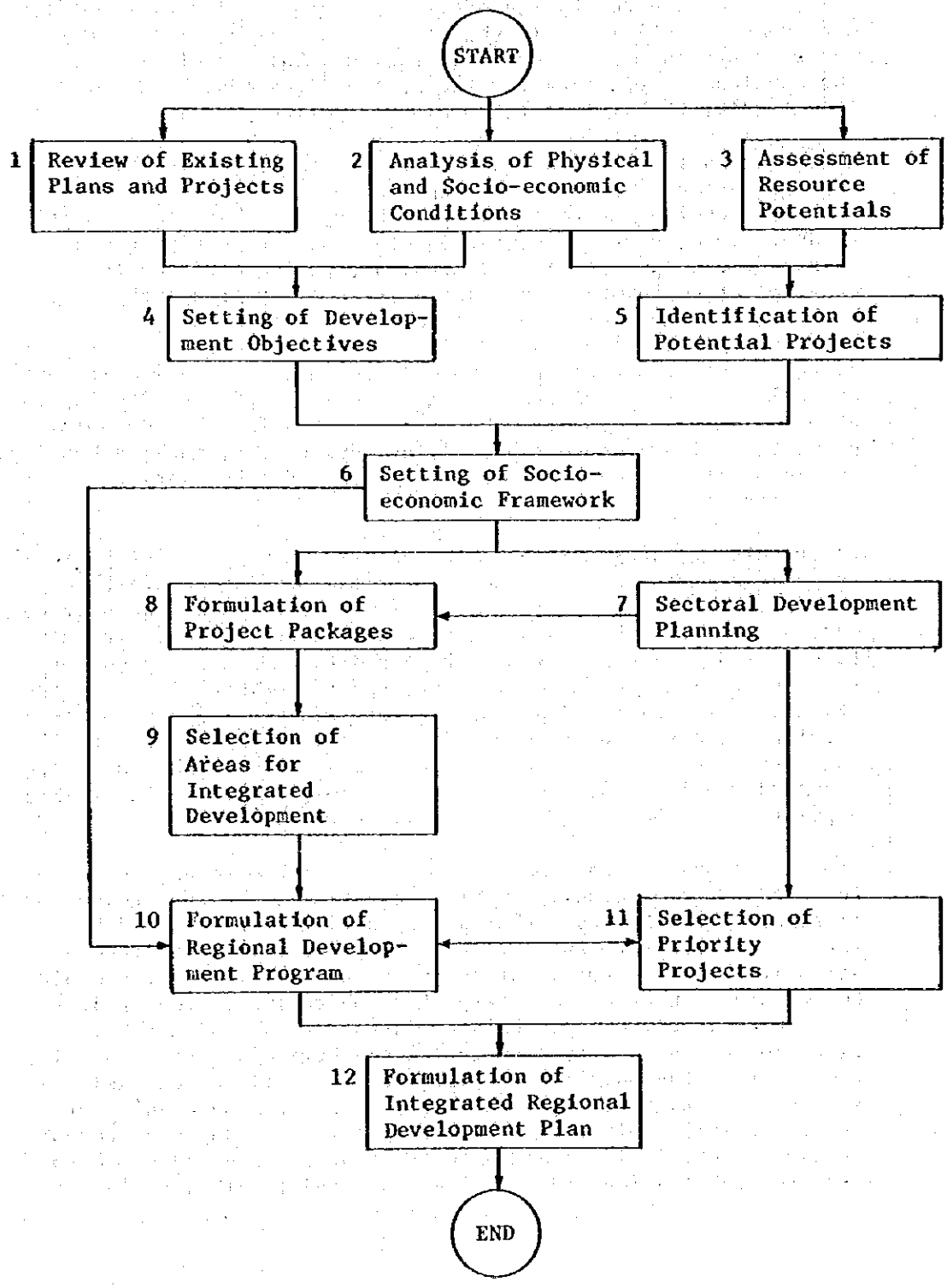
(v) To prepare an outline of the overall investment program and suggest, if deemed necessary, institutional arrangements for the implementation of the program.

The specific area to which this Study addresses itself comprises Aswan City and the area around High Dam Lake within 50 km of the shoreline, bounded by the Sudan border in the south. This Project Area roughly extends 300 km from north to south and 120 km from east to west. However, occasional reference to regions outside the Area is thought necessary, for instance, in order to understand the Area's demographic and socio-economic characteristics, estimate the availability of water, evaluate market prospects for the resources found in the Area, and so on. The time perspective for development planning comprises the five-year period of 1983-87 and the ten-year period of 1988-97. The Study is conducted in a series of steps shown in Figure 1.

2. Development Objectives and Policy Measures

Since the formulation of a development plan for the Project Area is one aspect of the national development plan, its development objectives and policy measures must conform to those of the national plan. Among the objectives stated in the current Five-

Figure 1 Flow Chart of the Study Method



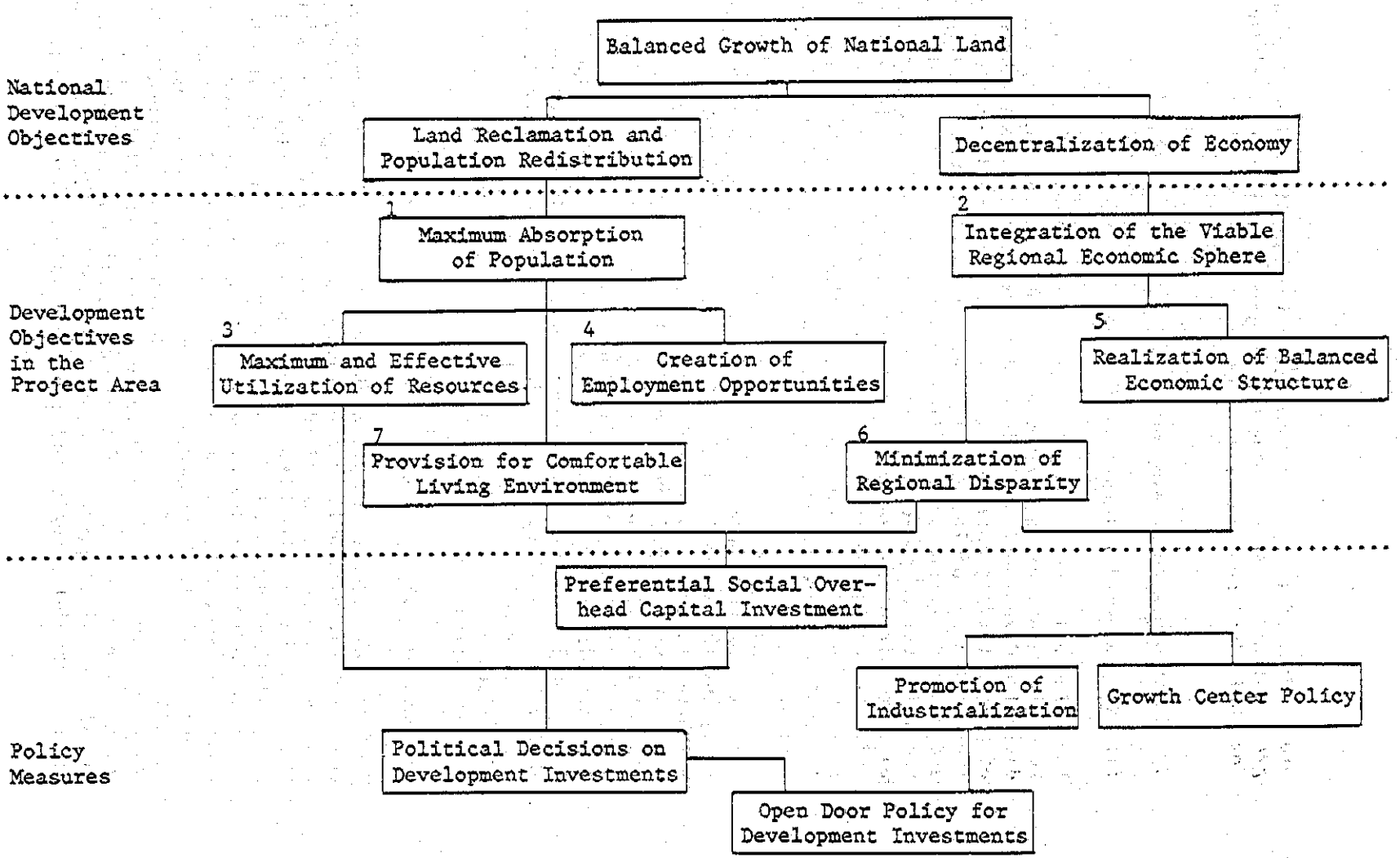
Year Plan (1978-82), the two generalized objectives of land reclamation/population redistribution and decentralization of the economy, as shown in Figure 2, represent the policy to remedy the problems created by the excessive concentration of population and economic activities in the Nile delta region, or in other words to attain a more equitable regional balance of growth. The development planning for the Project Area must be done, accordingly, within this national policy framework.

The above national objectives can be rephrased for the Project Area as maximum population absorption and integrated and viable economic development to enable the absorption. As shown in the figure, the population absorption depends on effective utilization of resource endowments in the Area, and consequently on the creation of employment opportunities resulting from such utilization. However, the employment creation alone would not be highly likely to attract a sizable population from other parts of the country, because the Project Area has harsh climatic and natural conditions and practically no vestige of past development efforts. It is necessary, therefore, to provide the in-coming population with a comfortable living environment, such as housing, public health, education, transportation and other various community services.

Intersectoral integration is also necessary in promoting regional economic activities. In order to realize a balanced growth of the Project Area, the prospective plan should aim at the development of not only the primary sector comprising agriculture, fishery and mining but also such secondary and tertiary sectors as manufacturing, construction, transportation, tourism and other services. The balanced sectoral growth will contribute to improving the levels of income and productivity in the Project Area and narrowing an estimated 10 - 20% disparity with the national standard. Only then, the Area will be able to attract a sizable population and have them permanently settled.

It is of course no easy matter to realize these requirements. There are a considerable number of constraints in the Project Area, and it is believed that a long period of time would be required in order to fully remedy the productivity and income disparities. Therefore, extremely strong policy measures would be necessary in order to attain these objectives. The Project Area which is virtually devoid of infrastructure with the exception of Aswan City must get in the beginning preferential treatment in the budget allocation for the build-up of basic infrastructural facilities which would support the Area's more or less self-sustained growth in a long run. Under the present circumstances, it is hardly expected that development projects have reasonably high economic and financial feasibility in the

Figure 2 Development Objectives and Policy Measures



Area. Most of the projects proposed in this Study depend to a great extent upon the strong and long-term political committment for their implementation.

3. Constraints to Development

(1) Natural Constraints

The climate in the Project Area is characterized, as commonly found in desert areas, by the extreme heat in the summer, wide diurnal and seasonal variations of temperature, virtual absence of precipitation, extremely low humidity, strong insolation, etc. These climatic conditions are adverse to agricultural development and human habitation. Specifically with respect to crop production, it must be noted that (i) irrigation is sine qua non, (ii) water requirements are larger due to high evapotranspiration, and (iii) while the recorded wind velocity does not preclude the introduction of sprinkler irrigation, plantation of windbreaks is indispensable as protection against wind erosion and evaporation.

The soils of the Project Area range from gravelly sand to clayey loam, but the predominant type is sandy soils composed of weathered sandstone and Pre-Cambrian granite. They have varying depth in the Area and are generally low in water retention and natural fertility. Soils of finer texture are found in alluvial terraces and beds of wadis, for instance, of Kurkur and Kalabsha and have higher water-holding capacity and fertility. These clayey soils, however, have generally high salinity. On the whole, the capability of soils found in the Project Area is low, and the overwhelming majority of land surveyed so far is identified as Land Classes III and IV, or even worse, by the Desert Institute.

(2) Availability of Water

The reservoir created by the High Dam is by far the most important body of water available in the Project Area. The Egyptian share of Nile water is 55.5 milliard m^3 relative to 18.5 milliards of the Sudan, and at the present time the entire Egyptian share is being utilized downstream. Under the circumstances, it is not possible to expect a large-scale intake of water from the reservoir for the Project Area. The scale of development in the Project Area will be dependent on an increase in the yield of the Nile upstream, and on water saved downstream. According to The Water Policy in Egypt (1975) prepared by the Ministry of Irrigation, it is estimated that Egypt will have an additional 25 milliard m^3 of water in a long term by recycling of drainage water in the delta region and the Upper Nile projects in the

Sudan to reduce evaporation loss, but there are many uncertain factors related to this estimate. In the more immediate future, Egypt's allocation of water will be increased by 1.85 milliards following the completion of the Jongley Canal now under construction in the Sudan. The domestic allocation of this additional share is yet to be decided, and a Water Master Plan is now being prepared for the purpose. It is expected that the integrated regional development in the Project Area will be considered in the formulation of this Master Plan.

The fluctuation of the level of the lake will be determined by the discharge of the Nile, the effect of the Tushka Spillway which is to be completed in 1982, and the requirement of water utilization downstream. It is anticipated that the completion of the Tushka Spillway will enable the dam operation at a higher level of water than currently done, but nevertheless it is difficult to forecast the exact annual fluctuation of the water level. The range of fluctuation is an important factor to affect the feasibility of projects, since it determines the design standards and therefore the costs of development projects.

With regard to groundwater, the rock underlying the Project Area is Nubian sandstone which has very low permeability and hence loss of water through seepage may be low. This is substantiated by the results of several test well borings. This also indicates that the lake is not the source of groundwater. Judging from test well data from Kurkur and Kalabsha, the quality of the groundwater of the Project Area is poor, and the quantity available for use is low. Under the circumstances, it is hardly expected to develop large-scale agriculture using groundwater.

(3) Schistosomiasis

The present survey found that Bulinus, the snail which is the schistosomiasis intermediate, is present in considerable numbers in some parts of High Dam Lake. The current population in the lake area is quite small and thinly scattered compared with the expanse of the lake, so that it cannot be said with certainty that infestation is a problem along the shore. However, as the development of the Area continues with increasing inflow of population in the future, it is evident that the shore area will be in great danger of being infested unless preventive measures against schistosomiasis are successfully implemented. Because of the recent development of a safe and low-cost chemical for treatment, the disease may no longer be said to be incurable. It is nevertheless essential that there be provision for adequate water and sewage treatment facilities in new communities to be developed in the shore, and that awareness of the cause and nature of the disease be improved among the settlers. It will be necessary to institute a program whereby group diagnosis and

treatment arrangements are made primarily through the network of health units and clinic boats.

(4) Possibility of Population Redistribution

With the exception of the period during the 1960s when the Aswan High Dam was being constructed, Aswan Governorate was subject to a constant loss of population through out-migration. It is not by any means sufficient to promote agricultural development, assure farmers of higher cash incomes, and improve their living environment for the purpose of stopping the outflow of population and reversing the trend. In order to attract people from elsewhere, it is imperative to provide urban employment opportunities which promise higher education- and skill-specific incomes. Urban development focusing on Aswan City should play an integral role to foster a viable economic sphere in the Project Area.

In providing social and economic incentives to have people settle in the lakeshore area, it will be necessary to pay special attention to those people expressing interest in relocating to the Area. At present there are about 7,000 fishermen eking out an existence through fishing in the lake. Also, some of the Nubians, who moved to Kom Ombo when filling of the dam reservoir started, have recently begun to try farming on the shore of the lake and also have the intention to do fishing in the lake. In order for these people to settle more or less permanently, it is necessary to offer them the farmland at a scale sufficient for them to obtain a stable income and produce some basic food for home consumption, while also providing necessary infrastructure in the form of education, health care and transportation for access to cities. From the viewpoint of the harsh natural conditions of the Project Area, it must be concluded that the cost of supplying the requisite incentives will be quite high, but unless such incentives are provided, in comparison to the attractiveness of Cairo and Alexandria, it will be difficult to succeed in resettling people in the Area.

4. Framework of Regional Development

(1) Economic Framework

An economic framework is constructed to indicate in quantitative terms the possible path which the development of the Project Area is expected to follow from 1983 through 1997. Overall assumptions of the framework are as follows.

(i) Aswan Governorate is assumed to be a distinct economic sphere which will become more or less independently viable vis-a-vis the other areas of the country,

especially the Cairo metropolitan area or the delta region that encompasses it. The planning frame for the Project Area, which is part of Aswan Governorate, will primarily conform to the requirements of this economic sphere, with occasional reference to Region 8 comprising Governorates of Aswan, Qena, Sohag and Red Sea South.

(ii) As an important corollary to the improved viability and reduced dependence of this regional economic sphere relative to the delta region, the disparity between the regional and national income levels will be eliminated.

(iii) Aswan City is assumed to be the primary core of regional development and grow as the center of industrial and service activities catering to the Governorate and probably to Region 8 as a whole.

The scale of population absorption primarily depends on the availability of employment opportunities, which are in turn determined basically by the availability and marketability of the exploitable resource endowments. In addition, in order to stop the out-migration from the Project Area and attract in-migration from elsewhere, it is essential to guarantee high per-capita incomes for the prospective population and to provide well-integrated basic social and economic services appropriately distributed in urban and rural areas. Hence, the following development requirements are set for the Project Area:

(i) High income in respective sectors to eliminate the disparities with the expected national levels,

(ii) Largest possible development of the industrial and service sectors vis-a-vis the expected production from the primary sector (agriculture, fishery and mining) and the expected market prospects, and

(iii) Maximization of benefits from urban agglomerations in Aswan City to attract investment and migration from other parts of the country.

The employment in the Project Area is projected to increase from 55,000 in 1982 to 248,000 in the year 2000, as shown in Table 1. With regard to the trend concerning the structure of employment, the construction sector would experience a net increase in employment of 50% during the five-year period of 1983 - 1987, and in the following years through 2000 the growth of employment in the mining/manufacturing and services sectors will rapidly pick up. Increase in agricultural employment up to 2000 will be

relatively small due to the larger farm size and higher labor productivity assumed in this Study to ensure high economic incentives for the farmers.

Table 1 Projected Employment by Sector (1982 - 2000)

(Unit: 000 persons)

	1982	1987	1992	1997	2000	Increase (1983-2000)
Agriculture	0.8	4.6	12.4	20.1	22.5	21.7
Fishery	7.4	8.0	8.7	9.5	10.0	2.6
Min. & Manuf.	9.5	14.1	26.7	42.5	55.0	45.5
Electricity	1.0	1.1	1.4	2.1	2.5	1.5
Construction	10.1	29.4	37.2	35.7	24.0	13.9
Services	25.9	34.7	52.4	90.4	134.3	108.4
Total	54.7	91.9	138.8	200.3	248.3	193.6

Source: JICA Study Team.

The increase of the population over the same period is estimated by assuming urban and rural crude labor participation ratios and unemployment rates on the basis of the estimates presented in the current Five-Year Development Plan. The results are shown in Table 2. Because of the dominance of Aswan City as a population center in the Area, the urban population is expected to reach nearly 83% of the total by 2000. However, the share of the urban population for Aswan Governorate as a whole will be about 59%, which is lower than the projected national percentage of 65%.

The regional gross domestic product (GRDP) is projected through the year 2000 with a set of assumptions on the size of exploitable resources, the scale of their market prospects, the growth rate of labor productivity, etc., as shown in Table 3. Sectoral shares in the year 2000 are expected to be 46.2% for services, 31.5% for mining/manufacturing, 13.6% for construction and 4.8% for agriculture and fishery. The reason for the urban-type

Table 2 Projected Population (1982 - 2000)

	1982	1987	1992	1997	2000
Total Population (000 persons)	209.5	299.9	422.2	581.2	700.4
	1982/87	1987/92	1992/97	1997/2000	1982/2000
Incremental Population (000 persons)	90.4	122.3	159.0	119.2	490.9
Annual Average Increase Rate (%)	7.5	7.1	6.6	6.4	6.9

Source: JICA Study Team.

Table 3 Projected GRDP by Sector (1982 - 2000)

(Unit: £E million in 1979 prices)

	1982	1987	1992	1997	2000	
Agriculture	0.4	6.8	20.9	39.3	49.2	
Fishery	5.1	7.7	11.6	17.4	22.0	
Min. & Manuf.	13.1	26.9	75.0	185.8	320.0	
Electricity	3.0	4.2	6.8	13.1	18.0	
Construction	11.3	50.1	100.7	154.5	137.9	
Services	29.9	53.5	110.3	260.8	470.1	
GRDP	62.8	149.2	325.3	670.9	1,017.2	1982/2000
Increment		86.4	176.1	345.6	346.3	954.4
Average Annual Growth Rate (%)		18.9	16.9	15.6	14.9	16.7

Source: JICA Study Team.

sectoral composition is due to the dominant presence of Aswan City in the Project Area.

Over the 18-year period from 1982 - 2000, the employment and GRDP are expected to grow 4.5 and 16.2 times respectively. This means that per-capita value-added would increase 3.5 times in 18 years, or at the average annual rate of 7.3%.

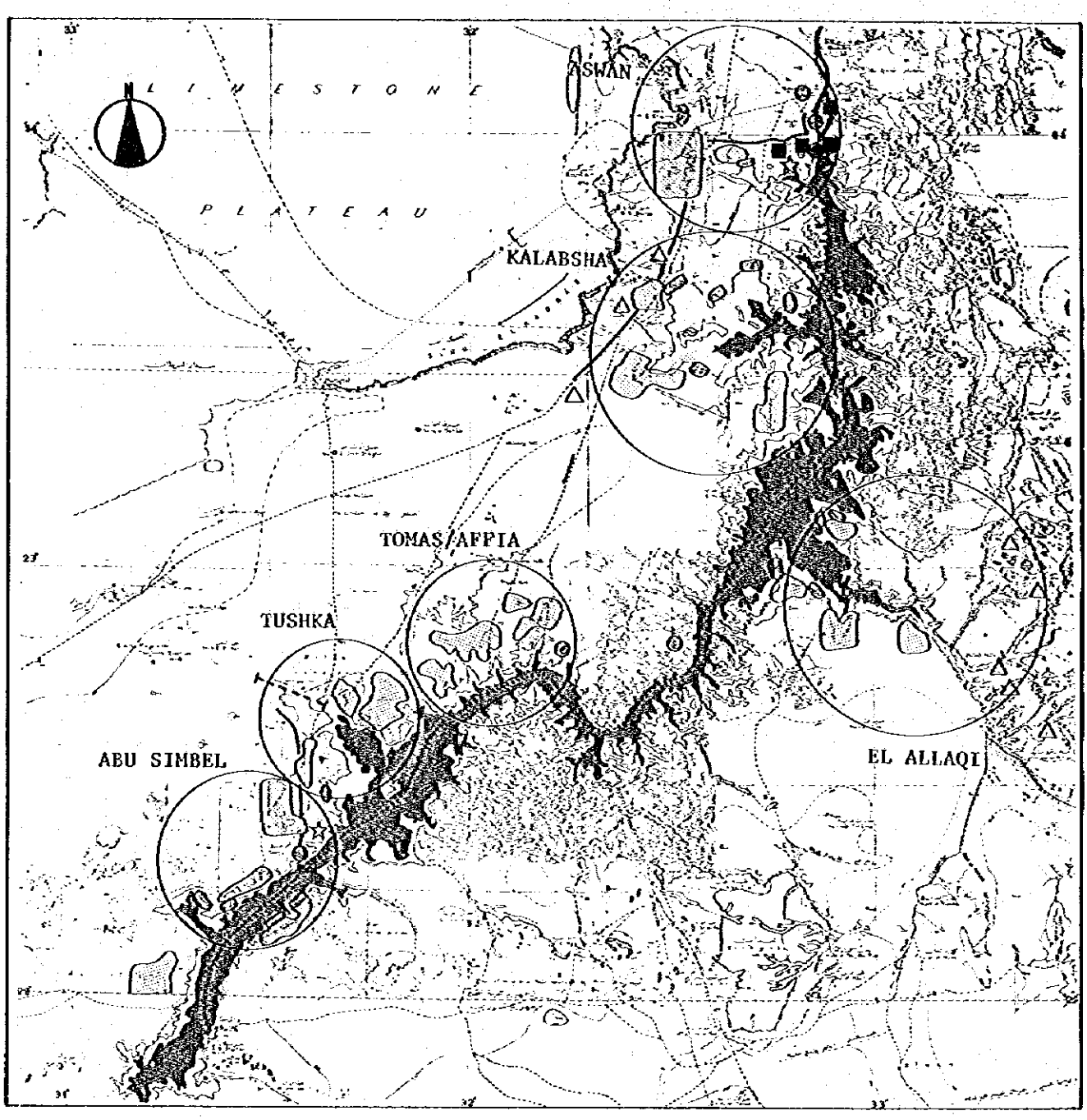
The economic development in the Project Area is expected to raise the average per-worker wage from the estimated level of £E 420 per annum in 1979 to £E 2,038 in the year 2000. The corresponding national figure for 2000 is estimated to be lower at £E 1,640, because the Project Area is expected to have considerably higher shares of the secondary and tertiary sectors than the country as a whole. If the non-agricultural sectors alone are considered, the present national per-worker wage of about £E 470 is estimated to be 11% higher than the figure of the Project Area. However, this disparity is expected to be eliminated by the year 2000. The per-worker average wage in the Project Area will grow at the average annual rate of 9.2% during 1982 - 1992 but the growth rate will slow down to 6.8% during the subsequent period of 1992 - 2000.

The total investment required for the development of the Project Area is estimated to amount to £E 2.3 billion in 1979 prices during the 15-year period of 1983 - 1997, 80% of which is anticipated from the public sector as shown in Table 4. This total investment requirement is 3.8 times as much as the projected increment of GRDP over the same period. This high incremental capital-output ratio, compared with the recent national ratio of 1.7, indicates substantially lower economic returns from the investment, which is rather expected in view of the harsh natural conditions and the present virtual absence of infrastructure and capital accumulation in the Project Area except in Aswan City.

(2) Identification of Development Areas

The Project Area extends about 300 km from north to south and remains to this day largely uninhabited except in Aswan City and Abu Simbel. Consequently, what little is available in the way of basic infrastructure is confined to the immediate vicinities of Aswan City and Abu Simbel.

The potentially exploitable resource endowments in the sectors of agriculture, mining/manufacturing and tourism are distributed in the Project Area as shown in Figure 3. Through assessment of the scale of development potentials of these resources and preliminary consideration of possible development projects, six potential development areas are identified in the Project Area. The sectoral and technological linkage as well as geographical



INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 3

Potential Areas for Development

0 10 20 30 40 50 60 70 80 90 100 (km)

Upland / Foreshore	Agricultural areas
	Fishery port
△	Mines
	Tourism development sites
■	Industrial development sites
	Paved roads / Navigation route
	Tushka Spillway
☆	Airports

Table 4 Required Investment (1983-1997)

(Unit: £E million in 1979 prices; %)

	1983-1987	1987-1997	1983-1997
Total Investment	487 (100.0)	1,840 (100.0)	2,327 (100.0)
Agriculture	176 (36.1)	290 (15.8)	466 (20.0)
Fishery	6 (1.2)	20 (1.1)	26 (1.1)
Min./Manuf.	79 (16.2)	348 (18.9)	427 (18.3)
Electricity	5 (1.0)	61 (3.3)	66 (2.8)
Trans. & Comm.	43 (8.8)	133 (7.2)	176 (7.6)
Commty. Dev.	132 (27.1)	619 (33.6)	751 (32.3)
Others	46 (9.4)	369 (20.1)	451 (17.8)
Public Investment	451 (92.6)	1,431 (77.8)	1,882 (80.9)
Private Investment	36 (7.4)	409 (22.2)	445 (19.1)

Source: JICA Study Team.

proximity among possible development projects are examined in addition, in order to help economize the costs of required construction works, especially of basic infrastructural facilities and housing, and to improve the resource development effects.

Each development area is to have its urban center which will provide the kinds of goods and services not readily available in the rural areas. The functions which the urban centers perform primarily depend on the size of population absorbable in the respective development areas. Based on the over-all assumptions and projections derived from the economic framework, it is estimated that the six development areas and their urban centers absorb, by the year 2000, population of varying sizes as shown below.

	Aswan	Kalabsha	El Allaqi	Tomas/ Affia	Tushka	Abu Simbel
Development Areas	503,500	89,300	28,700	10,100	23,900	42,400
Urban Centers	500,000	36,300	11,700	4,100	9,700	18,300

Figure 4 Hierarchy of Urban Centers and Rural Communities

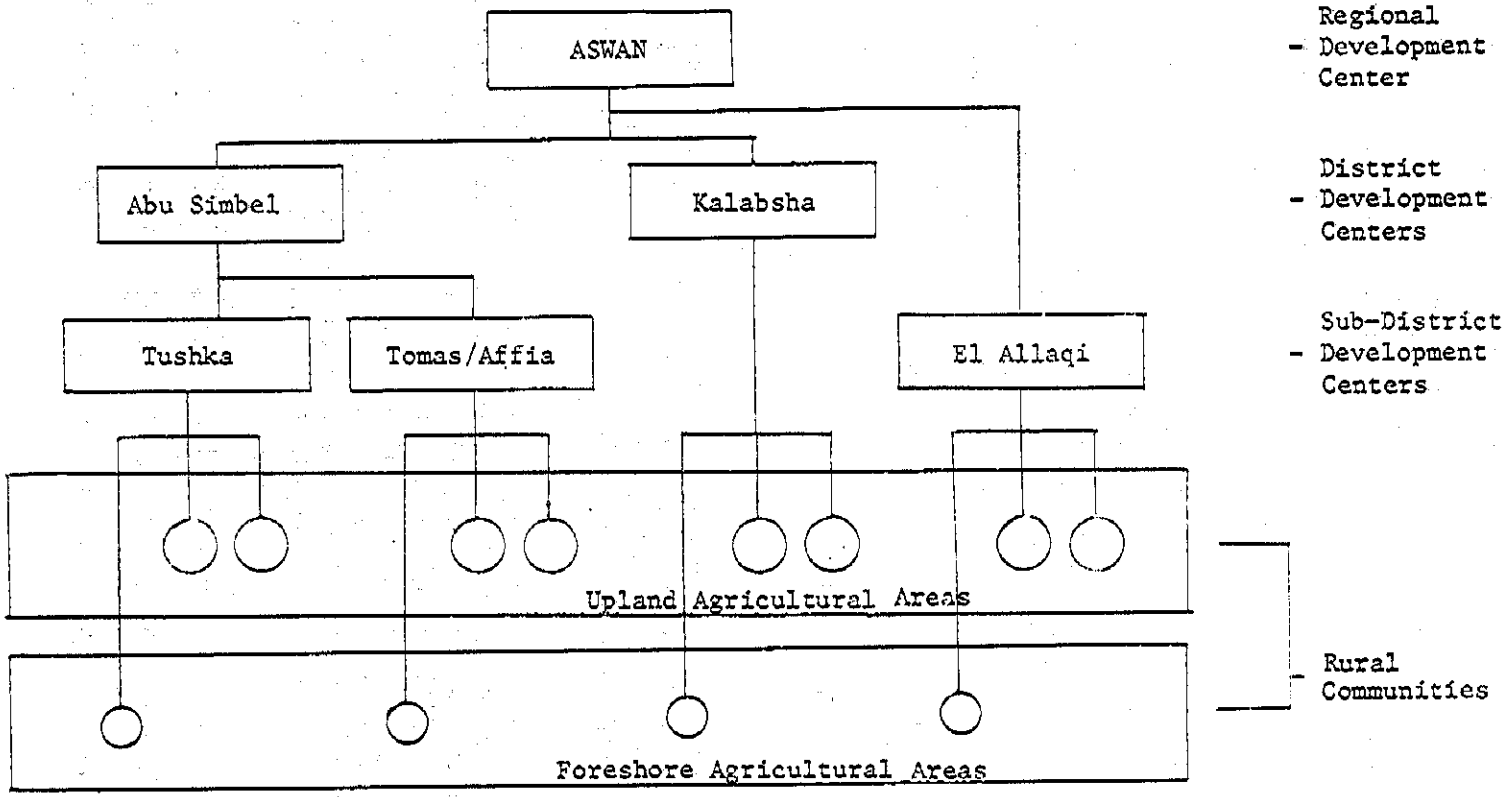


Table 5 Major Functions of Development Centers and Rural Communities

	Agriculture	Fishery	Mining and Manufacturing	Tourism and Recreation	Transportation, Communication and Power	Environmental Health and Medical Services	Education and Administration
Regional Development Center	- Collection and shipping of agricultural products - Regional headquarters of agricultural cooperatives - Main distribution center for fertilizer and agricultural pesticide	- Regional fishery base (collection, storage and shipping) - Supply of fishing boats and gears - Lake fishery control and management and applied research - Headquarters of coops.	- Manufacture of consumer goods for regional market - Manufacture of fishery- and agriculture-related industries - Manufacture of secondary construction materials - Large-scale repair workshops	- International resort facilities	- International port - Fishing port - National trunk roads - Inter-regional bus services - Railway - Main distribution center - Wholesale market - Telegraph and Telephone	- General Hospital - Headquarters of mobile medical units	- Government office - HDLDA headquarters - University - Police headquarters
District and Sub-district Development Centers	- District or sub-district headquarters of agricultural cooperatives - Quarantine and grading of agricultural products - Intermediate distribution of agricultural inputs	- Fishery surveillance and management units - Training services for fishermen - Repairs of fishing boats	- Processing of agricultural products - Medium-scale repair workshops	- International tourism - Nubian Culture Center - Parks and recreation facilities	- Domestic airports - Feeder ports - Local market facilities - Power supply stations - Post and telegraph offices - Petroleum storage tanks - Local distribution centers - Intra-regional bus terminals	- Central hospitals - Health centers - Schistosomiasis treatment units - Urban water supply and sewage system	- Secondary schools - Police stations - Branches of HDLDA and governorate offices - Town halls
Rural Communities	- Upland and foreshore irrigated agriculture - Agricultural coops. (collection of produce and distribution of inputs) - Experimental station	- Cooperatives	- Resource-based industries (esp. mining) - Small-scale repair workshops	- Local recreation facilities - Playgrounds for children	- Quays - Rural feeder roads - Gasoline stations - Mail boxes - Public telephone booths	- Rural health units - Potable ground water supply systems	- Primary and preparatory schools - Fire-fighting units - Police posts - Community centers
Camps		- Fishing camps - Temporary lodgings - Primary processing (salting and drying)			- Emergency microwave communication units - Small power generators - Fish storage tanks	- Simple sewage and garbage treatment units - Small water sterilization units	

The population size of each urban center is determined primarily in proportion to the population absorbable in its rural hinterland, which is in turn estimated on the basis of the possible development scale of the primary sector (agriculture, fishery and mining) and of the consequent development requirements in other sectors. For the purpose of planning the functions of the respective urban centers, it will be appropriate to define a hierarchical framework between the six centers in proportion to their respective population. Taking into account the population standards for urban planning in the General Organization of physical planning, with appropriate modifications according to the geographical positions of the centers, the possible scales of development in their spheres of influence (i.e. development areas), possibilities of functional linkage between the centers, etc., the six centers could be arranged in the hierarchical order shown in Figure 4. It will be appropriate and economical to plan the provisions of urban functions at each center in the manner indicated in an outline form in Table 5.

5. Sectoral Development Program

(1) Agriculture

The per-capita consumption of farm produce in Aswan Governorate is considerably lower than the national average. Moreover, there are substantial shortages in local supply of the major cereals (especially wheat) and vegetables in the Governorate. With regard to livestock and poultry products, the Governorate is highly dependent on sources outside. If the population of Aswan Governorate increases from 620,000 in 1976 to 1,280,000 in 1997, staple food consumption (wheat and coarse grains) would increase from the present consumption of 135,000 tons to 350,000 tons, while in the case of vegetables, taking potato for example, consumption would increase from the present level of 12,000 tons to 30,000 tons. It is further anticipated that demand for feedstuffs will increase, accompanying the increase in intake of animal protein. In regard to the Project Area, the creation of arable land will not be attained to such a scale as to fully satisfy the higher levels of demand expected in the future. Considering the need to offer economic incentives to prospective agricultural settlers, it will be necessary to adopt selected strategic crops for optimum utilization of arable land.

The most crucial limiting factor for the agricultural development in the Project Area is the availability of water for irrigation. Because the possibility of groundwater utilization is low, the Area's agriculture will have to depend entirely on High Dam Lake. The water intake and conveyance from the lake is technically possible anywhere, but the economic and financial feasibility

of the construction of such facilities must be considered to delimit the potential areas for agricultural development. The question is not the physical availability but economic exploitability of water in the lake.

As shown in Table 6, the estimated area of arable land which is possible to develop within the Project Area by 1997 is 150,000 feddans, including the Kurkur area (24,000 feddans) where the Government has already taken steps to develop large-scale commercial agriculture. To absorb as many population as possible, it is better to settle a larger number of small holders than a few commercial estates. Considering that the soil, climatic and other natural conditions are unfavorable, and that there is little by way of social infrastructure at present in the Project Area, it is thought that unless considerable incentives are provided it will be virtually impossible to attract a sizable number of agricultural population. For this reason, planning foresees that each farming household will have a holding of, on the average, 10 feddans, much larger than the current national average of about 2 feddans.

It is expected that the farms will mainly grow cash crops such as tomato, potato, onion, Jew's mallow, okra, pepper, garlic, etc., with 50% self-sufficiency in coarse grains as foodstuffs, 100% self-sufficiency in poultry meat and eggs and 25% self-sufficiency in milk and beef. Because there will be an emphasis on the production of vegetables, it will be essential to establish agricultural cooperatives which engage in effective marketing operation, including exports.

Two types of irrigated agriculture are proposed in the lakeshore of the Project Area as follows.

(i) Upland agriculture with fixed irrigation facilities (sprinkler system) located above the high water level of 183 m in a flood year, and

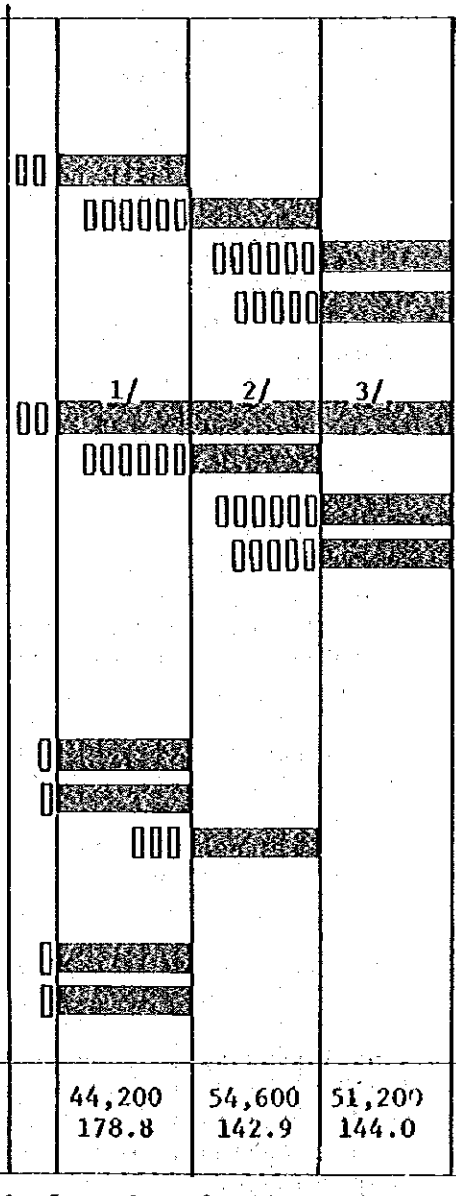
(ii) foreshore agriculture which uses movable irrigation equipment in the drawdown zone below 183 m.

The latter type of agriculture (see Figure 5) can be started relatively easily due to the cheaper costs and simple facilities and its early implementation is recommendable to settle fishermen or Nubians, some of whom want to practice both fishing and agriculture.

Upland agricultural development will proceed from Kurkur and Quastal/Adendan, because preparatory studies necessary for implementation have been more advanced and provisions of access to the sites are better than the other potential area (see

Table 6 Investment Schedule for Agricultural Sector

Site	Area (fds)	Project Cost (£E mil.)	'80'82	'87	'92	'97
I. Upland area						
(A) Northeast zone						
1. Kurkur	24,000	132.0				
2. Kalabsha	19,000	46.1				
3. Dakka	18,300	54.9				
4. El Allaqi	16,000	40.5				
(B) Southwest zone						
1. Abu Simbel	27,000	76.5				
2. Tushka	14,400	38.5				
3. Tomas/Affia	9,600	27.8				
4. Ballana	5,700	17.4				
II. Foreshore area						
(A) Northeast zone						
1. Kurkur	800	1.6				
2. Kalabsha & Dakka	9,300	18.6				
3. El Allaqi	2,200	4.4				
(B) Southwest zone						
1. Abu Simbel	2,100	4.2				
2. Tushka	1,600	3.2				
Total area	150,000			44,200	54,600	51,200
Total cost		465.7		178.8	142.9	144.0



Notes: Broken bars indicate the period of study, planning and detailed design.

1/ Quastal/Adendan project (8,000 feddans).

2/ 17,400 feddans.

3/ Project area No. 17 in Figure 6 (1,600 feddans).

Figure 5 Schematic Plan of Foreshore Agriculture

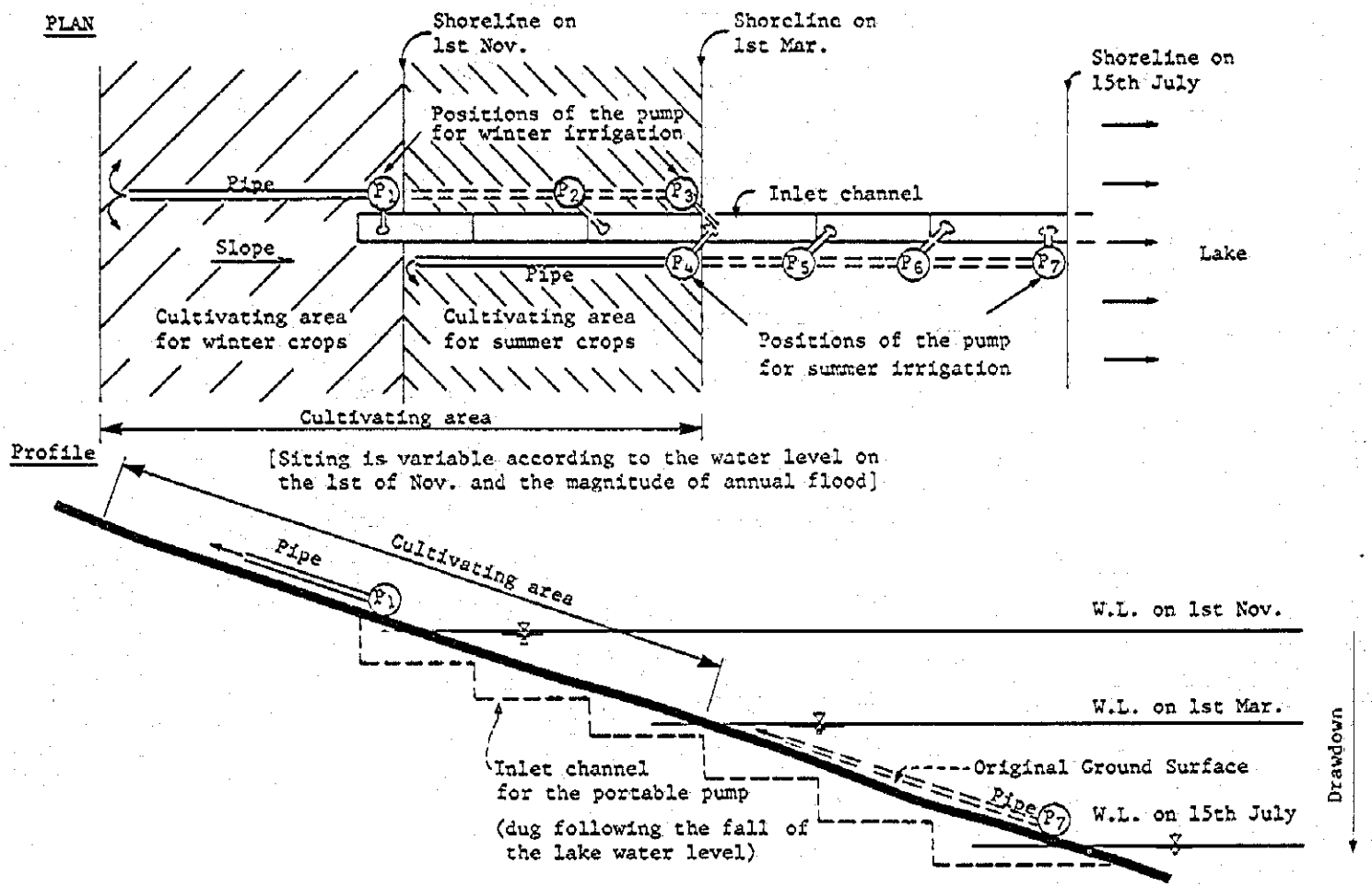


Figure 6 Location of Project Areas and Development Schedule

Site No.	Net Irrigation Area
	(feddans)
(A) Northeast Zone	
1	24,000
2	5,000
3	14,000
4	18,300
5	1,600
6	2,400
7	9,600
8	2,400
(B) Southwest Zone	
9	2,400
10	4,800
11	2,400
12	5,600
13	2,400
14	6,400
15	17,400
16	8,000
17	1,600
18	5,700

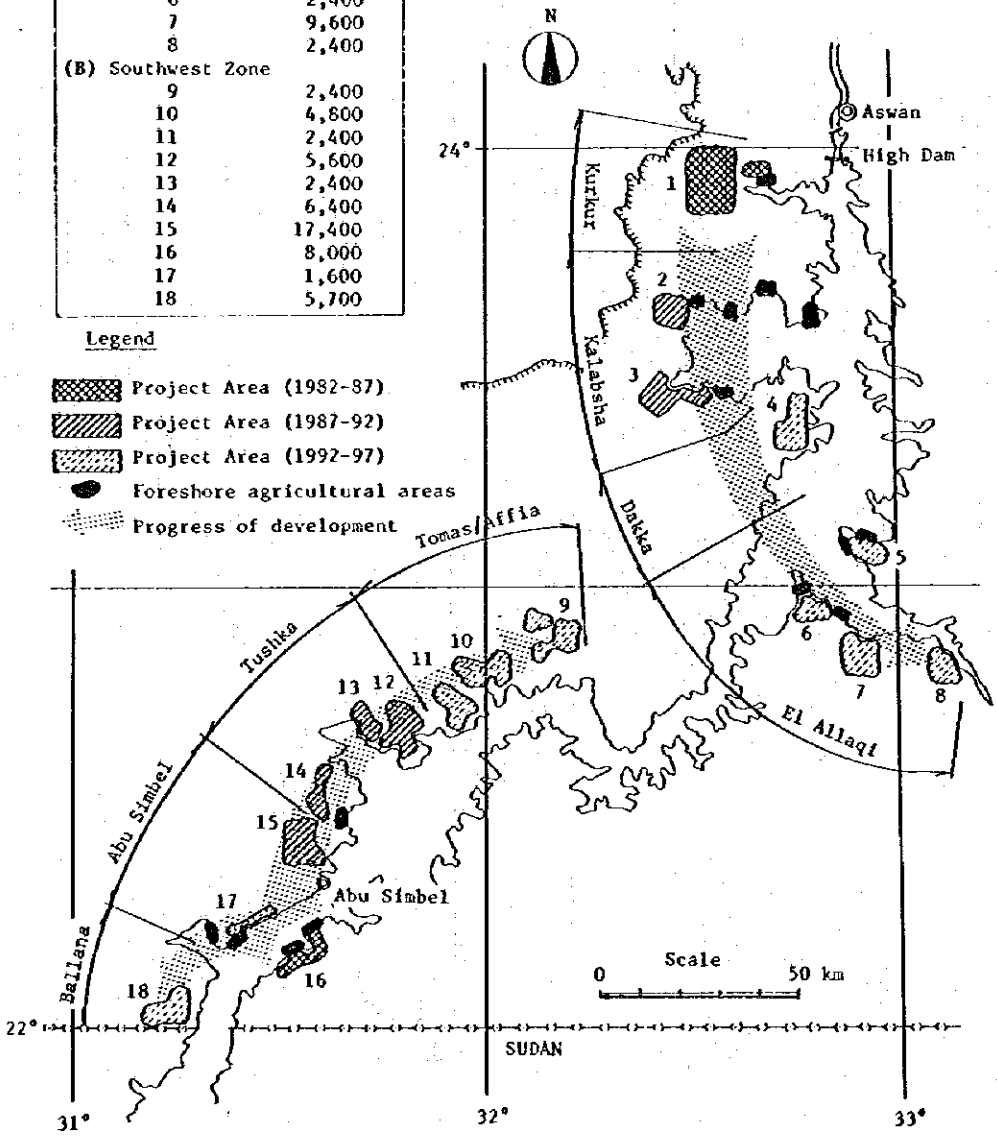


Figure 6). Subsequent development will be in Kalabsha and Abu Simbel/Tushka, because their accessibility to development centers are better than the rest. The development of Dakka, El Allaqi, Tomas/Affia and Ballana will be started after 1992 on the basis of preceding studies on soil and topographic conditions.

It is estimated that the total cost of agricultural development would be about £E 466 million in 1979 prices, of which £E 434 million are meant for the upland agricultural development of 134,000 feddans.

In order for success to be attained in agricultural development as described above, it is indispensable that there be thorough studies on topography and soil. In addition, it is also indispensable to modify the farming systems to suit the local conditions. Studies and experiments are necessary on the possibilities of cultivating new crops, selection of better varieties, efficient fertilizer application, effective plant protection, improvement of irrigation methods, etc. and the findings of these studies must be disseminated to the farmers through effective extension services. For this purpose, it is desirable to establish an experimental station with meteorological observation facilities which specializes in agriculture in the desert environment. The estimated construction cost is about £E 1 million.

(2) Fisheries

Observations

At present there are about 7,000 persons engaged in fishing over approximately 6,000 km^2 of High Dam Lake, and their annual catch has increased from 2,662 tons in 1968 to 22,575 tons in 1978, an 8.5-fold increase in ten years. The rapid increase was mostly brought by fresh fish production, which has accounted for 75% of the total catch in 1978 compared with 43% a decade ago. The increase of salted fish production has been relatively sluggish over the period.

Well over 90% of the fresh fish output has been accounted for by tilapia (Tilapia nilotica and galilaea) in recent years, with Nile perch (Lates niloticus) making up the rest. The fresh fish production peaks during the period from March to May, when approximately 40% of the annual total is hauled. The production of salted fish (tiger fish, or Hydrocynus forskali) stays more or less even from April through October, declining appreciably in the remaining months. The period of March-May coincides with the spawning season of tilapia and this has serious implications for the future. The average size of the hauled tilapia has been already decreasing, normally a sign

of overfishing. It is urgently necessary to start effective fishery management. For effective fishery control and possibly for fish culture for increasing the stock, it is essential to accumulate basic data on exploitable fish species, the aquatic environment as their habitats and ongoing fishing activities.

Fishing boats used in High Dam Lake are wooden rowing boats ranging 5 - 6 m in length and manned by two or four persons. Some 2,000 boats are currently employed over the lake. Major fishing nets used are trammel nets for tilapia and floating gill-nets for tiger fish. The number of boats powered by outboard engines has been recently increasing, especially in the northern part of the lake.

Fresh fish hauls are collected and carried to the West Harbor in Aswan by a fleet of 69 powered wooden carrier boats. The fish holding capacity of these boats varies from 3 to 65 tons. In addition, there are two 200-ton barges (non-powered) and two tug boats to transport tiger fish which are salted at the fishing camps. Together with those boats which are currently under construction, the fleet is estimated to have the annual transportation capacity of approximately 30,000 tons.

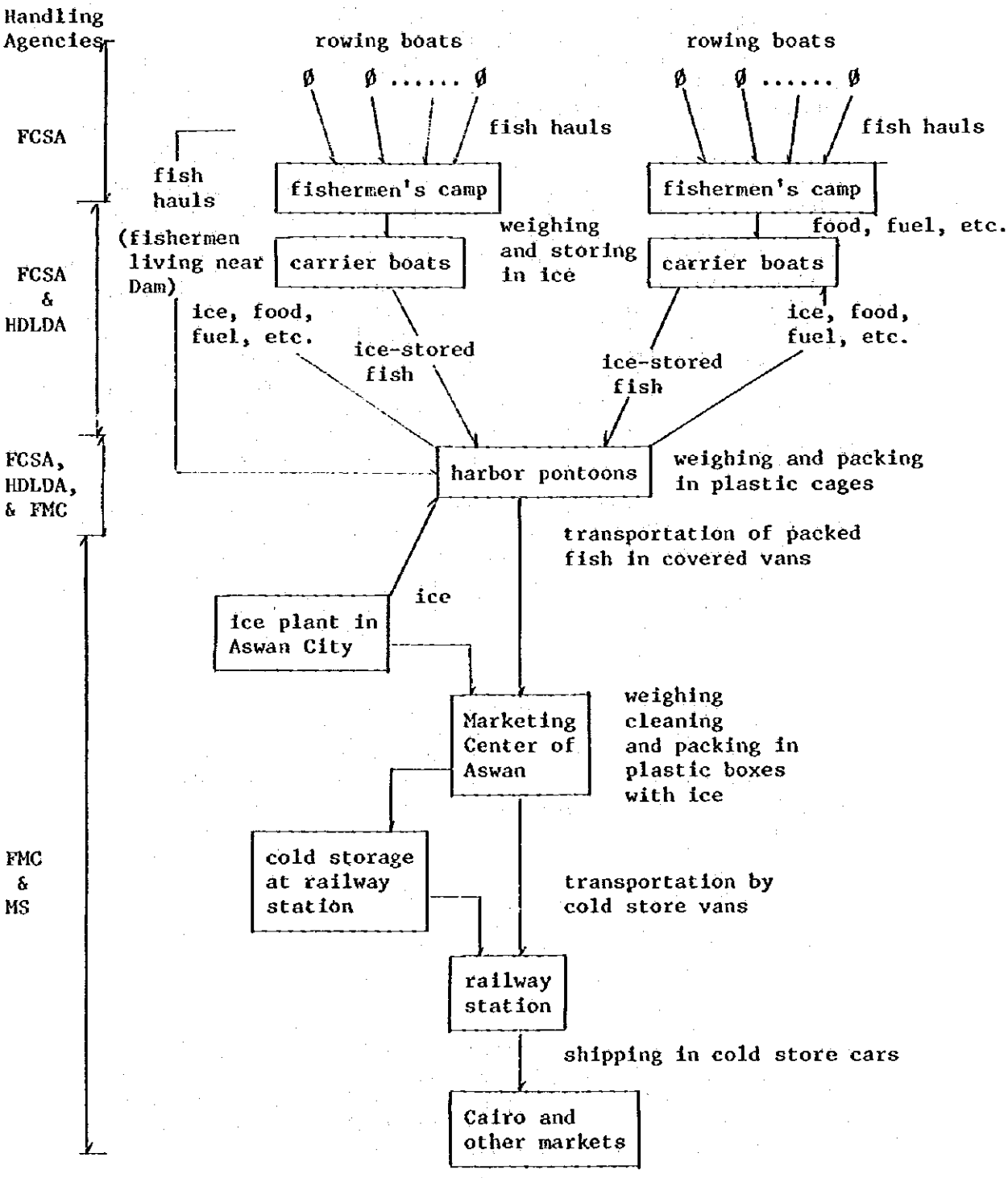
Figure 7 shows the flow of fish from hauling in the lake to the market. The lake is divided into eight zones for transportation services. In order to retain the freshness of tilapia, many problems are currently encountered after hauling. Under the sweltering sun, a substantial percentage of fish hauled at each fishing camp lose freshness before the arrival of ice-packed carrier boats and the spoilage is unnecessarily high also in the process of transporting the fish to the West Harbor at the High Dam. Therefore it is necessary to take measures to improve the storage method and thereby eliminate the wastage of valuable fishery resources and the loss of income to the fishermen.

Fish landings are handled only at the West Harbor in Aswan, where facilities are poor, merely consisting of one pontoon (28 m x 8 m) for unloading fish and two others (20 m x 7 m), one for loading ice, food, fuel, etc. and the other for office buildings. Operations are not going smoothly on occasion because the harbor is also used for other purposes. There is a need to turn the place into a specialized fishing port with more permanent facilities.

Measures for Development

The current trammel-net fishing method used for tilapia is on the whole adequate, except that there will be a need to identify an appropriate inner net mesh size of trammel nets, because this type of nets catches small, that is, immature fish and must be

Figure 7 Flow of Fish Hauls to Market



Notes: FCSA : Fishermen's Cooperative Society of Aswan
HDLDA: High Dam Lake Development Authority
FMC : Fish Marketing Company
MS : Ministry of Supply

carefully controlled from the viewpoint of resource conservation. With respect to the gill-net fishing method for tiger fish, there will also be a need to increase the mesh size to protect the stock base. In general, high-performance fishing gear should not be introduced rashly before the effective fishery management is instituted and appropriate attempts at increasing the stock base begin to take effect.

With respect to transportation and storage of fish hauls, the existing collection system by cruising carrier boats is judged adequate, provided that their services are more regularized. However, the storage method by iced water is recommendable instead of ice alone. Fish holds of the existing carrier boats will have to be made water-tight and adiabatic for this purpose. Furthermore, in order to eliminate the wastage before the arrival of carrier boats, each fishing boat and camp must be also equipped with a water-tight adiabatic container, with a capacity of 170 ℓ for the former and 1.2 tons for the latter. For the retention of freshness, the use of net cages for live fish might be introduced as well at fishing camps, although further studies are necessary to establish its feasibility.

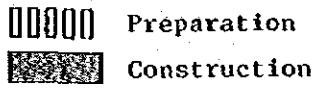
The following improvements of facilities are considered necessary to develop the West Harbor into a specialized fishing port. (i) The present dirt wharf should be reinforced with concrete. (ii) Four more pontoons must be added to service various loading and unloading activities. (iii) A number of coveyers and fork-lifts should be provided to ensure the efficiency of the handling at the port.

The most urgent requirement for the development of lake fisheries is to institute an effective system of fishery management. For this purpose, it is recommended to establish a Fishery Management Center, which will undertake various surveys and studies on fishery resources and environment as well as fishery control and monitoring.

The primary production of High Dam Lake is substantially high, and therefore, it is possible to artificially rear seedlings (mainly tilapia) in great quantity and release them into the natural habitat. This would contribute to increasing the fishery stock of the lake.

With regard to fish culture which requires certain specialized expertize and market conditions, it is believed that its introduction to the lake be made at a later date, or at least after a reasonable period of experimentation at the proposed Center proves the technical and financial feasibility of such an undertaking in a large scale.

Table 7 Investment Schedule for Fishery Sector



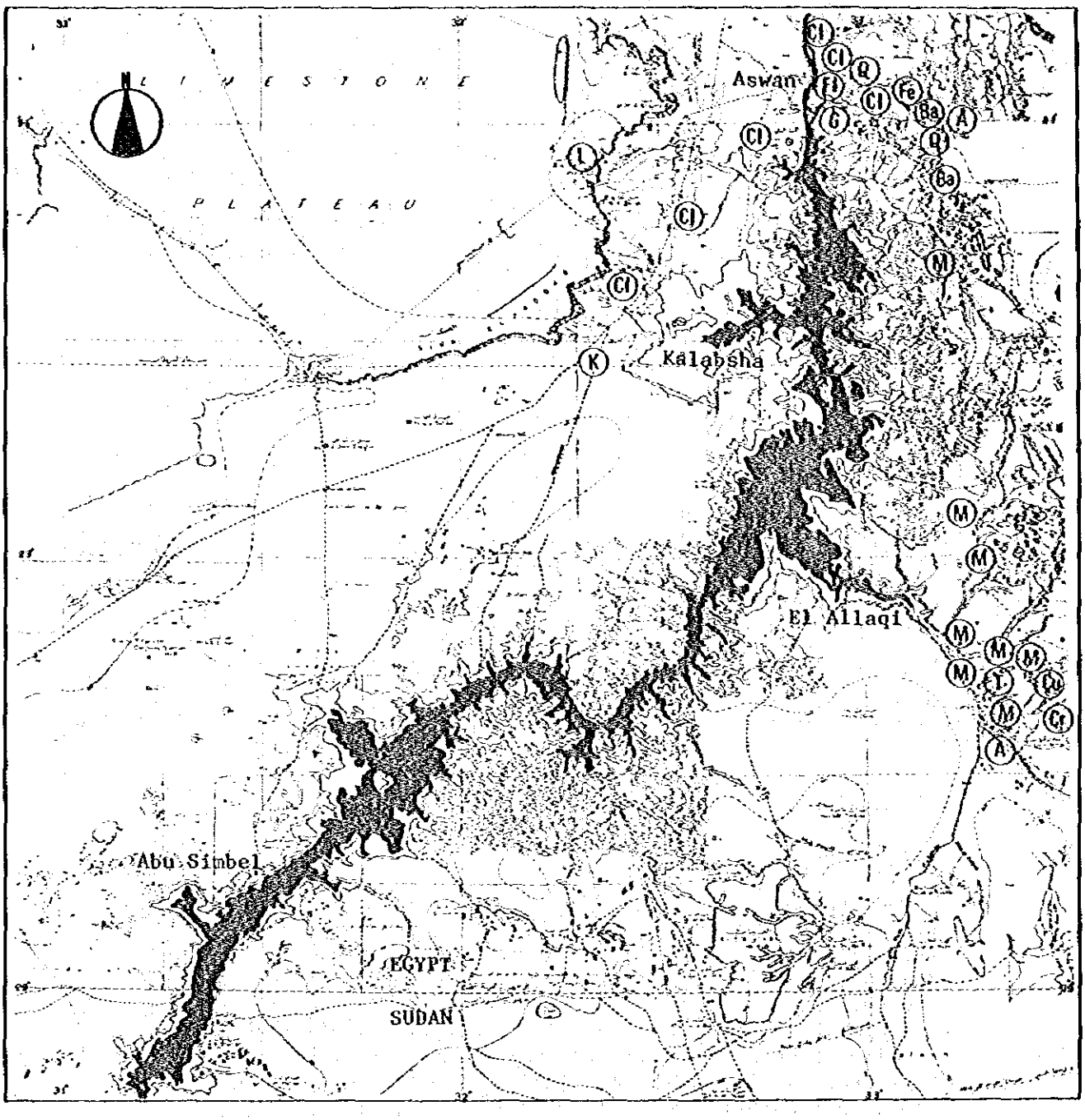
Projects	Project Cost (£E mil.)	'80 '82 '87 '92 '97
1. Fishery Management Center	1.6	
2. Improvement of Fish Storage	1.0	
3. Rearing and Release of Seedlings	n.a.	
4. Improvement of West Harbor	1.2	
5. Fish Culture	n.a.	
6. Abu Simbel Port	0.5	

(3) Mining and Manufacturing

Observations

In the Project Area, mining and manufacturing activities are all concentrated in Aswan City, most of which are not modern industries with the exceptions of fertilizer production at the Kima Factory and several industries for consumer goods. The major problems which are prone to hinder the future industrial development in the Project Area will comprise small market size, scarcity of technology and manpower for operating and managing the factories with modern facilities, shortage of investment funds, particularly those of the private sector, apparent difficulty of infusing linkage with other economic sectors as well as among the sub-sectors of mining and manufacturing, unfavorable climatic conditions for the establishment of certain industries, and insufficiency of infrastructure in the Project Area.

The development potentials of mineral resources in the Project Area are not yet sufficiently surveyed, but non-metallic resources seem to be promising (Figure 8). There are possibilities of finding exploitable metallic and non-metallic deposits toward the east extending outside the Project Area as far as



INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 8

Mineral Distribution in the Project Area

A : Gold
Ba : Barite
Cl : Clay
Cr : Chromium
Cu : Copper
Fe : Iron
Fl : Feldspar
G : Granite
K : Kaolin
L : Limestone
M : Marble
Q : Quartz
T : Talc

the Red Sea. If this could be the case, it is recommendable to develop these areas and to integrate with the Project Area.

Measures for Development

Since the mineral resources in the Project Area are promising and yet the Area's market size is small, the following policies for the mining and manufacturing development can be identified:

(i) To exploit and process such natural resources in the Project Area as fish, agricultural produce, minerals, and electric power so as to retain the resulting value-added within the Area;

(ii) To encourage industries which support the development of other economic sectors and of sub-sectoral mining and manufacturing activities; and

(iii) To produce consumer goods in accordance with the increase of population in the Project Area and Aswan Governorate.

Based on the above development policies, the implementation of following projects can be considered:

(i) The development of building and construction industry (e.g., cement industry, other non-metallic mineral processing) and other resource-oriented industries (e.g., fish processing) before 1987;

(ii) The development of vegetable and fruit processing and canning, high-technology processing of minerals (e.g., ceramics) and supporting industries for agricultural development (e.g., agricultural equipment and machinery) after 1985; and

(iii) Production of consumer goods at the start of 1990s. If any metallic minerals could be discovered and excess supply of electricity could be realized, the development of heavy and chemical industries may be considered.

To develop the above-mentioned mining and manufacturing activities, the infrastructure in the Project Area must be adequately provided, such as access roads to the mines, supply of industrial water and electricity, and the establishment of industrial estates which must be located near Aswan City with preventive measures for pollution. The industrial estates are particularly important for the planned industrialization and encouragement of private investors.

Table 8 Investment Schedule for Mining and Manufacturing Sector

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employment	Possible Implementation Period[2] (1980 82 87 92 97 2000)	Premises
A-1	-Fish Processing	High Dam	2.00	215		
A-2	-Slaughtering and Meat Processing	Aswan/ Kalabsha	3.00	400		Cattle Breeding
	-Cold Storage	Aswan/ Kalabsha	0.70	60		
	-Poultry Meat	Aswan/ Kalabsha/ Abu Simbel	0.30	75		
	-Dairy Products	Aswan	0.80	100		Cattle Breeding
	-Preserved Fruits (Fruit Canning)	Aswan/ Kurkur/ Kalabsha	0.50	100		Fruit Growing
	-Fruit Juice (Canning)	Aswan/ Kurkur/ Kalabsha	1.10	180		Fruit Growing
	-Tomato Ketchup and Puree	Aswan/ Kurkur/ Kalabsha	1.20	150		Tomato Growing
	-Vegetable Oils	Aswan/ Kurkur/ Kalabsha	1.20	150		Oil Seed Growing
	-Cane Sugar	North Aswan	10.50	300		
	-Animal Feedstuff	Aswan	3.00	90		Flour Milling and Fish Processing

Notes: 1/ See Figure 9. 2/ A time span during which the project can possibly be implemented.

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employment	Possible Implementation Period[2] 1980 82 87 92 97 2000	Premises
A-2	-Natural Dyestuff	Aswan	0.10	30		Plant Growing
	-Perfume Oil	Aswan	0.10	40		Plant Growing
	-Leather Shoes	Aswan	0.40	90		Tanning
A-3	-Iron Ore Upgrading	Aswan	7.50	900		
	-Copper Ore	South-west El Allaqi	35.00	700		Copper Ore Discovery
	-Chromium Ore	South-west El Allaqi	15.00	400		Chromite Discovery
	-Gold Ore	South-west El Allaqi	3.00	200		
	-Marble Quarries	El Allaqi	0.50	250		
	-Granite Quarries	Aswan	0.30	200		
	-Aggregate Quarries	Aswan/ Kalabsha/ Abu Simbel	1.00	150		
	-Clay Quarries	West Aswan/ Kalabsha	0.15	60		
	-Ceramic Tiles	West Aswan	2.60	200		
	-Ceramic Tableware	Aswan/ West Aswan	3.80	400		
	-Ceramic Sanitary Ware	Aswan/ West Aswan	2.30	200		

Notes: 1/ See Figure 9. 2/ A time span during which the project can possibly the implemented.

(continued on the next page)

Table 8 (continued)

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employ-ment	Possible Implementation Period[2] 1980 82 87 92 97 2000	Premises
A-3	-Porcelain Insulators	Aswan/ West Aswan	2.50	200		
	-Glass Containers	Aswan	4.00	400		
	-Glass Tableware	Aswan	1.50	150		
	-Clay Bricks	West Aswan	1.00	150		
	-Sandstone Bricks and Blocks	Abu Simbel	0.20	80		
	-Cement	West Aswan	50.00	400		
	-Quicklime	West Aswan	3.00	80		
	-Calcium Carbonate	Aswan	1.20	40		
	-Ferro-alloys	Aswan	18.00	700		
A-4	-Nitrogeneous Fertilizers	Aswan	60.00	1,800		Electricity Surplus
	-Aluminium Metal	Aswan	120.00	2,200		Electricity Surplus
	-Copper Metals	Aswan	35.00	500		Copper Mining
B-1	-Shipbuilding and Repairs	High Dam	4.00	110		
B-2	-Insecticides	Aswan	6.50	80		
	-Agricultural Implements	Aswan/ Kalabsha	0.80	70		
	-Agricultural Machinery (Small Tractors)	Aswan	4.80	220		

Notes: 1/ See Figure 9. 2/ A time span during which the project can possibly be implemented.

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employ-ment	Possible Implementation Period[2] (1980 82 87 92 97 2000)	Premises
B-2	-Water Pumps (Assembly)	Aswan	0.80	60		
	-Electric Motors and Transformer (Assembly)	Aswan	0.60	60		
	-Plastic Pipes and Tubes	Aswan	0.60	50		
	-Refractories	West Aswan	4.50	250		
B-3	-Asbestos-Cement Pipes	West Aswan	7.00	100		Cement Prod.
	-Concrete Blocks	West Aswan/ Kalabsha	0.60	80		Cement Prod.
	-Precast Concrete Products	West Aswan	1.00	100		Cement Prod.
	-Prefabricated Housing	West Aswan	4.00	120		Cement Prod.
	-Steel Reinforcement Bars	Aswan	27.00	500		
	-Steel Wire Products	Aswan	1.50	100		
	-Iron Foundry	Aswan	1.30	80		
	-Water Tanks (Steel or Plastic)	Aswan	0.80	50		
	-Tin Cans	Aswan	2.30	90		Canning Industries
	-Paints	Aswan	0.80	60		
	-Steel Structures	Aswan/ Kalabsha/ Abu Simbel	0.45	120		

Notes: 1/ See Figure 9. 2/ A time span during the project can possibly be implemented.

(continued on the next page)

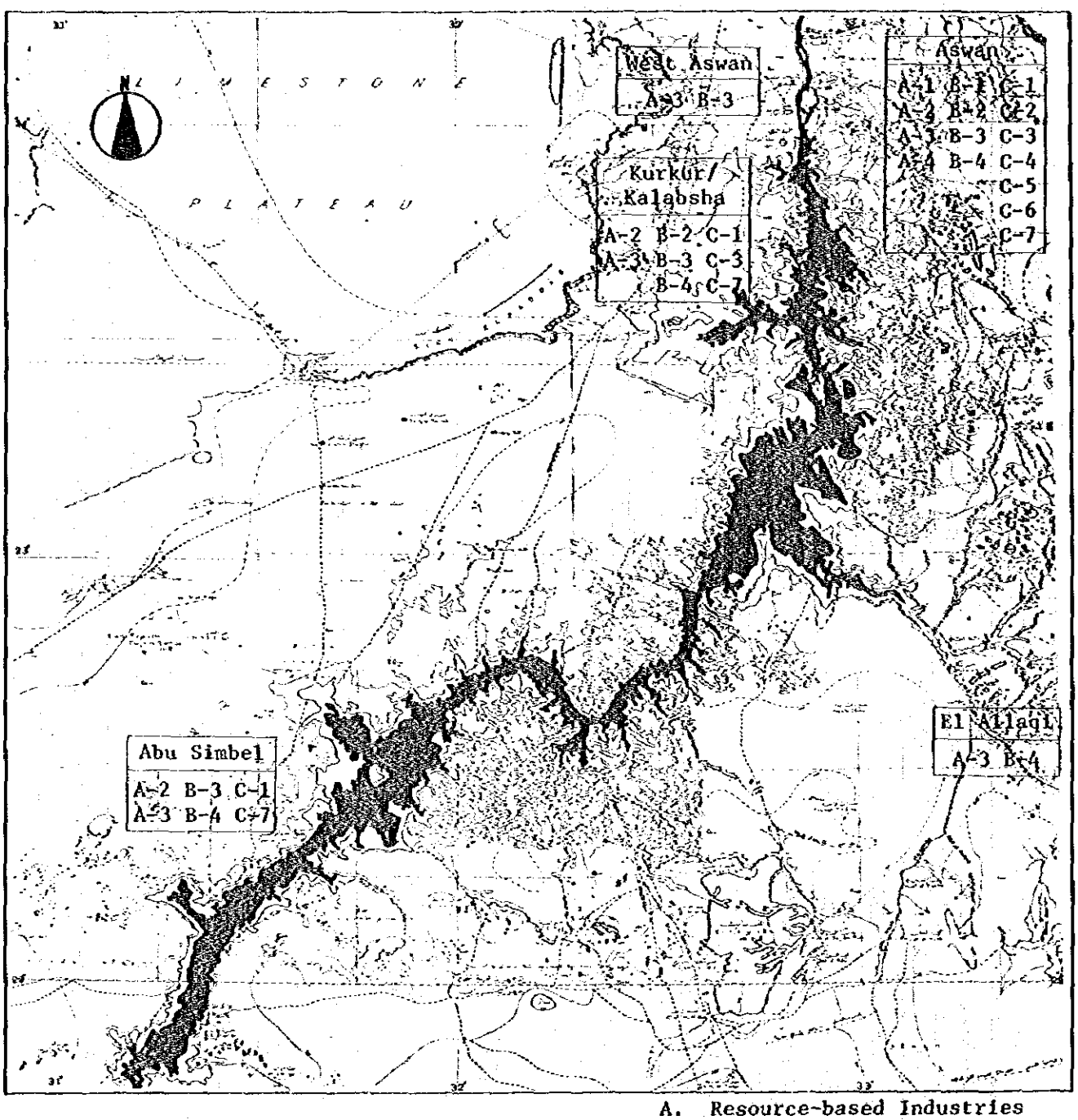
Table 8 (continued)

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employ-ment	Possible Implementation Period[2] 1980 82 87 92 97 2000	Premises
B-4	-Automobile Repairing	Aswan/ Kalabsha/ El Allaqi/ Abu Simbel	1.20	160		
	-Electrical Machinery Repairing	Aswan/ Abu Simbel	0.40	60		
	-Tyre Retreading	Aswan/ Kalabsha/ Abu Simbel	0.30	60		
C-1	-Flour Mill	Aswan	3.50	100		
	-Bakery	Aswan/ Kalabsha/ Abu Simbel	0.90	90		
	-Confectionaries	Aswan	0.45	40		
	-Pastas	Aswan	0.30	80		Flour Mill
	-Soft Drinks	Aswan	1.40	60		
C-2	-Ready-Made Garments	Aswan	0.20	120		
C-3	-Wooden Furniture	Aswan/ Kalabsha	0.20	50		
C-4	-Printing	Aswan	0.70	90		
C-5	-Soap	Aswan	0.30	40		
	-Detergents	Aswan	0.50	70		
	-Plastic Containers	Aswan	1.50	70		

Notes: 1/ See Figure 9. 2/ A time span during which the project can possibly be implemented.

Code[1]	Project	Proposed Site	Project Cost (£E mil.)	Employ-ment	Possible Implementation Period[2] 1980 82 87 92 97 2000	Premises
C-5	-Plastic Bags	Aswan	0.50	40		
C-6	-Aluminium Cooking Ware	Aswan	1.30	250		
	-Cooking Stoves	Aswan	0.80	80		
C-7	-Handicrafts	Aswan/ Kalabsha/ Abu Simbel	0.30	100		
Aux.	-Industrial Estates	Aswan/ West Aswan	29.30	-		

Notes: 1/ See Figure 9. 2/ A time span during which the project can possibly be implemented.



INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 9

Geographical Distribution of Mining and Manufacturing Activities

0 10 20 30 40 50 60 70 80 90 100 km

A. Resource-based Industries

- A-1 Fish Resources
- A-2 Agricultural Products
- A-3 Minerals
- A-4 Water and Electricity

B. Supporting Industries

- B-1 Fisheries
- B-2 Agriculture
- B-3 Building and Construction
- B-4 Repairs

C. Demand-oriented Industries

- C-1 Food and Beverages
- C-2 Textiles
- C-3 Wooden Products
- C-4 Paper and Printing
- C-5 Chemical Products
- C-6 Metal Products
- C-7 Other Products

The education and training facilities for professionals and sub-professionals (or technicians) must be expanded and improved to a certain extent in the Project Area. Particular attention must be paid to the training of professionals in the fields of geology and mining, civil engineering, architecture, and food processing and of technicians in the fields of civil engineering and building trades.

The estimated costs of the development projects and their respective implementation schedules are shown in Table 8, while their approximate location is shown in Figure 9.

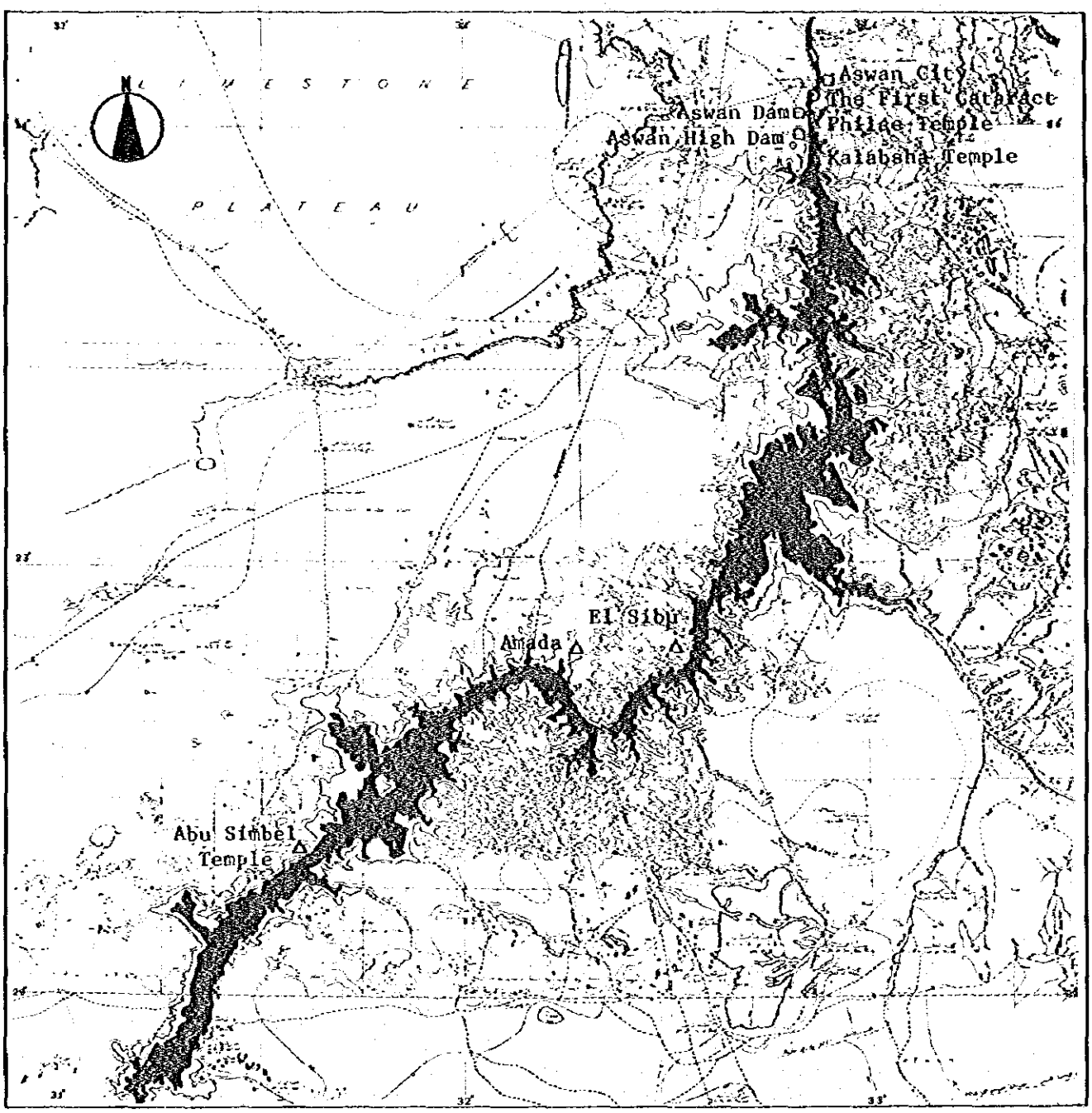
(4) Tourism

Observations

The demand for tourism is Egypt in composed of three distinct components: (i) European and American tourists, (ii) Arab tourists, and (iii) domestic tourists. The European and American tourists generally are interested in historical and archeological sites, and visit Cairo, Luxor and Aswan, confining their interest to sites along the Nile and virtually ignoring Alexandria and Mediterranean resorts. The visitors from other Arab countries follow an opposite course, by visiting Cairo, one of the most important cities in the Arab world, and enjoying Alexandria and the Mediterranean resorts in summer. The Egyptians have preferences similar to those of the Arab visitors from other countries, and are strongly oriented toward visiting Alexandria and the Mediterranean resorts during summer.

Tourist attractions of importance in the Project Area are historical resources rather than natural resources. In particular, the Great Temples of Ramses II and Nefertari at Abu Simbel are of value comparable to the pyramids. By means of the campaign led by UNESCO to save these treasures from being submerged in the lake, they have become widely known and highly evaluated. Accordingly, the Area's resources must be said to be of the type which are of appeal to European and American tourists (for the distribution of the Area's tourist resources, see Figures 10 and 11).

However, the presentation of the tourism resources and the accommodation for tourists in the Project Area leave much to be desired. There is a severe shortage of hotel rooms of international class in Aswan and Abu Simbel, but what is under construction is a number of middle-class hotels which are likely to experience financial difficulties in the future due to an over-supply. It is also necessary to remedy the shortcoming that there is no effectively functioning tourism information network not only for Aswan but for all of Egypt.



INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 10

Tourism Resources in the Project Area

△	Historical asset
□	Contemporary asset
○	Natural asset

Figure 11 Tourism Resources and Facilities in Aswan

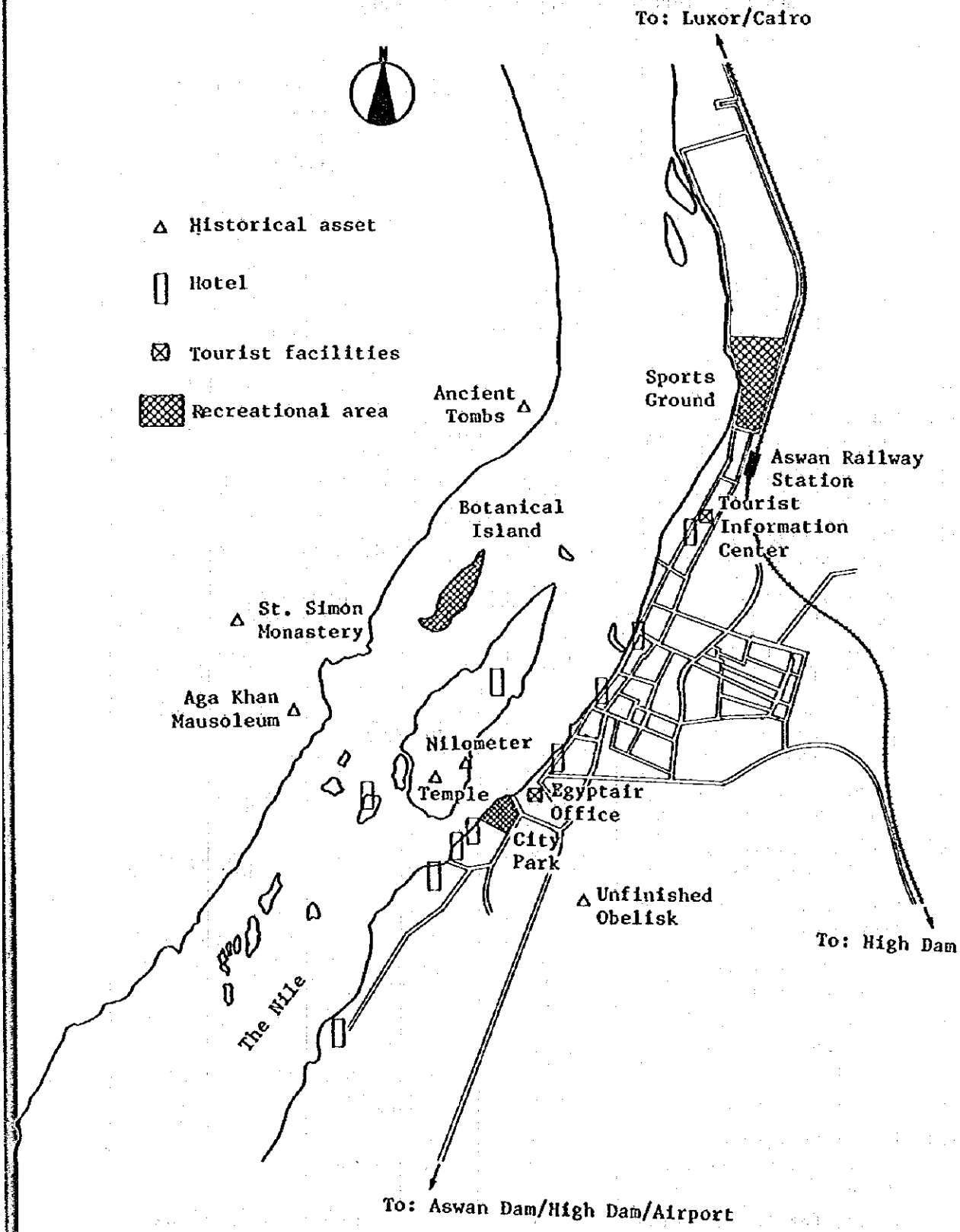


Table 9 Investment Schedule for Tourism Sector

▯▯▯▯▯ Preparation (Feasibility study, detail design, etc.)

▓▓▓ Construction

Project	Project Cost (£E mil.)	82	87	92	97
1. Aswan					
A-01 Hotel Extentions (3-5 star; 200 Rooms)	4.0	▯▓			
A-02 Hotel Construction (3-5 star; 150 Rooms)	6.0	▯▓			
A-03 Hotel Construction (3-5 star; 150 Rooms)	6.0	▯▯▓	▓		
A-04 Hotel Construction (3-5 star; 300 Rooms)	12.0	▯▯▯	▓		
A-05 Hotel Construction (3-5 star; 300 Rooms)	12.0			▯▯▯	▓
A-06 Hotel Renovation and Upgrading (3-5 star; 120 Rooms)	3.0	▯▯▯	▓		
A-07 Hotels Construction (1-2 star; 142 Rooms)	3.0			▯▯▯	▓
A-08 Hotels Construction (1-2 star; 410 Rooms)	8.7			▯▯▯	▓
A-09 New Jetty for Tourism at the High Dam	0.2	▯	▓		
A-10 Landing Facilities for Nile Cruisers	0.5	▯▯▯	▓		
A-11 Provision of Information and Tourists' Bulletin Boards	0.2		▯	▓	
A-12 New Visitor Center	1.5	▯▯	▯	▓	
A-13 Rehabilitation of Deteriorating Tourism Resources	1.0	▯▯▯	▓		
Investment Cost for Aswan Tourism	58.1	9.2	13.2	15.0	20.7

(continued on the next page)

Table 9 (continued)

Project	Project Cost (£E mil.)	82	87	92	97
2. Abu Simbel					
S-01 Hotel Extension (3-5 star; 44 Rooms)	0.8				
S-02 Hotel Construction (3-5 star; 200 Rooms)	8.0				
S-03 Hotel Construction (3-5 star; 300 Rooms)	12.0				
S-04 Hotel Construction (3-5 star; 300 Rooms)	12.0				
S-05 Nubian Folklore Village	3.0				
S-06 Tree Planting	0.1				
S-07 Sound and Light Show	0.2				
S-08 Yachet Harbor	0.3				
S-09 Botanical Garden	2.0				
Investment Cost for Abu Simbel Tourism	38.4	1.1	11.3	14.0	12.0
3. Lake Area					
L-01 Floating Hotels (2 Cruisers)	8.0				
L-02 Night Navigation Facilities	0.1				
L-03 El Sibu/Amada Tourism Development	1.0				
Investment Cost for Lake Area Tourism	9.1	-	-	9.1	-
Total Investment Cost for the Project Area	105.6	10.3	24.5	38.1	32.7

Source: The JICA Study Team.

Measures for Development

In connection with the future development and improvement of tourism in the Project Area, it is necessary to increase the number of international-class hotel rooms. In addition, it is essential to create new demand to prevent an excess capacity among the middle-class hotels. Although the High Dam itself is of limited appeal to international tourists, it represents a national undertaking of immense proportions. Therefore, it is possible to promote group tourism by schoolchildren and students, a trend already becoming discernible in recent years. With respect to international tourism, in addition to the urgent need to rectify the problem of inadequate tourist information, it is essential to improve the general attractiveness of the communities where tourists spend some time, notably Aswan City and Abu Simbel.

The sight-seeing at Abu Simbel is mostly done in one-day air trips from Aswan City. Considering the great attractivenss of the Great Temples, it is possible to establish Abu Simbel as an overnight stay, with combined provisions of more hotel rooms, better presentation of available resources, and a Nubian folklore village.

Concerning the historical assets found isolated on the shore of High Dam Lake, their development should be considered after the settlement of the area nearby progresses to a certain extent. Such possibilities as the acquisition of a floating hotel or hotels for the lake should be considered as a long-term proposition.

Table 9 shows the identified projects, their estimated costs and implementation schedules.

(5) Transportation

Reflecting the low level of economic activity in the Project Area and the consequent low level of transportation demand, transportation facilities in the Area are almost totally undeveloped except for Aswan City and its immediate vicinity. In such a case it would not be appropriate to select projects based on the expected demand. Rather, an effective transportation system will have to be planned to support the development of other sectors and to service various centers of development, thus stimulating the generation of transportation demand. From this veiwpoint, the Study Team adopted the following three objectives for planning the development of the transportation sector:

(i) Development of an arterial transportation network which will define the framework of the Project Area;

(ii) Provision of transport facilities which will support projects in other sectors; and

(iii) Provision of transport facilities needed in order to supply the minimum service requirements of the population in the Area.

Improvement of inter-regional and international trunk routes is important to the Project Area, because it will provide better accessibility to other regions and countries, but also because it defines the physical structure or framework of the Area's development. From this viewpoint, the provision of overland access between Aswan City and the western shore area of High Dam Lake, where most of the identified agricultural and community development projects are to be located, is considered as crucial. This trunk road on the western shore will be also important as a future trade route to and from the Sudan. Further, the Aswan - Berenice route extending directly from Aswan to the Red Sea will be important, because it will link the Project Area, and Southern Egypt as a whole, to neighboring countries and Europe via the planned port at Berenice. It is expected that in the future this route will be extended from Aswan as far west as the New Valley. Aswan City will then emerge as the primary core of Southern Egypt in the spheres of industrial activities and distribution of goods.

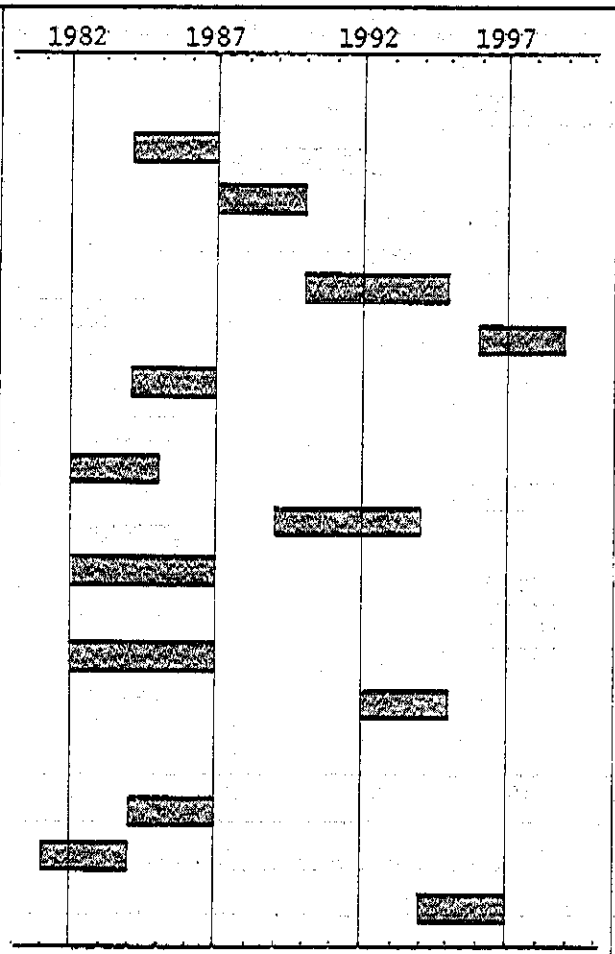
Major supportive transportation projects are the extension and improvement of feeder roads in connection with the development agriculture and mining, improvement and construction of specialized port facilities for fisheries and tourism, and the construction of intra-city roads and a bridge in Aswan City, etc.

Major basic needs transportation projects are the construction of simple quays in fishing villages, and construction of roads to provide small communities with access to arterial roads, as well as heliports and dirt runways for light aircraft used in times of emergency.

The approximate costs of the identified development projects and their respective implementation schedules are shown in Table 10, while the perspective transportation networks in the Project Area as a whole and in Aswan City in particular are shown in Figures 12 and 13.

Table 10 Investment Schedule for Transportation Sector

Development Project	Implementation Schedule	Project Cost[1/] (£E million)
	1982 1987 1992 1997	
A. Roads and Bridges		
1. Inter-regional Trunk Roads		
a. Aswan-Sudan Border		16.2
Phase I (Kurkur-Tushka)		(10.7)
Phase II (Tushka-Sudan Border)		(5.5)
b. Aswan-El Allaqi		9.3
c. Aswan-Berenice		18.0
d. Aswan-New Valley (Baris)		16.8
Phase I (Kurkur-Limestone Quarry)		(1.5)
Phase II (Limestone Quarry-Baris)		(15.3)
2. Secondary/Feeder Roads		
a. El Shallal Bridge (Nag El Mahatta-Nag Siheil Gharb)		3.5
b. Aswan West Riverside Road (Aswan Dam-Nag El Madab)		0.7
c. Aswan New Town Road (Aswan Dam-Sahara City)		1.2
d. Aswan East by-pass		2.8

Development Project	Implementation Schedule	Project Cost[1/] (£E million)
		
e. Kalabsha District Feeder Road		6.9
Phase I (60 km)		(3.3)
Phase II (65 km)		(3.6)
f. Tomas/Affia District Feeder Road		6.1
Phase I (70 km)		(3.9)
Phase II (40 km)		(2.2)
g. Tushka District Feeder Road		1.7
h. Abu Simbel District Feeder Road		4.2
Phase I (25 km)		(1.4)
Phase II (50 km)		(2.8)
i. Quastal-Wadi Halfa Road		2.8
j. El Allaqi District Feeder Road		8.2
Phase I (95 km)		(5.2)
Phase II (55 km)		(3.0)
B. Ports and Fleet		
1. Aswan East Port (expansion)		2.5
2. Aswan Fishery Port		1.2
3. Abu Simbel Fishery Port		0.5

(continued on the next page)

Table 10 (continued)

Development Project	Implementation Schedule	Project Cost[1/] (£E million)
	1982 1987 1992 1997	
4. Feeder Port		
a. Kalabsha North		0.2
b. Dakka		0.2
c. El Allaqi North		0.2
d. El Allaqi South		0.2
e. Tomas/Affia		0.2
f. Abu Simbel		0.5
g. Quastal/Adendan		0.5
5. Purchase of Vessels		
Phase I		7.5
Phase II		10.0
C. Airports		
1. Aswan Airport (expansion)		2.5
2. New Abu Simbel Airport		6.0
3. Runway for Light Aircrafts		
a. Kalabsha		0.1
b. El Allaqi		0.1

Development Project	Implementation Schedule	Project Cost[1/] (£E million)
	1982 1987 1992 1997	
c. Tomas/Affia		0.1
d. Tushka		0.1
e. Quastal/Adendan		0.1
f. Ballana		0.1

Note: 1/ 1979 prices.

Source: The JICA Study Team.

Figure 12 Transportation Networks in the Year 2000

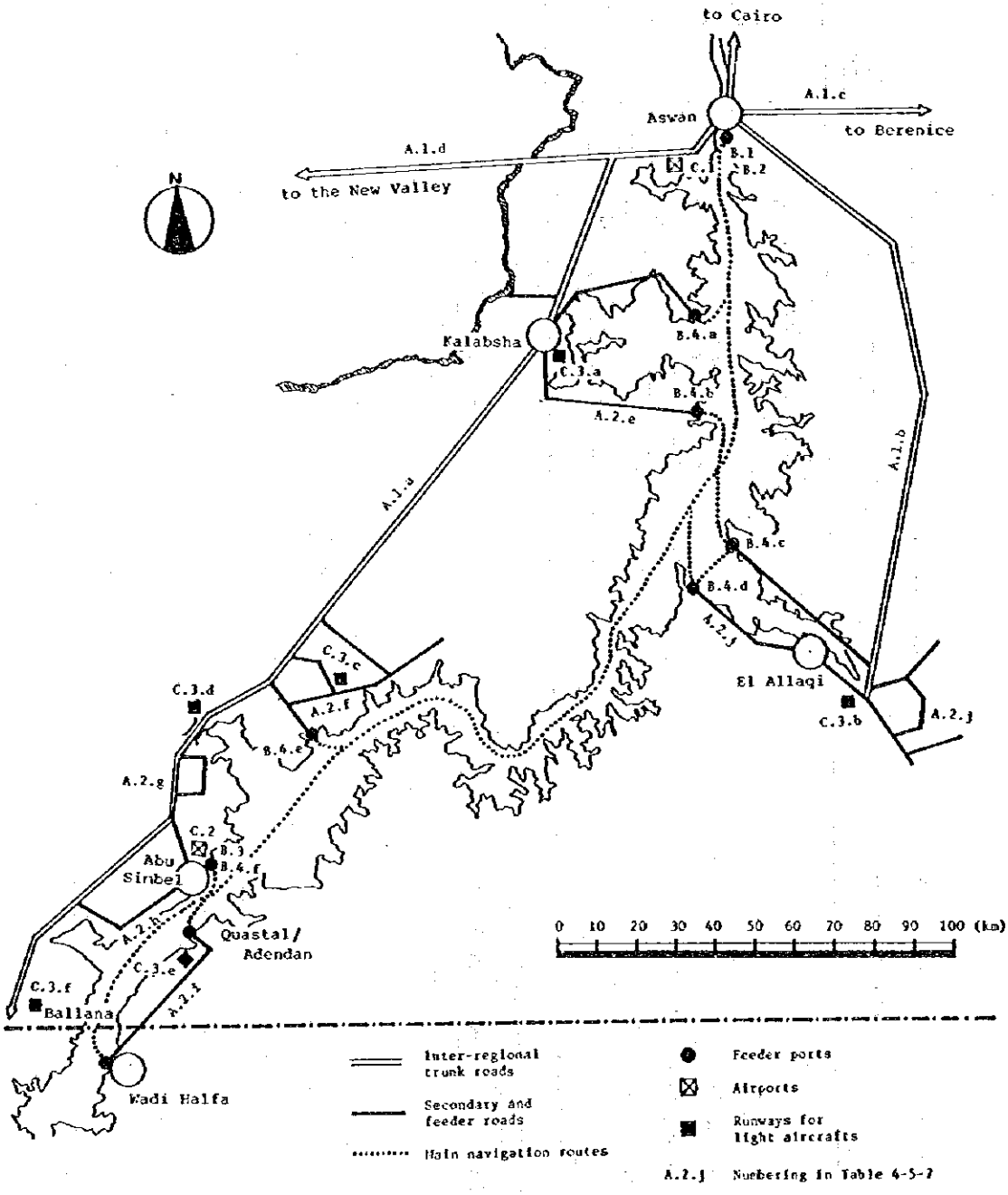
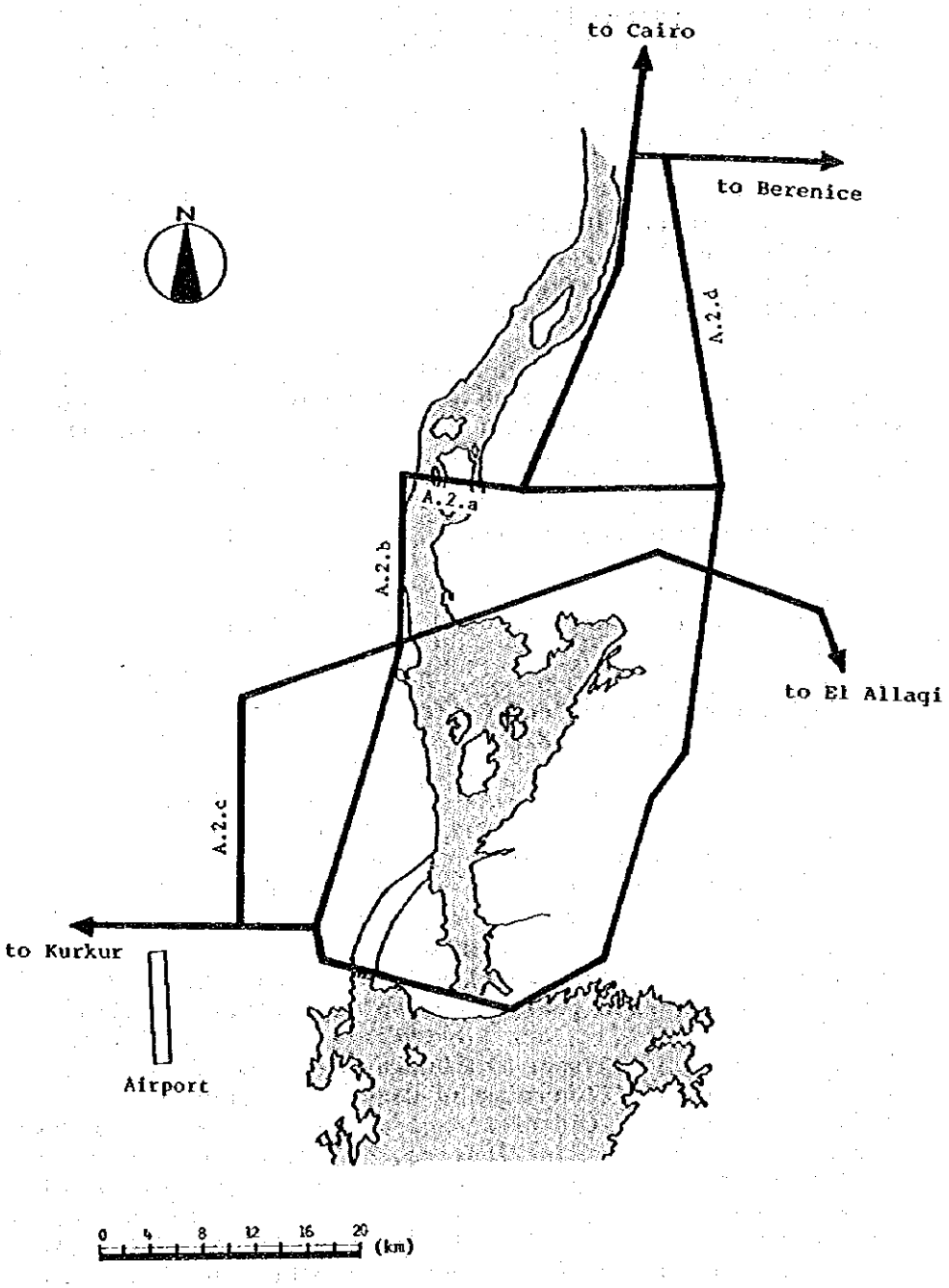


Figure 13 Future Road Network in Aswan City

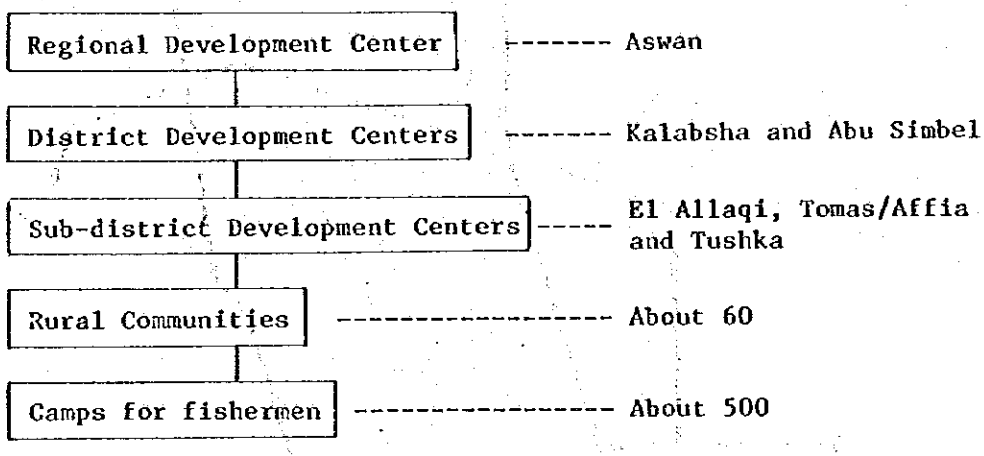


(6) Urban and Community Development

In order to settle an additional population of 700,000 in the Project Area by the year 2000, it will be necessary to develop settlements near the sites where various sectoral development projects are expected to be implemented. Construction of housing and related facilities must proceed apace with the growth of various sectoral activities and population agglomerations in urban areas should be planned in such a way as to facilitate the expansion of these activities.

The areas which will be of strategic importance in forging a link between industries and urban agglomerations are designated as "Development Areas," and six have been identified on the basis of population and geographic contiguity. Each development area has a central city designated as a Development Center.

As already mentioned, it is desirable that the above six Development Centers establish the following tiered relationship, from the viewpoint of overall development strategy for the Project Area as well as provision of public services.



The major development activities in the respective development areas and their urban centers can be summarized as follows.

The Aswan Area encompasses the Kurkur area and the area around the High Dam in addition to Aswan City. The City is to be the Regional Development Center and offer basic services to all branches of industry, distribution, and daily life, as well as services needed to support development activities within the Project Area. Its population growth will be at the highest level. The expected development in this Center will comprise various projects which can be grouped into the following three categories.

(i) Construction of a new town area (or areas) on the west bank mainly between the Old and High Dams

- A new town center (or centers) incorporating the major functions required by residents, such as education, health and medical care, administrative services, business and commerce, etc.
- Establishment of specialized ports for fisheries, goods traffic to and from the south and tourists
- Construction of industrial estates
- Construction of a tourism and hotel zone including the tourist port facilities to the west of the High Dam
- Construction of housing over a 15-year period

(ii) Extension and improvement of a transportation network centering in Aswan City

- A road system which connects the northern part of the country and the Project Area with a distribution center in the north of the City
- Construction of a new bridge across the Nile

(iii) Redevelopment of the existing built-up area of the City

- Renewal of the existing industrial zone and the downtown section of the City
- Improvements of the residential environment of the existing built-up area

In the Kalabsha and El Allaqi Areas, mining and agriculture will be the most important industries, and priority is to be given to mining development in particular. At Kalabsha, mining development will be directly followed by agricultural development, but mining development at El Allaqi will precede agriculture by about 5 years. The Development Center in the Kalabsha Area will come to function as an intermediate node for distribution, because the Aswan - Abu Simbel trunk road will be opened at an earlier date passing this area. The Development Center with a feeder port at El Allaqi will start as a gateway for bringing in equipment, supplies and materials needed for mining development, and later expand as a central city based on agriculture as well.

For the Tomas/Affia and Tushka Areas, agriculture will be the major economic activity. Provision of some infrastructure will accompany the construction of the Aswan - Abu Simbel trunk road

Table 11 Investment Schedule for Urban and Rural Community Development

Projects		Project Cost (£E mil.)	'82	'87	'92	'97
Aswan						
Aswan New Town		647		3/	4/	5/
City Renewal		*1/		6/	7/	8/
Rural Communities		2				
Abu Simbel						
New Town		19				
Rural Communities		14				
Kalabsha						
Urban Center		41				
Rural Communities		32				
El Allaqi						
Urban Center		13				
Rural Communities		9				
Tomas/Affia						
Urban Center		4				
Rural Communities		3				
Tushka						
Urban Center		10				
Rural Communities		8				
Total Costs	Urban	734		128	330	276
	Rural 2/	68		13	28	27

Notes:
1/ Unestimated.
2/ Excludes the costs of dwellings of those families who engage in upland and foreshore agriculture.
3/ Housing and new town center.
4/ Housing.
5/ Industrial estates, tourism districts, CBD and housing.
6/ Renewal of industrial areas.
7/ Improvement of environment in residential areas.
8/ Renewal of downtown area.

as it did with the Tushka Spillway and the central cities of the two Areas can and should utilize this for their own development.

The Abu Simbel Area will be developed primarily on the basis of its tourism resources, but its Central City will service agriculture in the outlying areas and lake fisheries and function as a gateway to the opposit shore (= Quastal/Adendan) of the lake and Wadi Halfa across the Sudan border. Development projects for this Development Center can be grouped into the following three:

(i) Improvement of tourist facilities in the vicinity of the Great Temples
(ii) Port and harbor improvement
(iii) Construction of the new town area

6. Regional Development Plan

The development of six Development Areas and their respective Development Centers will progress in accordance with the economic development and population growth as foreseen in the economic framework through the year 1997. Agricultural development will lead the overall community development program, but it is necessary to stage development activities in such a way as to achieve economy in infrastructural investment through effectively clustering related service facilities. The initial step is, for instance, to provide basic needs services to a small number of people already working in the Project Area but this is to be followed up by development of additional community facilities to be able to service increasing economic activities and population expected in the vicinity.

The basic steps for development can be stated as follows (see illustration on Table 12).

(A) Improvement of services for fishermen and Nubians living on the High Dam Lake shore

(B) Development of supportive facilities for the already existing industries, notably, fisheries, tourism and mining

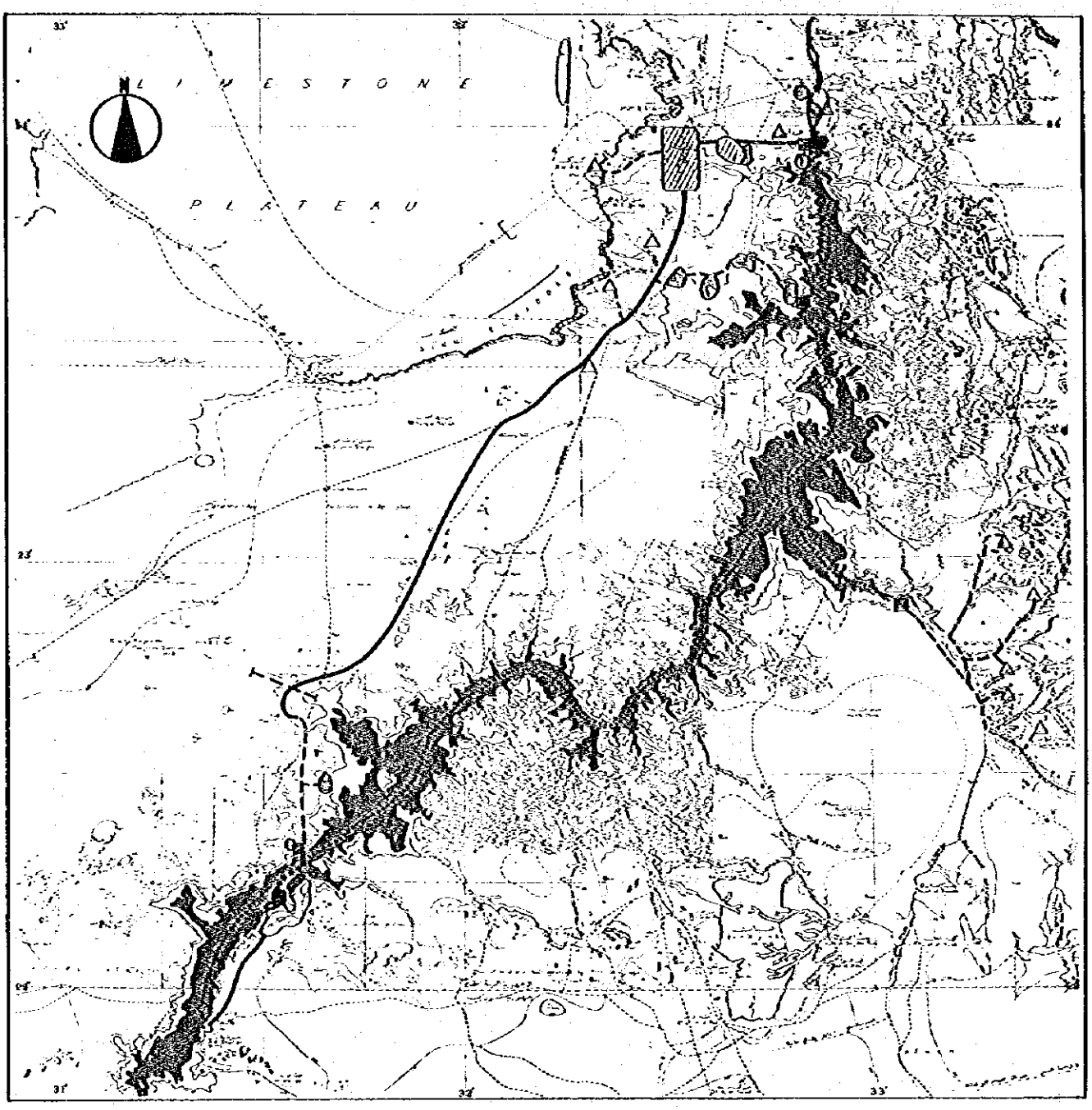
(C) Infrastructure development to improve accessibility to Development Areas, which is indispensable to initiate other sectoral development efforts

(D) Implementation of projects envisaged for productive sectors in the respective Development Areas

(E) Planning for greater and greater urban agglomerations as the implementation of sectoral projects start to yield in the way of agricultural products, fish hauls, mined ores, etc.

Table 12 A Model Illustrating the Steps for Development

Steps of Plan Implementation	Study Area					
	Aswan	Kalabsha	El Allaqi	Tomas/Affia	Tushka	Abu Simbel
Present Status	Population 190,000	A few scattered number of fishemen and Nubians			Spillway	Population 1,000
A. Urgent projects	Mobile medical care facilities	Improvement of jetties for clinic boats				
	Daily necessities service center	Improvement of fishermen's camps				
B. Projects to support existing industries	Fishery management center	Mining development	Mining development			Tourism development
	Tourism development	Agricultural experimental station				Agricultural experimental station
C. Basic infra-structure development projects	Aswan - Abu Simbel Road →				← Abu Simbel - Aswan Road	
	Aswan port facilities development ↓	East Road Navigation route development				
D. Agricultural development projects	Kurkur	Kalabsha Foreshore ⋮ Upland	El Allaqi Foreshore ⋮ Upland	Tomas/Affia Upland	Tushka Foreshore ⋮ Upland	Quastal/Adendan Foreshore ⋮ Upland
E. Urban and community development	Community development apace with development of foreshore agriculture and mining, etc. Establishment of development centers apace with development of upland agriculture.					



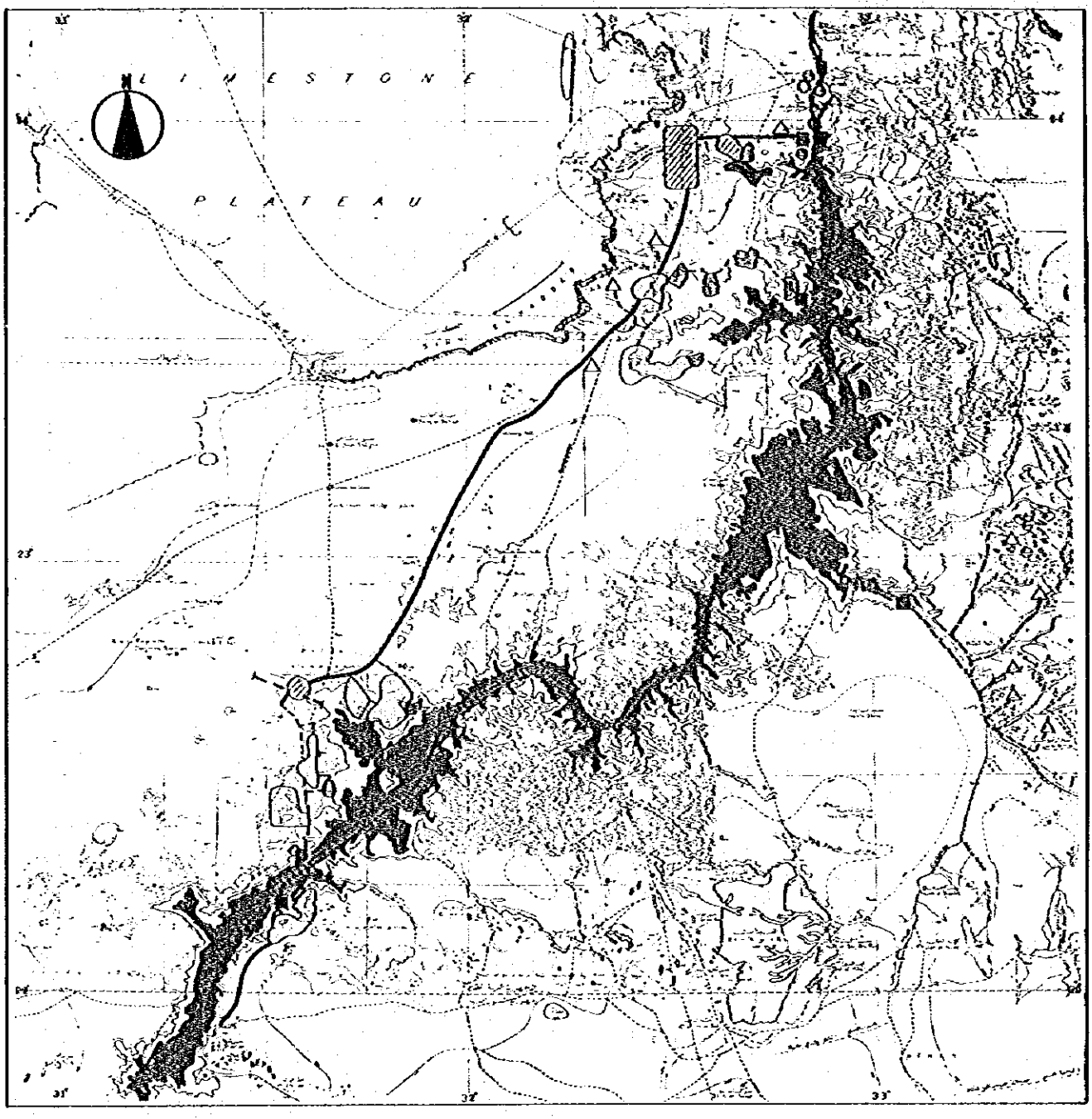
INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 14

Expected Development by 1987

0 10 20 30 40 50 60 70 80 90 100(km)

On-going Upland Foreshore	Agriculture
	Port facilities
△	Mines
	Tourism
	Trunk roads Feeder roads
	Tushka Spillway
	Navigation route ferry service



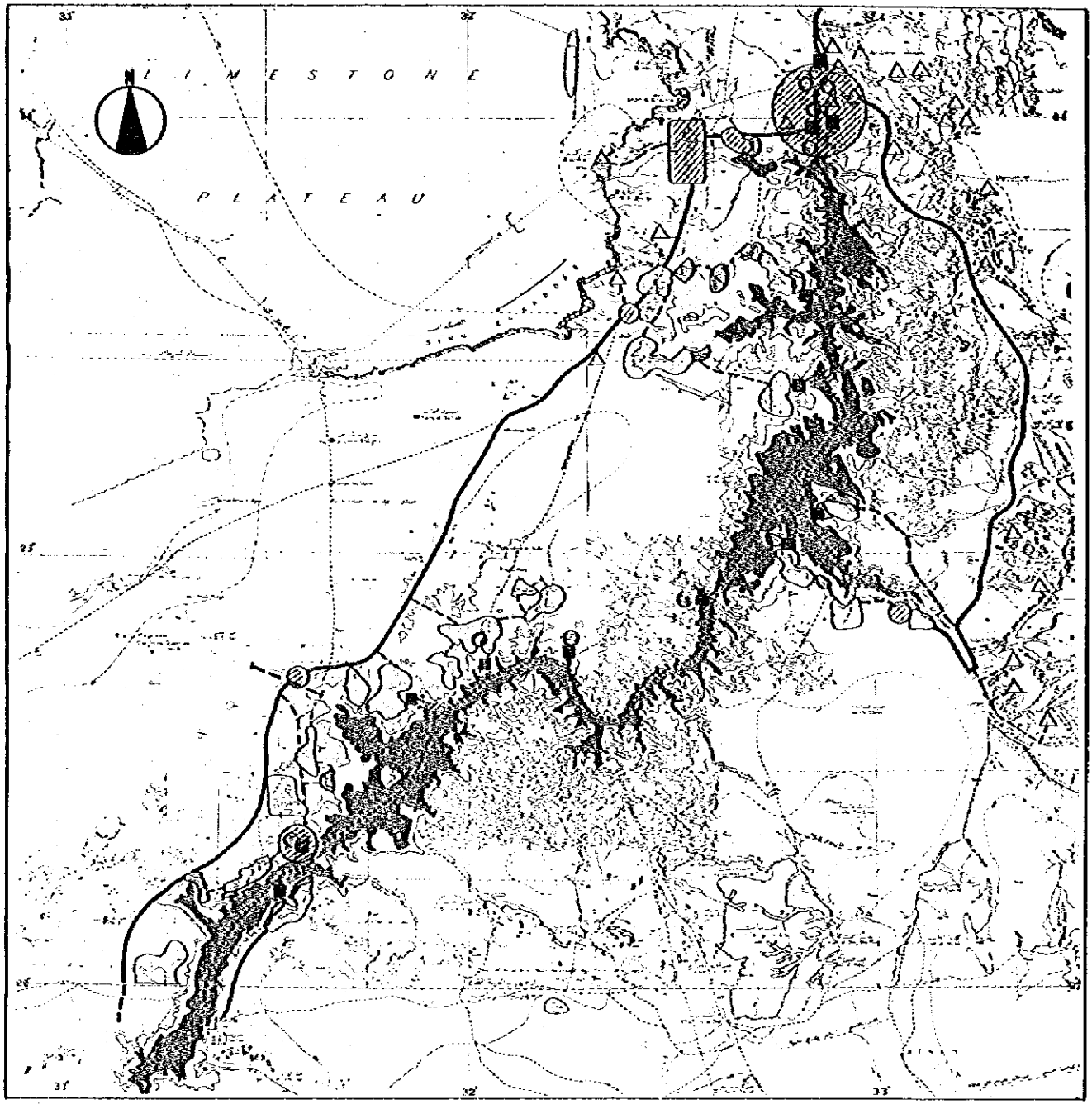
INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 15

Expected Development by 1992

0 10 20 30 40 50 60 70 80 90 100(km)

	Development centers
On-going Upland Foreshore	Agriculture
	Distribution centers & port facilities
	Fish culture
	Mines
	Tourism
	Trunk roads Feeder roads
	Navigation route Ferry service



INTEGRATED REGIONAL DEVELOPMENT PLAN OF THE HIGH DAM LAKE AREA

Figure 16

Expected Development by 2000

0 10 20 30 40 50 60 70 80 90 100(km)

	Development centers
	On-going Upland Foreshore } Agriculture
	Distribution centers & port facilities
	Fish culture
	Mining
	Tourism
	Trunk roads Feeder roads
	Navigation route Ferry service

Step A Projects: These projects have the purpose of providing and improving various services to fishermen and Nubians living in scattered locations on the shore of the lake. The headquarters should be established in Aswan City, probably in the New Town, to offer emergency rescues or regularly send clinic boats to the fishing camps. The fishing camps must be provided with permanent shelters and a few pilot settlement communities will be started first in areas with better accessibility to the City.

Step B Projects: These projects would involve promotion of fisheries through improving fishing techniques and instituting effective fishery management. Facilities for these purposes would be located in the new town area of Aswan City. In addition, mention must be made of improvement of tourist facilities in Aswan and Abu Simbel, and development of mining and associated infrastructure in Kurkur, Kalabsha and El Allaqi.

Steps C and D Projects: These would primarily comprise the Aswan - Abu Simbel trunk road on the western shore and the regular ferry service over the lake, the latter of which will service the rural communities on the shore envisaged as Step A projects. The construction of the trunk road will gradually extend from both ends, i.e. Aswan and Abu Simbel. Considering the mining of kaolin at Kalabsha and the completion of the on-going Tushka Spillway, the agricultural development in Kalabsha and Tushka can be also implemented as Step D projects in parallel with the trunk road.

Step E Projects: These projects would comprise the establishment of central cities in the respective Development Areas. With respect to Aswan City, development of housing in the new town area of Aswan City will have to proceed apace with the expansion and diversification of economic and social activities based in the City. With respect to other Development Centers in the Project Area, it will be appropriate that the development be implemented in accordance with the tempo of agricultural development, or in other words, settlement of farming population in the respective Development Areas which these central cities are expected to service.

The expected build-ups of the Project Area will progress during the three five-year periods as presented in Figures 14 through 16. The major development projects are listed up for the respective periods in Tables 13 through 15.

Table 13 Major Projects to be Implemented up to 1987

Sector	Project	Project Cost (£E mil.)	Location
Agriculture	1. Kurkur Land Development	133.6	Kurkur
	2. Kalabsha/Dakka Land Development	18.6	Kalabsha
	3. Tushka Land Development	3.2	Tushka
	4. Quastal/Adendan Land Development	19.2	Abu Simbel
	5. Abu Simbel Land Development	4.2	Abu Simbel
	6. Experimental Station	1.0	undecided
Fishery	1. Fishery Management Center	1.6	Aswan
	2. Improvement of Fish Storage	1.0	Aswan
	3. Improvement of West Harbor	1.2	Aswan
Mining and Manufacturing	1. Fish Processing	2.0	Aswan
	2. Ceramic Tiles	2.6	Aswan
	3. Ceramic Sanitary Ware	2.3	Aswan
	4. Clay Bricks	1.0	Aswan
	5. Cement	50.0	Aswan
	6. Calcium Carbonate	1.2	Aswan
	7. Shipbuilding and Repairs	4.0	Aswan
	8. Refractories	4.5	Aswan
	9. Asbestos-Cement Pipes	7.0	Aswan
	10. Steel Reinforcement Bars	27.0	Aswan
	11. Iron Foundry	1.3	Aswan
	12. Flour Mill	3.5	Aswan
	13. Plastic Containers	1.5	Aswan
	14. Aluminium Cooking Ware	1.3	Aswan
	15. Gold Ore	3.0	El Allaqi
Tourism	1. Hotel Constructions/Renovation	19.0	Aswan
	2. New Visitor Center	1.5	Aswan
	3. Hotel Constructions	8.8	Abu Simbel
	4. Nubian Folklore Village	3.0	Abu Simbel
Transportation	1. Aswan-Sudan Road (Phase I)	10.7	Aswan-Tushka
	2. El Shallal Bridge	3.5	Aswan
	3. Aswan East Port (Expansion)	2.5	Aswan
	4. Purchase of Vessels (Phase I)	7.5	Aswan
	5. Aswan-New Valley Road (Phase I)	1.5	Kurkur
	6. Kalabsha Feeder Road (Phase I)	3.3	Kalabsha
	7. Tushka Feeder Road	1.7	Tushka
	8. Abu Simbel Feeder Road (Phase I)	1.4	Abu Simbel
	9. Quastal-Wadi Halfa Road	2.8	Quastal
	10. El Allaqi Feeder Road (Phase I)	5.2	El Allaqi
Urban and Community Development	1. Aswan New Town	128.0	Aswan
	2. City Renewal	n.a.	Aswan
	3. Rural Communities	2.0	Aswan
	4. Secondary Schools	3.6	Aswan
	5. Rural Communities	6.0	Kalabsha
	6. Rural Communities	1.0	Tushka
	7. Rural Communities	4.0	Abu Simbel
Total		512.8	

Table 14 Major Projects to be Implemented from 1988 through 1992

Sector	Project	Project Cost (£E mil.)	Location
Agriculture	1. Kalabsha Land Development	46.1	Kalabsha
	2. Tushka Land Development	38.5	Tushka
	3. Abu Simbel Land Development	53.9	Abu Simbel
	4. El Allaqi Land Development	4.4	El Allaqi
	5. Experimental Station	1.0	undecided
Fishery	1. Fish Culture	n.a.	After F/S
Mining and Manufacturing	1. Slaughtering and Meat Processing	3.0	Aswan/ Kalabsha
	2. Animal Feedstuff	3.0	Aswan
	3. Iron Ore Upgrading	7.5	Aswan
	4. Ceramic Tableware	3.8	Aswan
	5. Porcelain Insulators	2.5	Aswan
	6. Glass Containers	4.0	Aswan
	7. Glass Tableware	1.5	Aswan
	8. Quicklime	3.0	Aswan
	9. Insecticides	6.5	Aswan
	10. Agricultural Machinery (Small Tractors)	4.8	Aswan
	11. Precast Concrete Products	1.0	Aswan
	12. Prefabricated Housing	4.0	Aswan
	13. Steel Wire Products	1.5	Aswan
	14. Tin Cans	2.3	Aswan
	15. Soft Drinks	1.4	Aswan
Tourism	1. Hotel Constructions	15.0	Aswan
	2. Floating Hotels	8.0	Aswan
	3. Hotel Construction	12.0	Abu Simbel
	4. Botanical Garden	2.0	Abu Simbel
Transportation	1. Aswan Berenice Road	18.0	Aswan
	2. Aswan East By-pass	2.8	Aswan
	3. Purchase of Vessels (Phase II)	10.0	Aswan
	4. Aswan Airport (Expansion)	2.5	Aswan
	5. Kalabsha Feeder Road (Phase II)	3.6	Kalabsha
	6. Aswan-Sudan Road (Phase II)	5.5	Tushka-Sudan
	7. Abu Simbel Feeder Road (Phase II)	2.8	Abu Simbel
Urban and Community Development	1. Aswan New Town	260.0	Aswan
	2. City Renewal	n.a.	Aswan
	3. Secondary Schools	3.3	Aswan
	4. Higher Technical Institute	1.5	Aswan
	5. Urban Center	41.0	Kalabsha
	6. Rural Communities	13.0	Kalabsha
	7. Secondary schools	1.9	Kalabsha
	8. District Center Hospital	7.0	Kalabsha
	9. Urban Center	10.0	Tushka
	10. Rural Communities	7.0	Tushka
	11. Sub-district Center Hospital	3.5	Tushka
	12. Abu Simbel New Town	19.0	Abu Simbel
	13. Rural Communities	7.0	Abu Simbel
	14. District Center Hospital	7.0	Abu Simbel
	15. Rural Communities	1.0	El Allaqi
Total		654.6	

Table 15 Major Projects to be Implemented from 1993 through 2000

Sector	Project	Project Cost (LE mil.)	Location
Agriculture	1. Dakka Land Development	54.9	Dakka
	2. Tomas/Affia Land Development	27.8	Tomas/Affia
	3. Ballana Land Development	17.4	Ballana
	4. Abu Simbel Land Development	3.4	Abu Simbel
	5. El Allaqi Land Development	40.5	El Allaqi
Mining and Manufacturing	1. Cane Sugar	10.5	Aswan
	2. Ferro-alloys	18.0	Aswan
	3. Nitrogeneous Fertilizers	60.0	Aswan
	4. Aluminium Metal	120.0	Aswan
	5. Copper Metals	35.0	Aswan
	6. Copper Ore	35.0	El Allaqi
	7. Chromium Ore	15.0	El Allaqi
Tourism	1. Hotel Constructions	20.7	Aswan
	2. Hotel Construction	12.0	Abu Simbel
Transportation	1. Aswan New Town Road	1.2	Aswan
	2. Aswan-New Valley Road (Phase II)	15.3	Kurkur-New Valley
	3. Tomas/Affia Feeder Road	6.1	Tomas/Affia
	4. New Abu Simbel Airport	6.0	Abu Simbel
	5. Aswan-El Allaqi Road	9.3	El Allaqi
	6. El Allaqi Feeder Road (Phase II)	3.0	El Allaqi
Urban and Community Development	1. Aswan New Town	259.0	Aswan
	2. City Renewal	n.a.	Aswan
	3. Secondary Schools	4.8	Aswan
	4. Rural Communities	13.0	Kalabsha
	5. Secondary School	1.2	Kalabsha
	6. Urban Center	4.0	Tomas/Affia
	7. Rural Communities	3.0	Tomas/Affia
	8. Sub-district Center Hospital	3.5	Tomas/Affia
	9. Rural Communities	3.0	Abu Simbel
	10. Urban Center	13.0	El Allaqi
	11. Rural Communities	8.0	El Allaqi
	12. Sub-district Center Hospital	3.5	El Allaqi
Total		827.1	

7. Recommendations

The regional development plan formulated for Aswan City and the rest of the High Dam Lake area is based on the realization, derived from the major national objective, that the attainment of maximum possible population absorption in the Project Area will help reduce the continuing population pressure in the northern part of Egypt and thereby ensure more desirable redistribution of population relative to regional resource endowments. The plan has incorporated the available data and surveys on resource potentials in the Project Area and presents, given the limited availability of basic data, the general orientation and the boldly assumed largest possible scale of development.

Although a considerable number of studies have been conducted over the Project Area, there are as yet many fields where the availability of information is far from satisfying a minimum requirement for planning. The Study Team therefore prepared this regional development plan with the uncertainty in the basic assumptions predicated by the inadequate data base over and above the uncertainty inherent in any type of planning for the future. In order to overcome the elements of uncertainty unavoidably contained in this plan, it is necessary to carry out research for those matters yet to be adequately covered, and to establish suitable institutional arrangements to support such research.

Regarding agriculture in particular, there are many matters to be studied and ascertained, such as the identification of new crops and varieties and methods of cultivation suitable to the local conditions, improvement of irrigation water management, introduction of effective pest and disease control, and so forth. It is urgently needed to establish an agricultural experiment station which can deal with these matters. With regard to fisheries, the accumulation and analysis of basic data on fishery resources in the lake are prerequisite for determining the maximum sustainable scale of development, and in order to do this, the establishment of a Fishery Management Center would be the first step. Other sectors similarly have their data shortcomings, and it is thought important that efforts should be concentrated on research, experimentation and pilot projects in the coming several years in order to establish a foundation on which to base future development programs.

There are a number of invariable constraints on development in the Project Area, such as the limited availability of water from the Nile, inadequate soil capability, and meteorological conditions. Furthermore, with the exception of Aswan City, the Area has received virtually no attention thus far with regard to

development. Under these circumstances, it is presumed that the public sector will and should shoulder the massive investment required for infrastructural and other sectoral development and thereby lay the foundation to attract people into the Project Area. In the largely uninhabited Project Area, it is extremely difficult to have an individual project satisfy the minimum requirement for economic viability on its own. It is vital to maximize the efficiency and benefit of development efforts by identifying packages of projects in accordance with the degree of locational agglomeration of resource endowments and with the technical and economic possibility of forward and backward linkages within and among sectors. Furthermore, in order to facilitate the active private-sector participation in the regional development, it will be indispensable to create a favorable environment for prospective investors, by providing such fiscal and financial incentives as tax exemption, concessionary loans, etc.

It has to be pointed out that there exist a number of conditions which are favorable for the development in the Project Area. First, there is one primary growth center in the form of Aswan City with a sizable agglomeration of population and industries. This city with a current population of 200,000 will play an integral role in servicing and stimulating the future development both in the already inhabited areas and the areas to be newly settled. The Project Area, with Aswan City at its center, traditionally has been an important node on the transnational route between the Mediterranean and, via the Nile, the Sudan. The importance of the Area will be more enhanced, when east-west routes are opened in the foreseeable future to connect Aswan with the Red Sea to the east and the southern part of the New Valley to the west.

With regard to the productive sectors, lake fisheries and tourism in Aswan and Abu Simbel have already achieved substantial scale of operation. Although the future prospects of fisheries depend in good part on the expected accumulation and analysis of data necessary for stock assessment, High Dam Lake has a substantially large productive capacity and its fishery production could be raised near the level of 150 kg per hectare attained elsewhere in the world, provided, of course, that all of the necessary measures are implemented to secure this maximum sustainable yield. Concerning tourism, the Projec Area is endowed with a substantial number of assets, notably the world-renowned Temples of Abu Simbel and others which have been saved through the international efforts led by UNESCO and Egyptian Government.

Some of the basic conditions necessary for initiating the development in the Project Area have already been prepared or are being prepared by various ministries and government agencies.

These attempts are no doubt a valuable contribution toward the national objective of balanced regional development and better utilization of the country's land area.

In order to facilitate the realization of the ultimate objective at which the on-going efforts are directed, the Study Team is of the opinion that the following measures should be assigned priority of earlier implementation in the Project Area.

(1) Establishment of a Fishery Management Center

(2) Establishment of an Agricultural Experiment Station

(3) A pilot project for community development at Kalabsha, consisting of 140 housing units for a population of 700 and foreshore agricultural development with a total area of 560 feddans

(4) Acquisition of equipment necessary to proceed with soil surveys on the lakeshore

(5) Acquisition of equipment necessary for iced-water storage of fish hauls

(6) Expansion and improvement of the West Harbor at High Dam Lake as a specialized fishing port

(7) Implementation of a feasibility study for the establishment of a cement plant (capacity of 300,000 tons/year)

(8) Creation of a "Visitors Center" for the improvement of tourism services

(9) Construction of additional hotel-rooms of international class at Aswan

(10) Construction of an Aswan-Berenice road

(11) Stepped-up construction of the road linking Aswan and the Sudan border via Abu Simbel

(12) Acquisition of radio equipment, a helicopter and a speed boat to provide emergency services to the fishing camps on the lakeshore

(13) Acquisition of three clinic boats for the fishing and agricultural communities along the lakeshore

(14) Formulation of the urban development plan for Aswan City

APPENDIX

THE STUDY ORGANIZATION

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A.1 The Study Team

Koichi AKI	Project Manager
Noriyoshi NAGAMATSU	Deputy Project Manager/Tourism Specialist
Koichi KANEKO	Land Use and Urban Planning Specialist
Hiroko SATO	Human Resource Specialist
Tsuneaki YOSHIDA	Water Resource Specialist
Takanobu NISHIYA	Water Resource Specialist
Shuichi SATO	Irrigation Specialist
Mitsuo TANOUE	Crop Specialist
Naohiko TODA	Agricultural Economist
Minoru NOMURA	Fishery Specialist
Kazuo TANAKA	Fishery Specialist
Atsushi KOIKE	Fishery Specialist
Yoshiyuki HAMADA	Fishery Specialist
Kyusuke ITO	Fishery Specialist
Masayoshi SATA	Mining Engineer
Tan HASHIDA	Industry Specialist
Tetsuo WAKUI	Transportation Specialist
Tomoo OSHIMA	Public Health Specialist
Toshiyuki OTSUKI	Economy and Finance Specialist
Tetsuo YAMADA	Regional Economist
Hirohisa SAITO	Financial Analyst

A.2 The Egyptian Counterpart Team

Soliman Abd El HAY	Chairman, Advisory Committee, Ministry of Development and New Communities
Mohamed A.G. ELMASRY	Chief Counterpart, Ministry of Development and New Communities
Wasim BAHR	Land Reclamation Specialist, Ministry of Development and New Communities
Mahmoud Ali EL GINDY	Agriculture Specialist, High Dam Lake Development Authority
Safwat GHATAS	Fishery Specialist, High Dam Lake Development Authority
Yehya DESSOUKI	Social Planner, General Organization for Physical Planning

A.3 Associated Egyptian Experts

Yousef AMIN	Ministry of Land Reclamation
Abdel Rahman el BISHRY	Ministry of Development and New Communities
S. El DEMERDASHE	The Desert Institute
Ali Fahmi EL KASHEF	Ministry of Development and New Communities
Ezzat ELMASRY	Ministry of Tourism
Helmy FARAG	Ministry of Planning
Michel FOUAD	General Organization for Physical Planning
Reda El GARHY	Ministry of Development and New Communities
Fawzi HELWA	High Dam Authority
M. A. ISMAIL	Ministry of Development and New Communities

A. F. Abdel LATIF	The Academy of Scientific Research and Technology
Mikhart MAHAROUS	High Dam Lake Development Authority
Abd Rashid MANSOUR	Ministry of Development and New Communities
M. MEKKAWY	Regional Planning of Aswan
Almotaz B. MOBARAK	Ministry of Health
Mustafa MOMEN	High Dam Lake Development Authority
Rafik El NAGGAR	Ministry of Development and New Communities
El-Almedi Abd El RAOUF	Ministry of Land Reclamation
Abd Latif RASHWAN	High Dam Lake Development Authority
M. A. Abdel SALAM	The Desert Institute
Salah Abd el WAHAB	Ministry of Development and New Communities
Moustafa ZEITOUN	Ministry of Tourism

A.4 The Japanese Advisory Committee

Kanji ENDO	Chairman of the Japanese Supervisory Committee, Japan International Cooperation Agency
Yoshinosuke YASOSHIMA	University of Tokyo
Minoru NOMURA	Tokyo University of Fisheries
Takeichiro KAFUKU	Overseas Fishery Cooperation Foundation
Kunio TORIYAMA	Ministry of Agriculture, Forestry and Fisheries
Yoshihisa ITO	Ministry of Agriculture, Forestry and Fisheries
Susumu ISHIDA	The Economic Research Institute for the Middle East

A.5 Counterpart Organizations

Ministry of Development and New Communities
- Advisory Committee
- Research and Studies Organization
- High Dam Lake Development Authority

A.6 Cooperating Organizations

(Cairo)

Ministry of Planning
Ministry of Irrigation
Ministry of Land Reclamation
Ministry of Agriculture
Ministry of Tourism
Ministry of Transport
Ministry of Public Health
Ministry of Supply
Ministry of Education
Ministry of Manpower
Ministry of Industry
Ministry of Energy
General Organization for Physical Planning
Institute of National Planning
The Desert Institute
Central Agency for Public Mobilization and Statistics
Academy of Scientific Research and Technology
Tippetts-Abbett-McCarthy-Stratton

(Aswan)

Aswan Governorate Office
Regional Planning of Aswan
The High Dam Authority
Aswan City Council
Abu Simbel City Council