

### 3) Soil Salinity

Soil salinity in the two areas are very different in each soil family ranges from very low to high saline values. Thus, they are classified into four classes as reference to the salinity maps. There are some interesting phenomena between soil families and soil salinity classes.

### 4) Land Capability Classification

Since Wahby Downstream Area and South Area of Lake Qarun are cultivated land, the land is classified as a capability of present condition according to the categories described before in the paragraph of Land Capability Classification for North Wahby and Com Osheem areas.

The land capability in Wahby Downstream Area is classified as type II. And that in South Area of Lake Qarun is classified as type III, IV and IV/V shown in Land Classification Map.

#### 3.2.5. Seismology

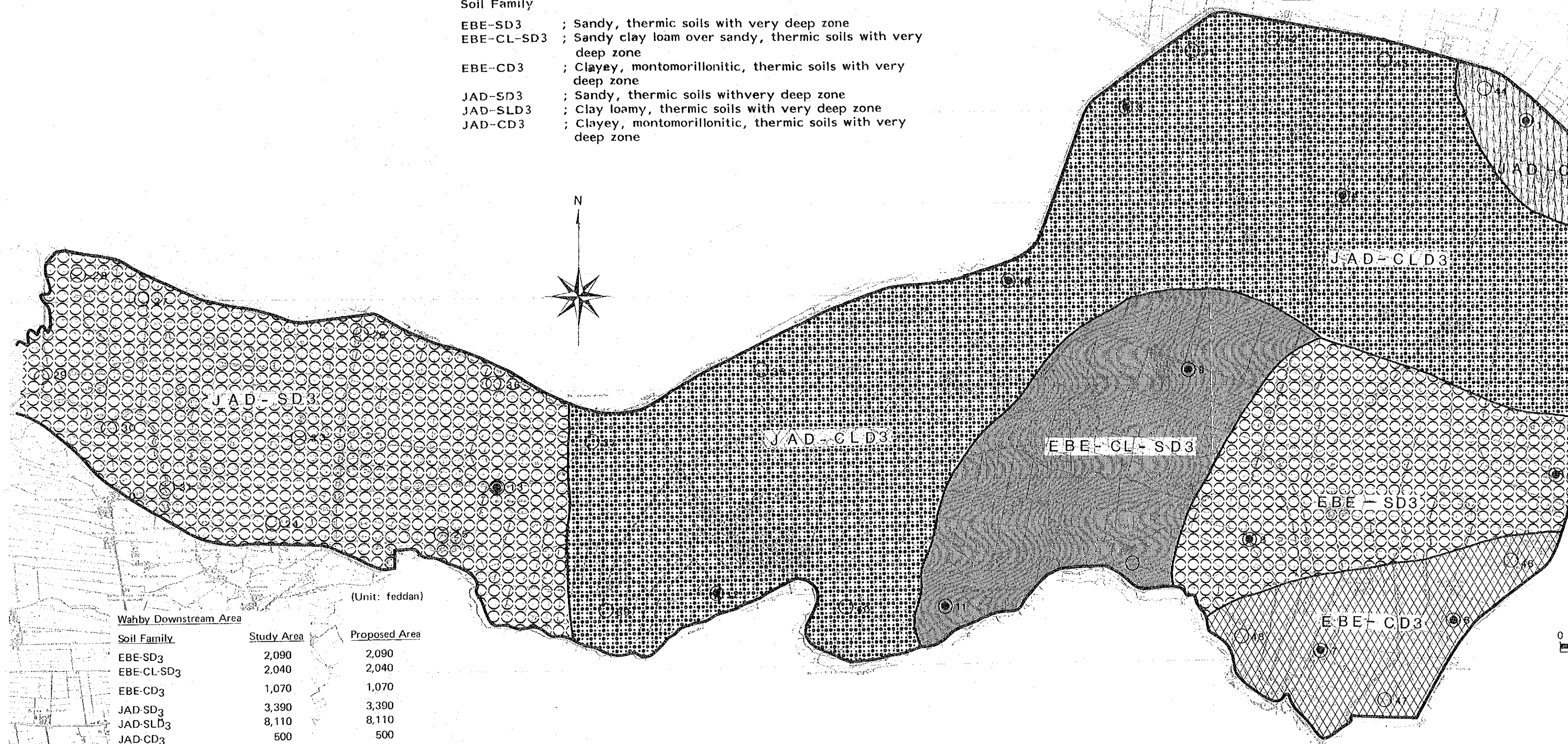
There are some historical records on earthquake in the ancient time. However, earthquake rarely takes place in Fayoum in recent years. Since the Project Area is located on the stable masses, the area belongs to a quiet area on seismology. For the design of irrigation systems, MOI, Fayoum does not take into consideration earthquake.

Under the situations, from economic point of view, no earthquake is considered in the design for the Project.

# SOIL

## LEGEND

- Small Auger
  - ⊙ Open Pit
- Soil Family
- EBE-SD3 ; Sandy, thermic soils with very deep zone
  - EBE-CL-SD3 ; Sandy clay loam over sandy, thermic soils with very deep zone
  - EBE-CD3 ; Clayey, montomorillonitic, thermic soils with very deep zone
  - JAD-SD3 ; Sandy, thermic soils with very deep zone
  - JAD-SLD3 ; Clay loamy, thermic soils with very deep zone
  - JAD-CD3 ; Clayey, montomorillonitic, thermic soils with very deep zone





(Unit: feddan)

Soil Family	Study Area	Proposed Area
EBE-SD3	2,090	2,090
EBE-CL-SD3	2,040	2,040
EBE-CD3	1,070	1,070
JAD-SD3	3,390	3,390
JAD-SLD3	8,110	8,110
JAD-CD3	500	500
<b>Total</b>	<b>17,200</b>	<b>17,200</b>

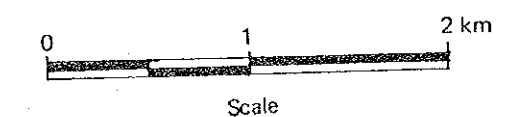
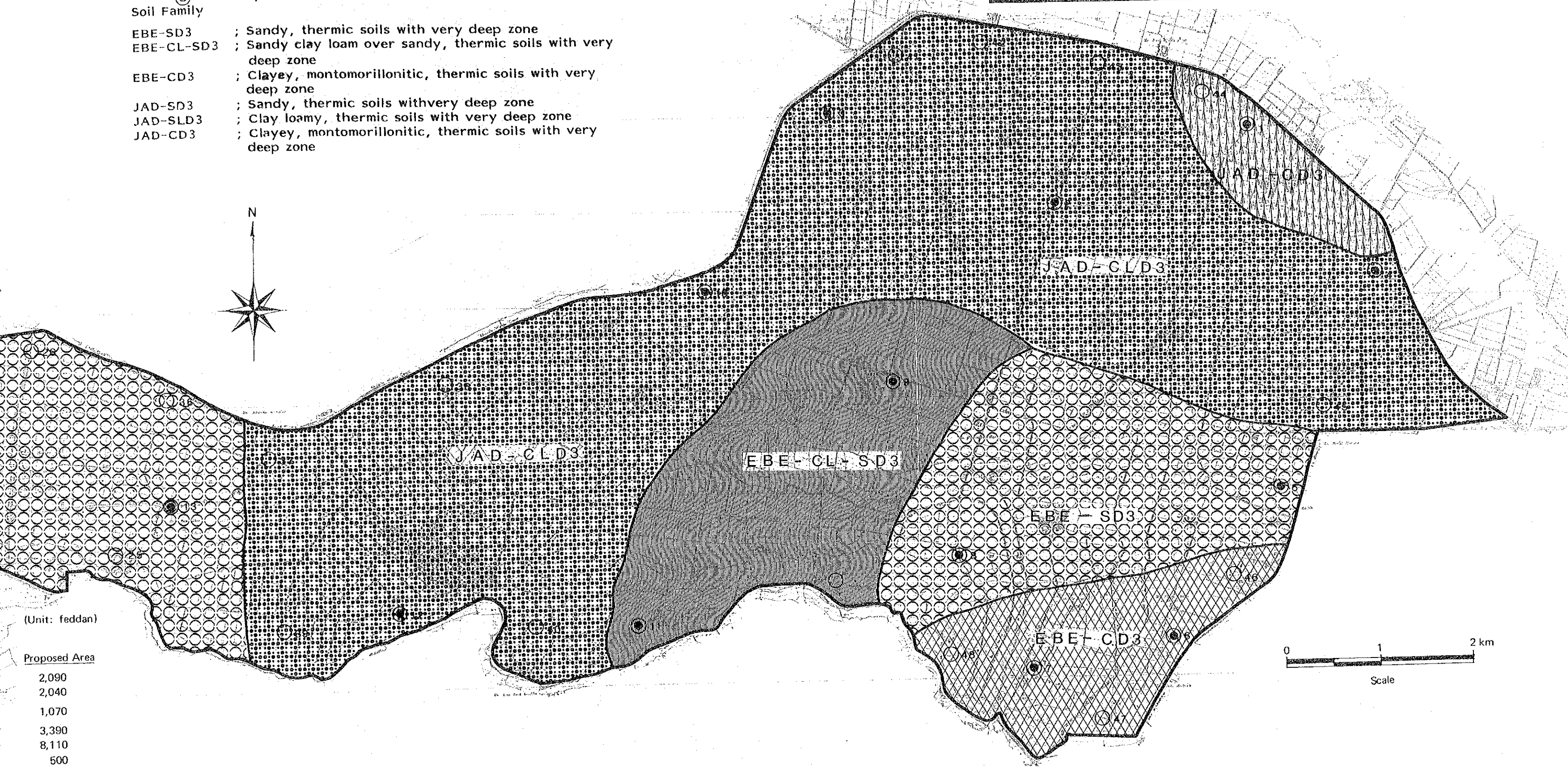
# SOIL MAP

**LEGEND**

-  Small Auger
-  Open Pit

Soil Family

- EBE-SD3 ; Sandy, thermic soils with very deep zone
- EBE-CL-SD3 ; Sandy clay loam over sandy, thermic soils with very deep zone
- EBE-CD3 ; Clayey, montomorillonitic, thermic soils with very deep zone
- JAD-SD3 ; Sandy, thermic soils with very deep zone
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(Unit: feddan)

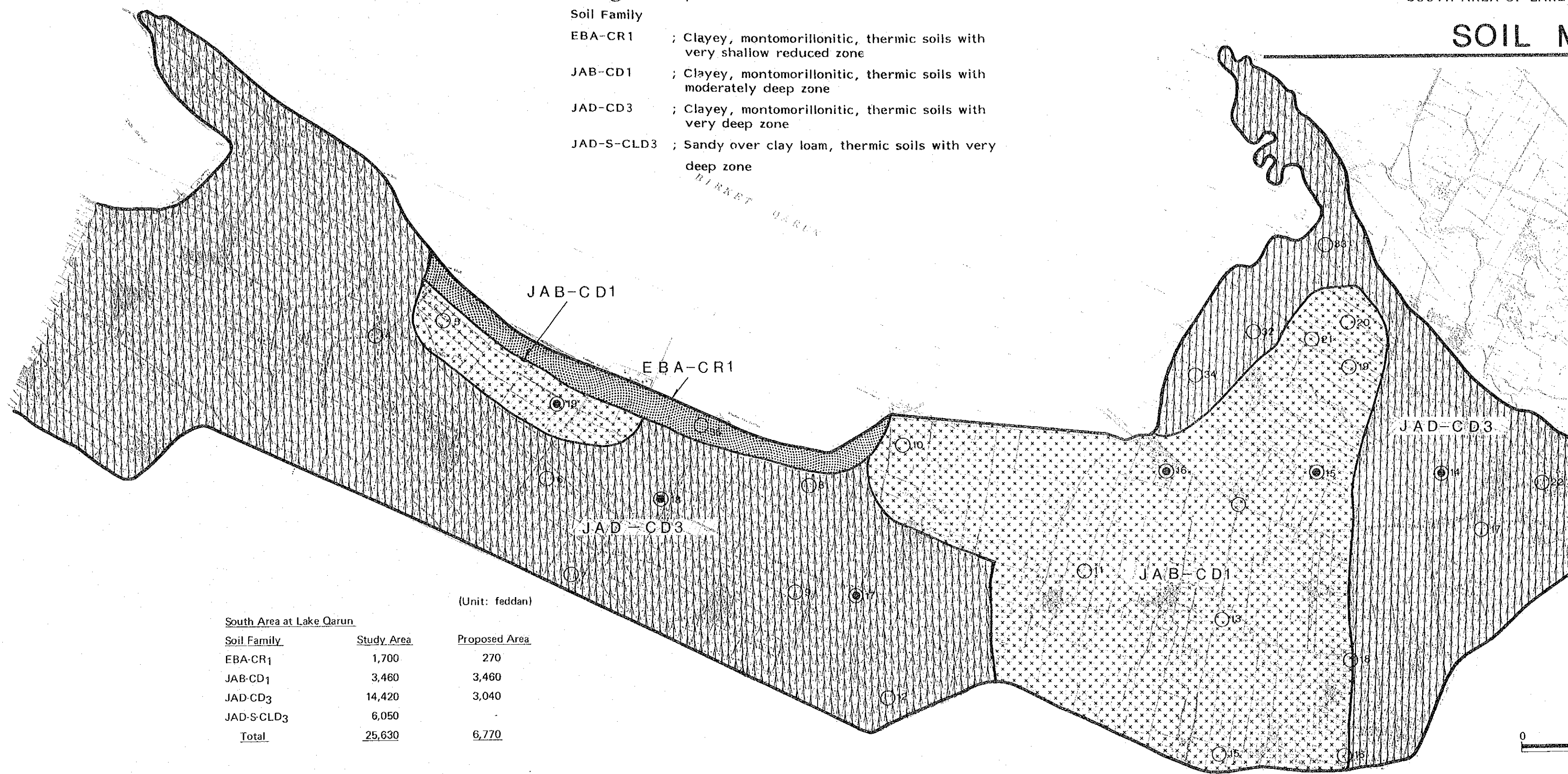
Proposed Area
2,090
2,040
1,070
3,390
8,110
500
17,200

SOIL M

LEGEND

- ---- Small Auger
- ---- Open Pit

- Soil Family
- EBA-CR1 ; Clayey, montomorillonitic, thermic soils with very shallow reduced zone
  - JAB-CD1 ; Clayey, montomorillonitic, thermic soils with moderately deep zone
  - JAD-CD3 ; Clayey, montomorillonitic, thermic soils with very deep zone
  - JAD-S-CLD3 ; Sandy over clay loam, thermic soils with very deep zone



(Unit: feddan)

Soil Family	Study Area	Proposed Area
EBA-CR1	1,700	270
JAB-CD1	3,460	3,460
JAD-CD3	14,420	3,040
JAD-S-CLD3	6,050	
<u>Total</u>	<u>25,630</u>	<u>6,770</u>

FAYOUM AGRICULTURAL DEVELOPMENT PROJECT  
SOUTH AREA OF LAKE QARUN ( 1 )

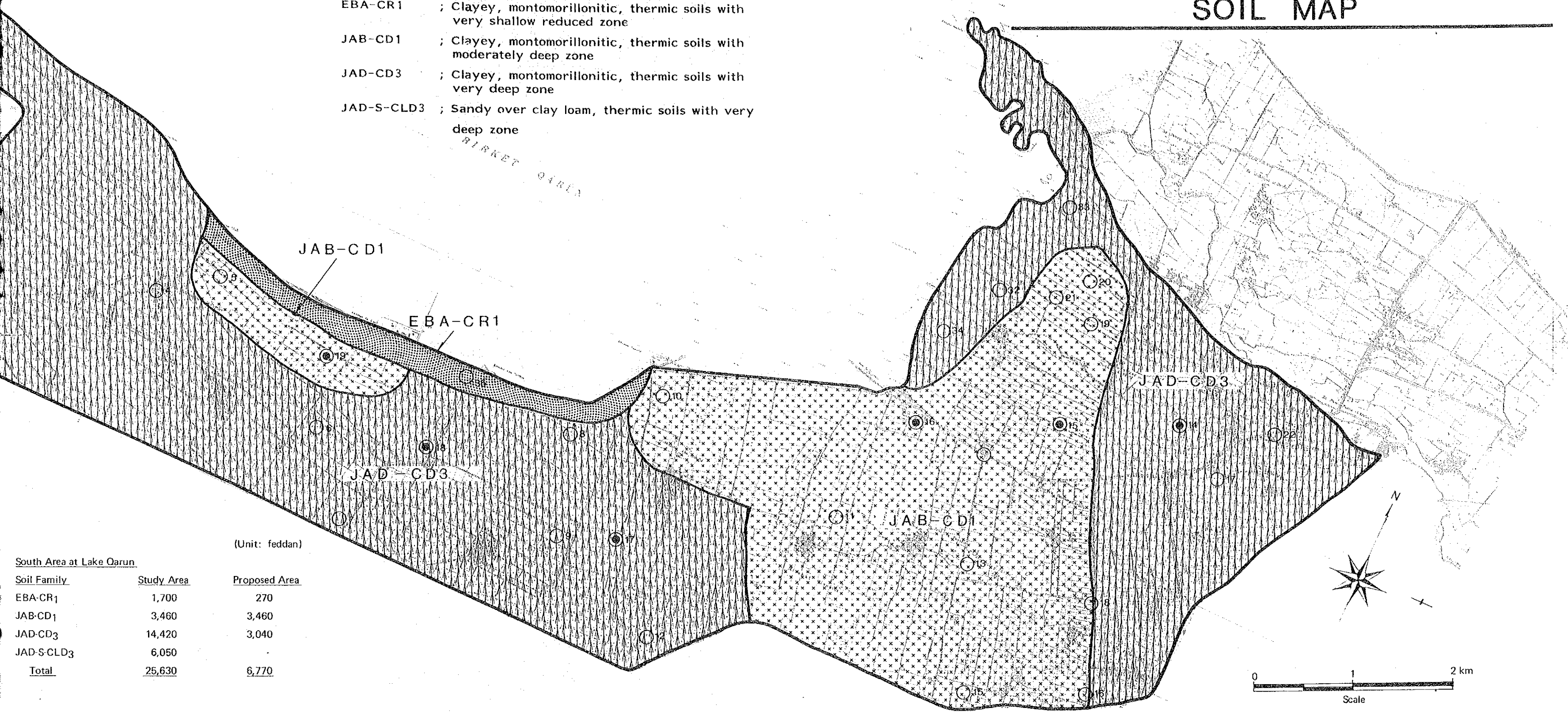
SOIL MAP

LEGEND

- ----- Small Auger
- ⊙ ----- Open Pit

Soil Family

- EBA-CR1 ; Clayey, montomorillonitic, thermic soils with very shallow reduced zone
- JAB-CD1 ; Clayey, montomorillonitic, thermic soils with moderately deep zone
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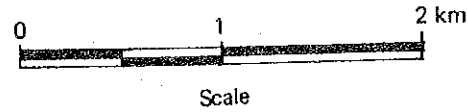
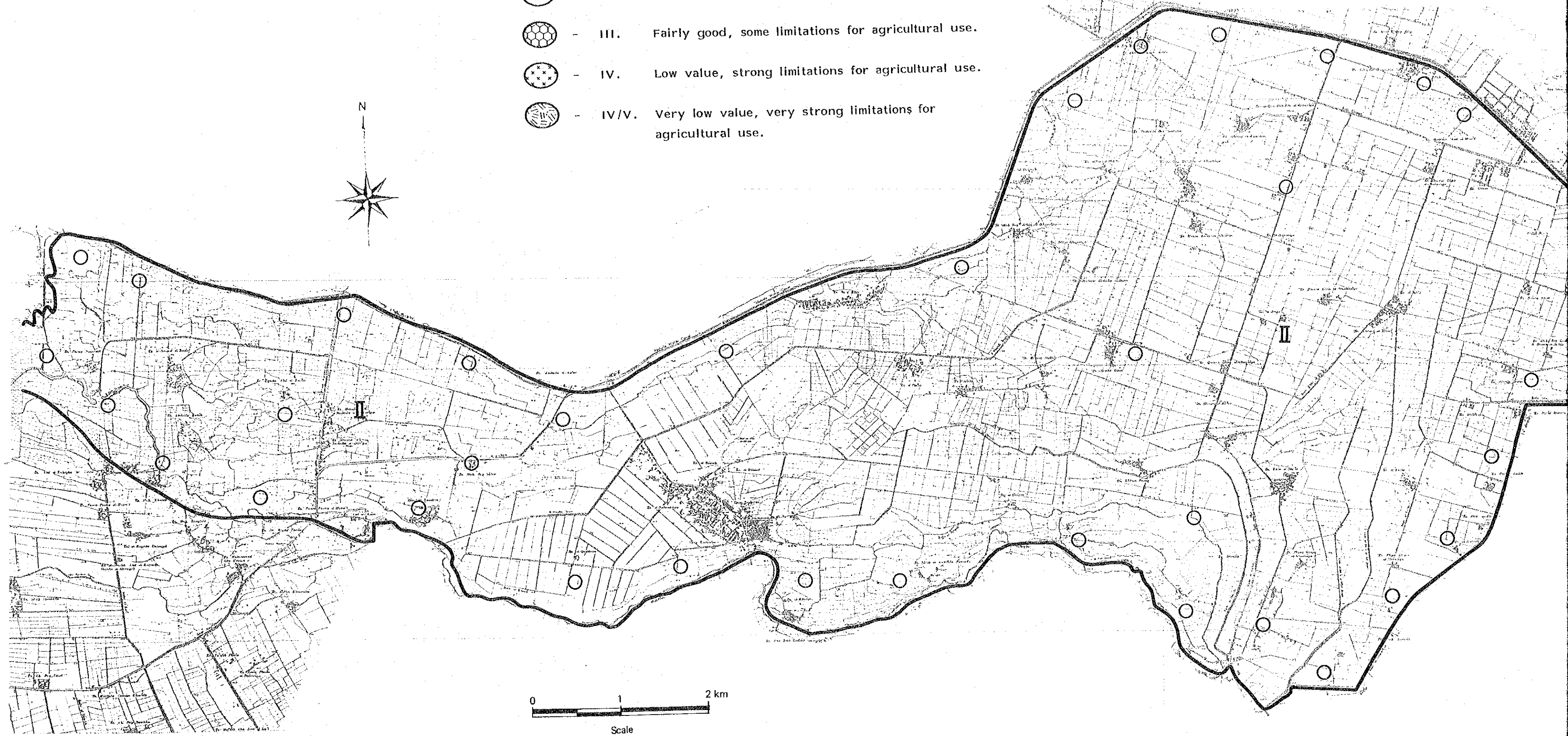
(Unit: feddan)

South Area at Lake Qarun		
Soil Family	Study Area	Proposed Area
EBA-CR1	1,700	270
JAB-CD1	3,460	3,460
JAD-CD3	14,420	3,040
JAD-S-CLD3	6,050	-
<b>Total</b>	<b>25,630</b>	<b>6,770</b>

# LAND CLASSIFICATION

## LEGEND

Symbol	Land Class
○	II. Good, no important limitations for agricultural use.
⊗	III. Fairly good, some limitations for agricultural use.
⊙	IV. Low value, strong limitations for agricultural use.
⊘	IV/V. Very low value, very strong limitations for agricultural use.



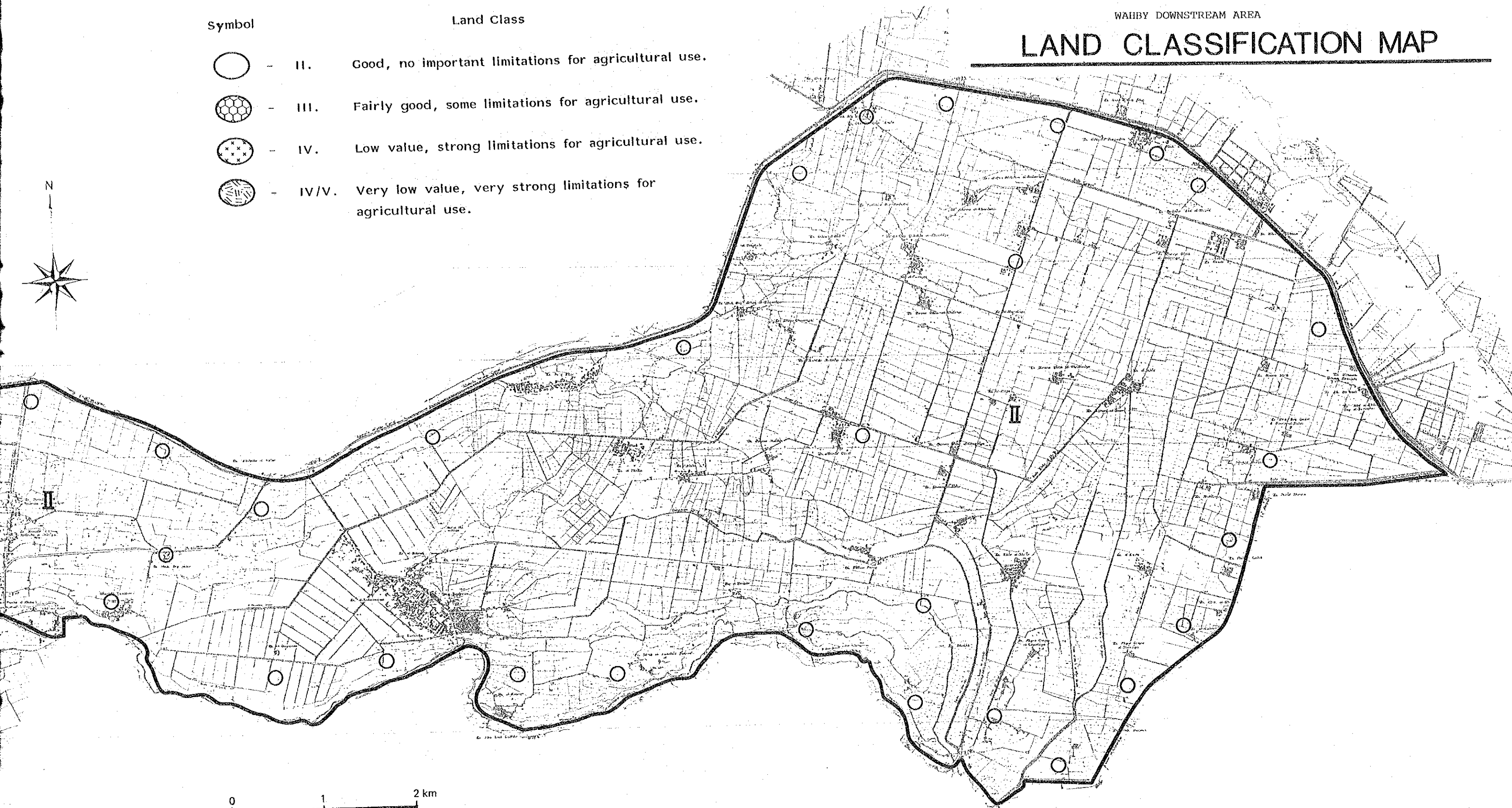
LEGEND

Symbol	Land Class
○	II. Good, no important limitations for agricultural use.
⊗	III. Fairly good, some limitations for agricultural use.
⊕	IV. Low value, strong limitations for agricultural use.
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FAYOUM AGRICULTURAL DEVELOPMENT PROJECT

WAHBY DOWNSTREAM AREA

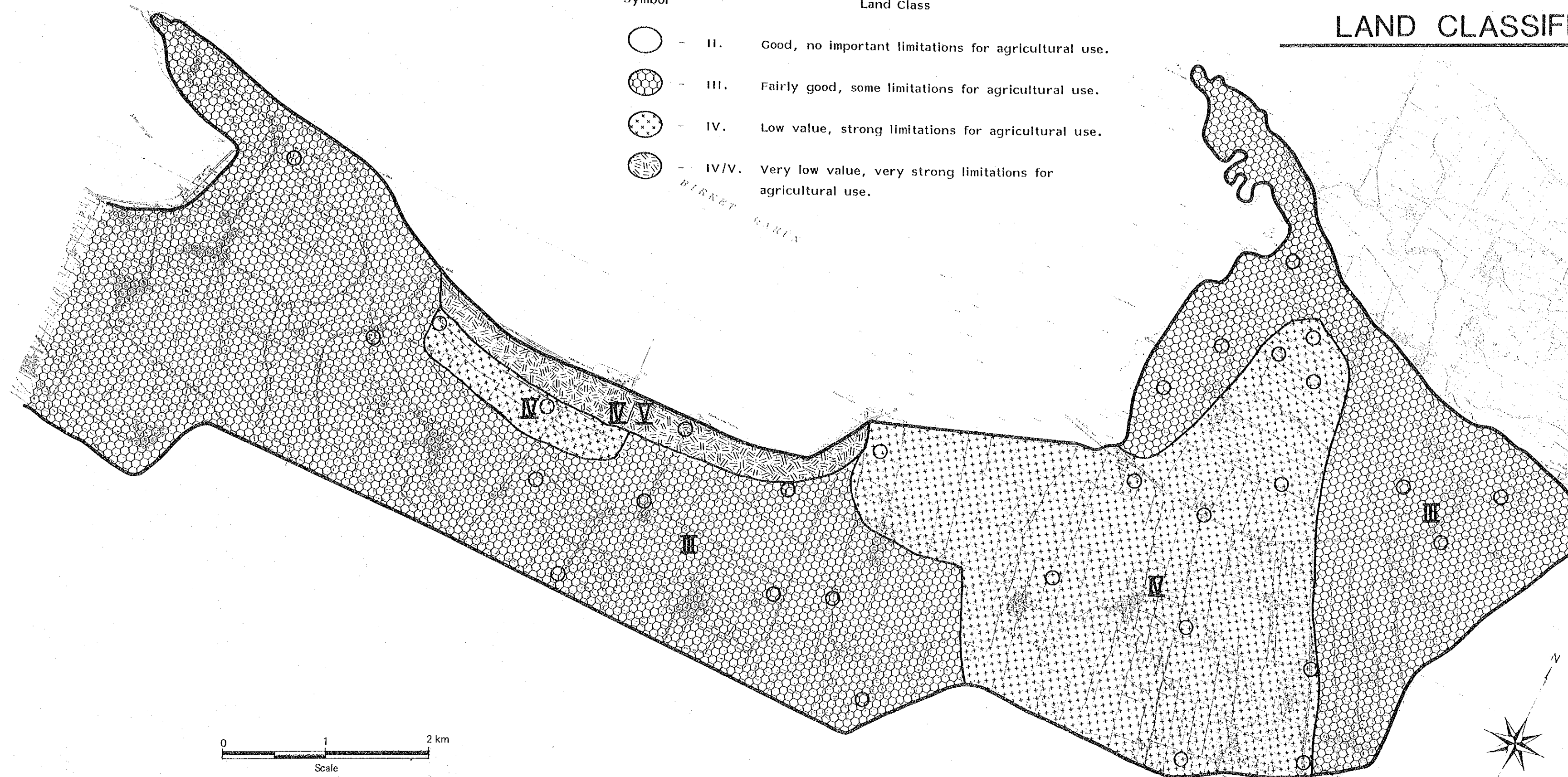
LAND CLASSIFICATION MAP



# LAND CLASSIFI

## LEGEND

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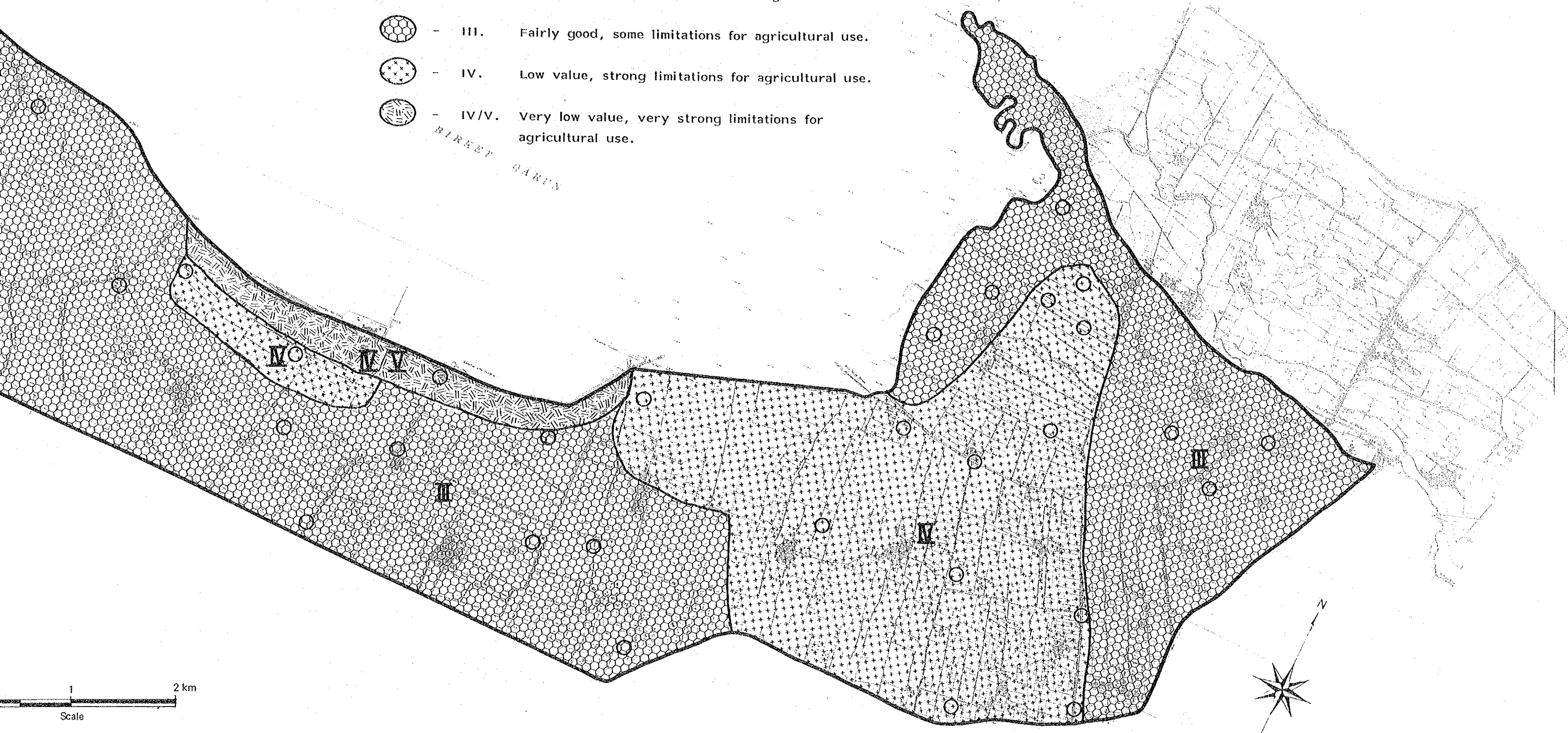




# LAND CLASSIFICATION MAP

## LEGEND

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### 3.3. Present Agriculture

#### 3.3.1. Land Use and Land Tenure

The average holding land per farm household is 1.6 feddan in Egypt and 2.8 feddan in Fayoum Governorate. The 87 percent of the total farm households have cultivated land of less than five feddan in the Governorate. Farm households consist of land owner and tenant farmer. Landless farm labors are important labor source.

North Wahby and Com Osheem areas are desert lands. A part of their lands is developed in recent years.

Wahby Downstream Area and South Area of Lake Qarun are cultivated areas. The farm size on average by village basis as village units are 7.3 feddan in the former area and 4.1 feddan in the latter area. However, there is a fair-sized fallow land because of shortage of irrigation and leaching water, or seasonal inundation.

#### 3.3.2. Agricultural Practices

Most of the farmers in the Project Area keep cattle, mainly cows and buffaloes, and a few sheep, donkeys and camels. Because of the poor conditions concerning irrigation water, there is a fair-sized amount of fallow land and rotational cultivation has not been introduced.

Nili crops are widely cultivated. Main crops are forage crops and winter vegetables. Tractors of 65 horse-powers are mainly used for farming. For disease protection, hand-sprayers, dusters or sprayers of 600 liters are used. Wheat shall be harvested by thresher machines.

### 3.3.3. Crops

Because of the poor water supply, there is a fair-sized land for Nili crops which is about 18 percent of the cultivated land.

Cotton is mainly cultivated in large area in Fayoum Governorate. However, such area are decreasing in size and this is the same tendency throughout Egypt. Main crops in the Fayoum Area are berseem, wheat, barley, tomatoes and beans as winter crops, cotton, maize, millet, sesame as summer crops, and maize as Nili crops. There is a mixed fruit cultivation area with olives, grapes, dates, lemon, mangoes and guavas, these are situated in the area where the groundwater level is relatively low.

### 3.3.4. Commodities Necessary for Agricultural Production

Superior varieties of vegetables and cotton have been popularized in the Fayoum area. Fertilizer and agricultural chemicals are used in accordance with the promotion basis on an extension service. Especially, disease protection is carried out for tomatoes by farmers themselves. Aerial application by a helicopter is carried out for cotton, maize, Nili crops and winter season tomatoes.

### 3.3.5. Marketing Structure

#### (1) Marketing Institution

The main marketing institutions on quota crops such as cotton, rice, onion, beans, and sesame are the village banks and the governmental trading company. The village banks which are the agents of the governmental company are located usually together with the local agricultural cooperatives. Farmers send their products to collective points. The village banks make advance and final payments for crop production and input materials to farmers. The

governmental trading company plays a role of dealers. The specialized marketing cooperative society for field crops in Fayoum Governorate level has membership of eleven multipurpose local cooperatives in village level. This specialized cooperative helps membership on purchasing of input used in their production.

Non-quota crops such as vegetables, fruits, fodder crops, meat and milk, etc., are marketed by private dealers. These products are transported to local markets or to Cairo by private dealers. There are two central wholesale markets belonging to Fayoum Governorate. One of the two was established in 1972 and 58 dealers belong to this wholesale market. Vegetables and fruits are sent to retail markets in Fayoum from these two wholesale markets.

Cattle is sent to 12 slaughterhouses by butchers and breeders. Baladi milk and buffalo milk produced by general farmers is processed by farmers themselves or some of milk is collected by middleman. Large scale dairy farms market the products to factories in Cairo. The marketing channel of lamb is the same as that of cattle cow. Eggs are marketed to private shops or public stores through middleman.

## (2) Marketing Facilities

Agricultural cooperatives in village level have the storages of fertilizers. A wide yard is available at collection points of village bank. Some collection points are uncovered and fenced. A large quantity of fertilizer bags are stored at the uncovered yards. The governmental trading company belongs to quota crop sector and the dealers in non-quota sector send their trucks to collect the products from village points or farm fields. The dealers use small crates to load vegetables and fruits. The wholesale market of vegetables and fruits has storages belonging to the membership dealers.

### (3) Marketing Quantity

A part of quota crops produced by farmers are purchased by the Bank for Development and Agricultural Credit, Fayoum. In 1982, the Bank purchased the products of 100 percent of cotton, six percent of wheat, 52 percent of rice, 55 percent of beans, 69 percent of sesame, and five percent of groundnuts yielded in Fayoum. It is considered that approximately 15 percent of quota crops production is sent to the outside of Fayoum Governorate. Raw cotton with seed are sent to the four cotton gin factories located in the Governorate. Wheat and rice produced in Fayoum are short for the consumption in Fayoum. Hence, a part of them is imported for supplement.

The major non-quota crops are fodder crops, vegetables, and fruits. The fodder crops consists of berseem for winter and maize, millet and sorghum for summer. In 1982, about 2.1 million tons of berseem and about 1.4 million ardabs of maize, millet and sorghum are fed to about 198,000 head of cattle, buffalo and other livestock in Fayoum.

One of the wholesale markets in Fayoum City collect about 50 to 60 percent of vegetables, especially, watermelon, tomato and cucumber produced in Fayoum. A part of tomato and watermelon are sometimes imported from the other governorates during summer season. Among the fruits, 50 percent of orange, ten percent of mango and ten percent of grapes are marketed at the wholesale markets mentioned above. About 80 percent of tomato collected by the wholesale market is sent to Cairo.

### 3.3.6. Agricultural Research and Extension

#### (1) Agricultural Research and Education

In the Tamiah district, there is a branch station which belongs to Agricultural Research Center in Giza. This branch station produces the fruits seedlings and gathers the seeds of crops. The results of these practice are extended to the whole country through the extension organization of the Ministry of Agriculture. Seedlings and seeds are parcelled to the whole country through MOA on the commercial base. There is Faculty of Agriculture, Cairo University located in Fayoum City and two agriculture schools in Fayoum Governorate for educating the youth who will be engaged in agriculture.

#### (2) Extension Services

Organization of the extension services in Egypt is well established through the Country, Governorates, Districts and villages. In villages, agricultural supervisors, in charge of all the extension services for the area of more than 500 feddan, are assigned.

### 3.3.7. Agricultural Cooperatives and Credit

#### (1) Agricultural Cooperatives

There exist 158 agricultural cooperatives in Fayoum. The membership farmers are 110,930 persons. Hence, one cooperative is organized by 702 farmers on an average and Tamiah district has 21 cooperatives with 1,255 memberships. These cooperatives consist of the multipurpose local society organized in village level, the specialized cooperatives for livestock and mechanization in village level and governorate level, the multipurpose joint society in district level and one governorate multipurpose cooperative society.

The specialized marketing cooperative society for vegetables and fruits is organized in governorate level. The membership of this marketing cooperative is the multipurpose local society in village level. (refer to Table D7-1 in Appendix D)

The functions of the multipurpose cooperatives of village level are the management of crop rotation under the control of the national plan, village production plan inclusive of livestock, bee, agro-industries, land reclamation, fisheries, etc., common marketing of products, promotion of credit, enlargement of farm mechanization and training, etc. (refer to Law 122, 1980)

At present, the main marketing institution in quota crop sector, that is, cotton, rice, onions, beans, and sesame consists of the Bank for Development and Agricultural Credit in Fayoum, village banks, and governmental trading company.

According to the field survey, the Menshat agricultural cooperative was established in 1958. The membership farmers are 1,446 persons. The total cultivated area is about 3,110 feddan. The main function is to supply farm materials such as fertilizers, chemicals and seeds. This cooperative deals about 20,000 tons of them per year. The cooperative has one big tractor and four sprayers sized 600 liters.

Fayoum specialized marketing cooperative for vegetables and fruits was established in 1964. The members are 63 multipurpose local cooperatives. The main functions of it are; i) to secure loans for cultivation of tomato and sweet melon; ii) to supply seeds of all vegetables excluding fruits; iii) to supply sprayers with or without motor and chemicals; and iv) to supply paper for leaf. In 1983 this cooperative handled ten tons of seeds, two tons of chemicals, 1.5 tons of sulphate, and loan of LE 0.5 million for tomato and melon. This cooperative has a project to establish a grading station of tomato for export.



## (2) Agricultural Credit

The main source of agricultural credit in Fayoum is BDAC, Fayoum. BDAC, Fayoum is one of the 17 subsidiary banks at governorate level of the Principal Bank for Development and Agricultural Credit (PBDAC). El Fayoum BDAC has five branches at district level and 41 village banks. One village bank is located in the multipurpose local cooperatives' building. One village bank serves about 3.8 villages.

The role of village banks is to supply agricultural inputs, to market certain agricultural products, and to provide members of farmer with loan. El Fayoum BDAC purchased the following inputs and outputs in 1983. (refer to Table D7-2 in Appendix D)

Inputs (1983)	Fertilizers:	183,516 tons
	Chemicals:	320 tons
	Seeds:	50,205 tons
Outputs (1982)	Cotton:	197,056 kantar
	Onion:	26,545 tons
	Beans:	96,674 ardab
	Rice:	19,414 tons
	Wheat:	40,054 tons
	Sesame:	13,116 ardab
	Groundnuts:	105 ardab

The loans are divided into three types of short, medium and long terms. The short-term loans are divided into that for cultivating and that for investment. Table D7-3 in Appendix D shows the loaning conditions. Table D7-4 in Appendix D shows the credit condition for the settled farmer. The distribution of agricultural loans to Tamiah district in 1982 was LE 2.5 million in 233 cases. (refer to Table D7-5 in Appendix D) The total amount of loan reached about LE 10.6 million in 1982. The objectives of loans are as follows;

Short term loan	:	Fattening cattle, and purifying drains
Medium term loan (personal and cooperative)	:	Breeding female cattle, establishment of pens, breeding poultry and poultry houses
Long term loan	:	Poultry houses

### 3.3.8. Farmers' Organization

Land owners in cultivation and tenant farmers are qualified to participate in the agricultural cooperative. The total membership farmers in 158 agricultural cooperatives is composed of 110,930 persons. Since the land owners in cultivation are considered having a membership, it is said that farmers rely on the activities of agricultural cooperatives.

The field survey at Rashuwan agricultural cooperative revealed that fee of LE 0.35 per feddan is collected for the management of this cooperative. In general, the agricultural cooperatives do not take part in the operation and maintenance of terminal irrigation facilities.

However, it was also found in the field survey at several small villages that terminal irrigation and drainage facilities are maintained by farmers' groups themselves. In Ez Mansour Ali of Minshat Tantawi, ten to 12 farmers organize on farmers' association to maintain irrigation canals of about two kilometers in length. They pay four to five Egyptian pound for labor cost of about 30 man laborers. In some small villages of Mazatley, several farmers purchase small pumps with fuel engine for common use, and pump up irrigation water from the drainage canals in summer season.

In Ez El Yunan of Rashuwan which suffers most severely from the shortage of irrigation water in summer, some farmers maintain their terminal canals together with their neighbors.

Farmers in Ez El Faraqsa of Fanous pay five Egyptian pound per feddan as maintenance fee of small irrigation canals and LE 35 per feddan for drainage canals.

### 3.3.9. Fishery

#### (1) Fishing Ground

Fishing grounds in the Fayoum Governorate are Lake Qarun and Lake Rayan located at inland. Water surface area of both lakes are about 230 square kilometers for Lake Qarun and about 150 square kilometers for Lake Rayan.

#### (2) Fishery Production and Species

Fishery production in both lakes in 1982/83 are 1,933 tons for Lake Qarun and 175 tons for Lake Rayan. About 90 percent of the fish production in the Fayoum Governorate come from Lake Qarun.

It is considered that more than 15 species of fish inhabit in Lake Qarun, especially Bouilty (Telapia) has highest production occupying 72 percent of the total production.

#### (3) Fishing Port

No large ports are observed in the both lakes. There are eleven ports along the south coast of Lake Qarun and one port in Lake Rayan. There are 550 boats in Lake Qarun and 30 boats in Lake Rayan, but most of them have no engines.

#### (4) Marketing

In 1981, 2,046 tons of fish are produced in the Governorate, of which 77 percent is distributed in the Governorate and the rest is transported to the outside of the Governorate. For transportation of fishes small amount of ice are used.

#### (5) Stocking Fries

In order to keep fishery resources a few species of fry are released to both lakes from January to May in every year. Fries are supplied from the Mediterranean coast areas such Alexandria, Port Said and so on.

#### (6) Water Qualities

Salt concentration in Lake Qarun is about three percent which has been increased year by year and fluctuated with seasons at the rate of 3.8 percent in summer and 2.9 percent in winter. In Lake Rayan, salt concentration is low at the rate of 1.9 percent and PH is 8.27 and fresh-water fishes such as Shilan, Lobais, Qarmout are inhabited.

### 3.4. Animal Farming

#### 3.4.1. Number of Animals

Number of livestock in the Fayoum Governorate in 1983 is 192,000 head of cows, 63,000 head of buffalo and 122,000 head of sheep and goats. Baladi cows of local variety, friesian and brown swiss are included in cow group, but the majority of cow is baladi which have increased since 1979 at an annual average rate of 9.7 percent. As for the number of buffalo some fluctuations are observed and annual increase rate in the same period have been stagnant in the recent years. Number of sheep and goats has been increased steadily by 8.9 percent annually (refer to Table E1-1 in Appendix E).

In Wahby Downstream Area and South area of Lake Qarun, 2,695 head of buffalo, and 16,156 head of cow, 6,625 head of sheep and goats and 598,630 chicken are bred in 1982. Majority of cattle is occupied by cow (detail is given in Table E1-2 in Appendix E).

There are no available data on the number of draft cattle but it is estimated that about five percent of total number of cattle are used for draft. Comparing with another area the draft cattle in the Fayoum Governorate are not abundant due to an increase of agricultural machineries in the recent years.

#### 3.4.2. Number of Slaughtered Animals

There are 12 slaughterhouses in the Fayoum Governorate which are operated for four days in a week, of which one day is for cooperatives. According to the data since 1978, more than 20,000 head of animals have annually been slaughtered in the Governorate.

The majority of slaughtered animals are occupied by male cows and veals (refer to Tables G2-1 and G2-2 in Appendix E).

Possibility of slaughtering in Egypt is ruled in the law as follows. Only the animals compatible with this law can be slaughtered.

Cow	female	more than five years old
	male	more than two years old or more than 300 kg of body weight
Buffalo	female	more than five years
	male	no limitation in age and body weight

No data is available as regards to the slaughtered animals in the Wahby downstream area and South area of Lake Qarun. According to the Governorate-wise data, 6.6 percent of livestock is annually slaughtered in Fayoum Governorate. Applying this figure for the estimation, about 1,680 head of livestock are estimated as a slaughtered animals in the both areas in 1982.

#### 3.4.3. Performance of Animals

As a rule, performance for milk production of baladi cows and buffalo is lower than that of exotic cows owing to long calving interval and short lactation period. But fat content of buffalo milk is highest among them at six to seven percent. Average annual milk production by varieties is 1,200 kilograms for buffalo and 650 kilograms for baladi cows. Average live body weight is 350 kilograms for baladi cow, 450 kilograms for buffalo and 530 kilograms for friesian.

Generally, buffalo and baladi cows are bred in the ordinary farmers and exotic cattle such as friesian and brown swiss are kept in the large scale farm such as animal breeding cooperatives. Detailed performance of each animal is shown in Table E1-5 in Appendix E.

#### 3.4.4. Animal Feeds

Main feed in winter season is berseem (Egyptian Clover) which occupies 47 percent of the winter cropping area in 1980/81 in the Governorate. By-products like wheat straw are also utilized. In the large-scale farm such as animal breeding cooperatives which has many cow and buffalo, more concentrates are offered in order to save labor for feeding.

In summer season, maize, sorghum, wheat straw, and some concentrates are fed. In the field, the stubble grazing by sheep and goats are often observed.

#### 3.4.5. Production of Animal Products in the Existing Area

As aforesaid, there are no data available to estimate the animal products in Wahby downstream area and South Area of Lake Qarun. One method for this purpose is to estimate by applying the Governorate-wise data on the number of cattle by age and the number of slaughtered animals.

##### (1) Milk Production

According to the structure of herd by age and by sex, 66 percent of female buffalo is more than two years old, and 68 percent of baladi cow and 65 percent of cross are belonging to the same growing stage. The estimation of milk production would be made taking into consideration the effective calving rate. (refer to Tables E1-3 and E1-4 in Appendix E)

* Female Buffalo (more than 2 years)	$1,560 \times 0.55 \times 1,200 = 1,030$ tons
* Female Baladi (more than 2 years)	$6,060 \times 0.55 \times 650 = 2,166$ tons
* Female Cross (more than 2 years)	$830 \times 0.85 \times 3,800 = 2,681$ tons
<u>Total</u>	<u>5,877 tons</u>

## (2) Meat Production

As mentioned above, it is estimated that about 1,680 head of livestock were slaughtered in Wahby Downstream Area and South Area of Lake Qarun in 1982. According to the statistics of the Veterinary Department, about 80 percent is occupied by cattle, and the rest is by sheep and goats. Meat production in both areas is estimated as follows;

Beef: 1,345 head x 350 kg x 0.52 = 245 tons

Lamb: 335 head x 50 kg x 0.50 = 8 tons

### 3.4.6. Animal Husbandry in Farm Economy

Every farm household have some animals for milk and meat and egg production, for transportation, and for cultivation. Baladi cow is bred mainly for farm operation and meat production, while buffalo is for milk production. In Wahby Downstream area and South Area of Lake Qarun, many farm households who grow some baladi cow for fattening are often observed. Generally, they buy stock cattle for fattening at animal market. The age and body weight on an average of the stock cattle are six months and 150 to 200 kilograms, respectively. Farmers raise them for six months, and sell them to butchers or to middle-men at a price of LE 2.20 per kilogram of live body weight. Farmers get about LE 770 as a gross income from one head of fattened baladi cattle. As a general practice, bull calves of buffalo are sold for meat in six weeks age and the income of LE 100 to LE 120 per head can be expected.

Buffalo produces milk of about 1,200 kilograms during a lactation period of 150 to 200 days. The farm-gate price of milk varies with the fat ratio and the average unit price is LE 0.30 per kilogram for cow milk and LE 0.40 for buffalo. In the Project Area, there is a big farm growing 1,200 head of friesian and 1,200 head of fattening cattle. Daily milk production is eleven tons. Milk is



transported to Cairo for processing in the Misr company for Milk and Food.

Farmers who have surplus green fodders sell them to local market at a price of LE 0.05 per bundle of sorghum and LE 0.02 for berseem. Sometimes green fodders are dealt between farmers and dealers with the unit of feddan at a price of LE 145 to 160 per feddan.

### 3.5. Irrigation, Drainage and On-farm Conditions

#### 3.5.1. Irrigation Conditions

Because of the arid climate, agriculture cannot exist in Fayoum without irrigation. The sole irrigation water source is the Nile water. Water is sent to Fayoum through Bahr Yusef, the main canal running from Dyrout barrage of Ibrahimia canal, which is located some 300 kilometers south of Cairo. Ibrahimia canal itself is fed from the Nile river at Assiout barrage about 360 kilometers south of Cairo. Bahr Yusef canal takes a zigzag course of about 276 kilometers until it reaches Fayoum depression through Hawara Gap where Lahon regulator is operated. From the immediately upstream and downstream of Lahon regulator on Bahr Yusef, the three canals of Hawaret Adlan, Bahr Hassan Wassef, and El Agouz extend to irrigate 1,448 feddan, 116,466 feddan, and 1,260 feddan, respectively, in the western side of cultivated land in Fayoum. Particularly, Bahr Hassan Wassef is a big canal, and it feeds the two main canals of Gharag and Nazla at El Nazia intake. After diverting water to the above-mentioned canals for the western area of Fayoum, Bahr Wahby branched off at Hawara regulator, which is located some eight kilometers downstream of Lahon regulator, and serves an area of about 71,000 feddan (29,800 ha) in the eastern area of Fayoum. Bahr Yusef flows until it reaches the city of Fayoum. At the downstream end of Bahr Yusef in Fayoum city, six canals branch off to serve farm lands in the middle part of Fayoum.

Bahr Wahby runs along the eastern boundary of Fayoum depression. After changing its course to west, Bahr Wahby flows along the northern part of Tamiah district which adjoins North Wahby area, part of the Project Area. Several canals branch off at the upstream reaches of the diversion point of Gomhouria canal which serves the southern Com Osheem area, also part of the Project Area to be reclaimed.

The canal system is designed based on a water duty of 30 cubic meters per feddan per day. Irrigation in Fayoum is of gravity system. Gravity irrigation is hardly seen in this country, and is practicable in Fayoum since it has a comparatively steep topographic slopes of about 1:500 on an average from the hilly eastern mouth of Fayoum depression to Lake Qarun in the west.

Water levels of canals are controlled by cross weirs of a perfect overflow type, and kept higher than farm lands irrigated through vents. The vents are off-takes or turnouts located at the head of distribution network of on-farm. The crest of vents controlled by one weir has the same design. However, the width of vent weirs is determined to allow a discharge required to irrigate their service areas. The designed discharge is based on successive 24 hours, seven days a week operation.

The irrigation Department in Fayoum is responsible for the operation and maintenance of irrigation systems under the supervision of Director General of Irrigation and two Inspectors of Irrigation. Each Inspector is responsible for an area of about 180,000 feddan. He is assisted by one senior or junior irrigation engineer assigned to one irrigation district. The irrigation engineer has his office at the main town of the district, and is helped by some technical and administrative staff in carrying out his duties. It is deemed that the number of staff for operation and maintenance of the irrigation system is very small, and that this organization should be improved by upgrading the system facilities and also by encouraging farmers concerned in participating in cooperative activities so as to create public spirit on the utilization of limited water resources.

Aside from the above-mentioned improvement of irrigation system, Fayoum Governorate is making great efforts to increase the total irrigation efficiency by way of re-use of drainage water. In this method, drainage water with salinity contents would be mixed

with fresh water of Nile for providing a suitable water quality for irrigation. It would make new water resources necessary in expanding the irrigation area in the new reclamation area of North Wahby and Com Osheem.

### 3.5.2. Drainage Conditions

Two main drains of Wadi and Batts drains and 12 small drains dispose drainage water to Lake Qarun. Part of discharge in Wadi drain is diverted to Wadi El Rayan through the open channel and a tunnel constructed in 1974. Wadi drain serves an area of about 175,000 feddan, Batts drain serves about 152,000 feddan, and 12 small drains serves about 38,000 feddan.

Lake Qarun is a closed basin of about 60,000 feddan (252 sq.km) in size, and has a storage capacity of about 1,150 million cubic meters at the water level of (-)43.20 meters. The water level of Lake Qarun depends upon the balance between the inflow to the lake and evaporation from the lake surface. Artificial control of evaporation cannot be made at present. Thus, the fluctuation of the water level of Lake Qarun has to depend on the control of discharge flowing into the lake. The Governorate informs that the lake water level should be maintained not lower than (-)43.8 meters since the lower water level than this will increase the water salinity and affect fishery industry while the highest level in April not higher than (-)43.3 meters in order to protect roads, structures, and buildings, etc., on the lake shore from flooding water, and to conserve cultivated land alongside the lake.

The drainage water flowing into the lake could be controlled by increasing the total irrigation efficiency through a decrease of water disposed to drains, and also by utilizing drainage water for irrigating crops again, so-called the re-use of drainage water.

### 3.5.3. On-farm Conditions

The operation and maintenance of irrigation systems in Fayoum depression are made by the Ministry of Irrigation, Fayoum. It controls irrigation systems to vents. Vents are located at canals belonging to the Governorate to distribute irrigation water to farms on 24-hour and weekly bases. Farmers shall be responsible for operation and maintenance of irrigation facilities at the downstream of the vents.

Vents in Fayoum could be classified into four types, that is, models 24, 36, 54 and 69. The open width of vents is decided by models, and a model is selected by the scale of a service area of each vent. When the overflow depth of vents is kept at 24 centimeters for 24, 36 centimeters for 36, 54 centimeters for model 54, and 69 centimeters for model 69, one millimeter's opening width of vent models 24, 36, 54, and 69 can serve a half feddan, one feddan, two feddan, and three feddan, respectively, on the basis of 30 cubic meters water supply per day per feddan.

The irrigation farm channels connected to the vent, so-called "mesqas", is maintained by farmers. The mesqas or farm ditches are insufficient in density, resulting to cause insufficient irrigation water supply to lots. At the on-farm, two types of irrigation methods are practiced in Fayoum, that is, small basin irrigation and furrow irrigation. The former irrigates successive lots in a small basin by cutting bunds whereas the latter is widely carried out to irrigate such crops as cotton, beans, and vegetables. Insufficient provision of mesqas or farm ditches, and too large covering area of vents have caused an un-uniform distribution of irrigation water.

#### 3.5.4. Operation and Maintenance

The Ministry of Irrigation is responsible for operation and maintenance of irrigation systems while farmers are responsible for them downstream of vents. The existing irrigation system in Fayoum has a few gated head regulators such as two at Lahoun Regulator which controls a discharge flowing into fayoum depression and from which Bahr Hassan Wassef and other canals branch off to irrigate the western Fayoum area. The most canals have no measurement facilities. For distributing irrigation water to most canals, the proportional supply by controlling water levels of canals is prevailed. Bahr Wahby, the main canal covering the Project Area, has several complete overflow weirs, so-called "Nasbah", which regulate the water levels of the canal and keep proportional water distribution to farm lots through vents.

In principle, the existing system premising the proportional distribution would made equity in water distribution. However, the distortions of the said system would take place through unauthorized diversion of water by some farmers and by irregular modification of structures like vents. The principle equity of the system would be completely lost. To recover such functions of the system, the Ministry of Irrigation is trying to lower water level of the canal at weir by providing particular discharge pipes with the weir and others.

The complete distortions of irrigation systems would invite many complains in distributing irrigation water. On the upstream reaches of Bahr Wahby considerable over-irrigation is observed while on the downstream reaches a big area suffers from the shortage of irrigation water supply. Despite of great efforts of the Ministry of Irrigation to make equity distribution, the present situation of the irrigation system has not yet been solved because they are beyond control of the Ministry.

The rehabilitation or improvement of the existing distribution system by providing them with measurement and control devices would be necessary, and the more important in removing the present constraints would be a study and evaluation of actual water distribution, promotion of coordination among farmers as water users and staff of the Ministry of Irrigation in securing equitable water supply.

As for the first step on this regards, the establishment of a model farm for betterment of water management is recommendable to demonstrate farmers the necessity of cooperation and procedures of proper water distribution.

#### 3.5.5. Other Development Schemes Related to the Project

Fayoum Governorate has several development plans of agriculture in the depression by expanding agriculture horizontally and vertically. Most agricultural development projects in the Governorate are under implementation or under planning by assistances of international or by-lateral bases with participation of Holland, Sweden, Italy, West German, United Nation of of America, and others. Among them, large-scaled projects for agriculture and shown in Table 3-1.

Table 3-1 List of Large Scale Projects for Agriculture in Fayoum

Name of Project	Site	Aim and Capacity	Starting Date	Funded by	Study Stage	Funded Condition	Remarks
1. Integrated Poultry Project	Azab, Fayoum	Produce 10 million Chicks and 500,000 eggs for hatching	early 1981	Holland		Grant + Loan	Complete
2. Livestock Slaughterhouse	---	-----	late 1981	Sweden	F/S	Grant	Complete F/S Insie. Cancelled
3. Dairy Products Project	Tamiah	6,000 ton/year	late 1981	Sweden	F/S	Grant	Complete (F/S)
4. Poultry Integrated Project	Daramad, Fayoum	Capacity 13 million baby chicks for farmers + 44 million eggs	mid. 1981	Locally	Construction	---	Complete
5. Food Security Project	Fayoum	Provision of food items	late 1981	Locally	Construction	---	Complete
6. Cattle Feed Factory Project	Senorus	Capacity 120,000 ton/year	early 1980	Locally	Implementation	---	Under Construction
7. Egg Production Food Security	Com Osheen	Annual capacity 30 million eggs	early 1982	Locally	Implementation	---	Under Construction
8. Land Reclamation Project	Kootah	6,000 feddan of Reclamation	mid. 1982	Italy	F/S	Grant	Complete
9. Re-using Batts Drainage Water	Tamiah	Reuse water of 4.5 cu m/sec	late 1982	Holland	F/S	Grant (Gilta 5 million)	Complete
10. Fayoum Agricultural Development	Etsa	Land Improvement of 36,000 feddan	1982 1983	W. German W. German	F/S D/O	Grant (US\$ 36 million)	Complete Under Construction
11. Water Balance Study	Whole Area	Installation of Equipment & computer Analysis for 4 year	1983	Holland	Under study	Grant (Gilta 0.85 million)	Under Study
12. Improvement of Infrastructure	Whole Area	Rural Improvement (5 years) computer Analysis for 4 year	1980	U.S.A.	Implementation	Grant	Under Construction



## CHAPTER IV. THE PROJECT



## CHAPTER IV. THE PROJECT

### 4.1. Objectives and Components of the Project

#### 4.1.1. Objectives

The Project aims to increase agricultural production in the Project Area by effective use of water resources and expansion of farmland by reclaiming the desert area, to create employment opportunities throughout the year, and to improve the living environment from a viewpoint of rural development by which the social infrastructure and new rural communities will be provided. The water resources for the Project will be created through the reuse of drainage water to be lifted at Tamiah by way of mixing it with fresh water of Bahr Wahby.

The following should be envisaged to achieve the objectives and to accrue benefits quickly in the Project Area:

- Reclamation of land in North Wahby and Com Osheem areas, and establishment of the irrigation system;
- On-farm development for the irrigated agriculture as well as for modernized agricultural practice;
- Improvement and rehabilitation of the existing irrigation and drainage facilities including the institutional arrangements and the strengthening of agricultural supporting service in Wahby Downstream area and South Area of Lake Qarun;
- The Model Farm in Com Osheem area for practical training of irrigation and for betterment of water management.

- X Provision of agro-industry and social infrastructure in the reclamation area.

#### 4.1.2. Project Components

The Project involves the following components :

##### Land Reclamation:

- Soil Improvement : To practice deep harrowing, to remove salt and obstructive materials and to add improvement materials ;
- Irrigation Facilities: To construct pumping facilities and pipeline networks ;
- On-farm Facilities : To construct on-farm facilities including sprinklers and drip irrigation facilities, other related facilities and farm roads .

##### Agricultural Development:

- Irrigated Agriculture: To introduce the modernized farming techniques with proper water management ;
- Livestock Breeding and Fattening : To introduce the animal husbandry under the proposed cropping pattern and the proposed land use ;
- Agro-industry : To introduce agro-industries for processing agricultural and animal products ;

Agricultural Supporting Service

: To establish and strengthen the farmers organization to support farmers in producing, processing, and marketing the products, and to carry out the proper operation and maintenance of irrigation and drainage system ;

Model Farm

: To establish the Model Farm in Com Osheem area for farmers' training and promotion of modernized agriculture and betterment of water management through practices,

Rural Development:

Social Infrastructure:

To provide the social infrastructure in the reclamation area, including construction of trunk roads, branch roads, and farm roads, domestic water supply, electrification, sewage facilities and others ;

Villages

: To provide villages and related facilities



## 4.2. Plan Formulation

### 4.2.1. Land Use

The Project is quite complex in the components covering land reclamation, rehabilitation/improvement of existing irrigation and drainage systems and improvement/upgrading of drainage in inundation area. Among these components, the land reclamation aims to create new agricultural land by reclaiming desert area, and the proposed land use of the reclaimed area will play a vital importance for formulation of the Project, while the other land for rehabilitation/improvement and improvement/upgrading are presently under cultivation. Therefore, the discussions on land use in the present cultivation area is different from those for reclamation work.

As for the reclamation work in North Wahby and Com Osheem areas, a land use plan is proposed as shown in Table 4-1. North Wahby area covers a gross land of 5,100 feddan (2,140 ha), while Com Osheem area has a gross land of 3,700 feddan (1,550 ha). The total gross area for land reclamation is planned at 8,800 feddan (3,690 ha). Of these figures, after deducting the land for structures, villages, and other facilities, the land holder area to be disposed to farmers in North Wahby and Com Osheem, and the total of the two are 4,420 feddan (1,850 ha), 3,160 feddan (1,330 ha), and 7,580 feddan (3,180 ha), respectively. Taking into consideration the present farming practice in Fayoum depression and the future program of the Government for horizontal expansion of agriculture, it is proposed that the Cattle Breeding and Fattening Farm in a part of Com Osheem area would be developed by the Governorate and the agricultural development in the other area would be implemented by the land reclamation cooperatives to be organized. In the proposal, three sizes of farms to be established in the area are recommended. They are small farm of five feddan and large farm of 15 and 20 feddan as shown in Table 4-2.

Table 4-1

Proposed Land Use

<u>Description</u>	(Unit : feddan)		
	<u>North Wahby</u>	<u>Com Osheem</u>	<u>Total</u>
a. Gross Project Area	5,100	3,700	8,800
b. Structure, Village, and Facilities	680	540	1,220
c. Land Holder Area (a-b)	4,420	3,160	7,580
d. On-farm Facilities (approx. 5%)	220	160	380
e. Farm Land Acreage (c-d)	4,200 (82.4%)	3,000 (81.1%)	7,200 (81.8%)

Table 4-2

Proposed Land Disposal Program

<u>Description</u>	(Unit : feddan)		
	<u>North Wahby</u>	<u>Com Osheem</u>	<u>Total</u>
Gross Land	5,100	3,700	8,800
Arable Land (c) of above Table 4-1	4,420	3,160	7,580
<u>Development by Governorate</u>			
Cattle Breeding and Fattening Farm	-	1,060	1,060
<u>Development by Land Reclamation Cooperative</u>			
Small Farm ( 5 fed)	2,210 ( 442)	1,040 ( 208)	3,250 ( 650)
Large Farm (15 fed)	1,110 ( 74)	540 ( 36)	1,650 ( 110)
Large Farm (20 fed)	1,100 ( 55)	520 ( 26)	1,620 ( 81)
Total of Development Area by Cooperative	4,420 ( 571)	2,100 ( 270)	6,520 ( 841)
Grand Total of Arable Land	<u>4,420</u>	<u>3,160</u>	<u>7,580</u>

Note: The figures in ( ) mean number of farmhousehold to be settled.



Each 250 to 350 feddan of farms in the reclamation area would establish one village which is a unit of community. The village is composed of the large farms of 15 feddan and 20 feddan as leading farmers in the village, and the small farms of five feddan. The combination of these farms would contribute to the establishment of a well-balanced community as well as for successful development of the modernized agriculture.

Wahby Downstream Area is presently cultivated. However, farmers in this area has much complains for insufficient irrigation water supply. The area being suffered from the shortage of irrigation water covers over the total of 17,200 feddan (7,220 ha) in gross acreage. The present land use will be continued in the area.

A part of the South Area of Lake Qarun suffers from inundation caused by considerably high water level of Lake Qarun. Most of the coastal area covering 480 feddan (200 ha) is seasonally inundated, and the neighboring area of 6,290 feddan (2,630 ha) is affected by ill-drainage and high groundwater table. The present situations in the area would be improved by providing dike, drainage channels and drainage pumping stations. In connection with land use in the area, some directly submerged area will be dried up, and a certain area will be free from ill-drainage. It is expected to restore productive agricultural land in the area by the Project.

#### 4.2.2. Land Disposal

The land disposal in the reclamation projects in Egypt is made by applying two systems, distribution and auction. The distribution system is adapted to establish small holder and the auction system is adapted for large holder. The small holder, that is, settlers of small land or landless farmers and retired soldiers is traditionally distributed at one to eight feddan while the large holder, that is, settlers of agricultural secondary school diploma and university

graduate is disposed at ten to 30 feddan. The allocation rate of the reclaimed land for the distribution system and the auction system is reported at 40 percent and 60 percent, respectively according to the information of GARPAD.

On the other hand, the land holding system aims at the development of a large number of successful family farms. According to the Five Year Development Plan for 1982/87, the share of the implementing land disposal by government, co-operative & persons and companies are 48, 49 and three percent, respectively. It is considered that the Government is attempting to mobilize private capital through a realization of implementing by co-operative & persons and companies (refer to Appendix D-8).

As for the land disposal of the Project, alternative case study on the proportion of land disposal of the reclaimed land for small and large farmers is conducted taking into consideration the followings;

- The water management and farming in the North Wahby and Com Osheem areas need a high technology. The large holder of the graduates of agricultural high school on college has an intelligence to practice the high technology. The large farmer shall play an important role as leader of farmer's group.
- In Egypt, the profitability of fruits production is very high. Hence, the fruits are mainly cropped by the large farmer who are able to invest much initial cost. Particularly, the matter shall be adaptable to the North Wahby and Com Osheem Project Area where the drip and sprinkler irrigation system are proposed.

- Small farmer will supply their family labor for large farmers. But as the cropping intensity is high, the total family labor in the Project Area is not enough to full total demand labor. The large farmer must employ hired labor from the neighborhood and will easily hire laborers due to much funds.

The result of the said alternative study are as follows (refer to Appendix D-8);

- Alternative studies on net farm income (balance) based on average base and low base financial prices by different farm size show that farmer with over four feddan can support his living in case of the average base financial prices, while farmer with over five feddan can be in case of the low base financial prices.
- Allocation of the large area for small holders, that is small land farmer, landless farmer and retired soldiers would be enable to settle much in number. Since the local currency cost for construction of social infrastructure should be born by land value to be sold to large holders. Average land value in the Wahby Downstream Area is roughly assumed at 3,000 to 4,000 LE per feddan of cultivated land. The private capital to be mobilized for construction of social infrastructure can be recovered by the case of the rate between small holder and large holder at 50:50 among several cases of allocation rate.
- Alternative study on land disposal between five feddan and six feddan shows that the six feddan farmer can certainly gain more income than that of the five feddan farmer. However, number of settlers in case of six feddan farmers is 110 households smaller than that of five feddan farmers. The said difference will affects much for labor balance in the area.

Taking into consideration the above-mentioned study, it is proposed for land disposal that farm size of small holder and large holder are five, 15 and 20 feddan, respectively and the rate of allocation to small holder and large holder is uniformly made at 50:50.

#### 4.2.3. Optimum Scale of Development Plan

The optimum scale of the development plan should be studied by project component basis since the Project involves quite complex components composing of three different features, that is, reclamation of desert area in North Wahby and Com Osheem, rehabilitation of the existing irrigation system in Wahby Downstream area, and improvement of drainage facilities in the South Area of Lake Qarun.

##### (1) Reclamation Area

As for the reclamation work, the area is part of the desert located at the right bank of Bahr Wahby. No development plan of the area has been conceived until now since no water resources for plant growth was available. By a recent study on the reuse of drainage water, new water resource to be created by mixing drainage water of Batts drain with fresh water of Bahr Wahby can be secured for the agricultural development of the area.

The development plan of the desert area should carefully be studied from the following points of view;

- a. Availability of water resources;
- b. Natural features of the area to be developed; and,
- c. Location of the area in connection with a distance to water sources, and marketability of agricultural products, etc.

In connection with available water resources for the development of the Project, a discharge of 4.5 cubic meters per second at the peak will be pumped up from Batts drain at Tamiah, and released to Bahr Wahby. According to the design standard of the irrigation facilities provided by the Ministry of Irrigation, a design capacity of 30 cubic meters per feddan per day is adopted. In compliance with this standard, a discharge of 4.5 cubic meters per second will be able to cover over an area of about 13,000 feddan at maximum, if it is allowed to utilize all the water resources for the Project.

As for the second consideration, the shape of the area shows a belt with 12 kilometers long and two kilometers wide extending in parallel with Bahr Wahby. The elevation of the area ranges between ten to 30 meters above the mean sea level, declining from north to south with a slope of about 1:150 on an average. The reclamation area of North Wahby and Com Osheem is classified by elevation as follows;

Elevation Range	North Wahby Area		Com Osheem Area	
	Area (fed)	Percent	Area (fed)	Percent
10 - 20 m	2,280	43.9%	1,520	40.4%
20 - 26	2,010	38.7	1,830	48.7
26 - 28	810	15.6	350	9.3
28 - 30	70	1.4	40	1.1
30 - 31	20	0.4	20	0.5
<u>Total</u>	<u>5,190</u>	<u>100.0</u>	<u>3,760</u>	<u>100.0</u>

Taking into consideration the variation of acreage by elevations, and also irrigation methods to be introduced to the Project, it is quite reasonable to limit the Project Area by the elevation of 28 meters above the mean sea level. The land higher than the elevation of 28 meters above the mean sea level is occupied by only 1.8 percent of the area in North Wahby and 1.6 percent of the area in Com Osheem. In spite of relatively small acreages of the said areas, more than four meters of lifting head should be added to the design head of the pipeline and pumping facilities when these areas are involved in the Project. And also, topography of the area

shows that the area of above 28 meters above the mean sea level is very steep and not suitable for agricultural development.

As for the third consideration about the location of the Project Area, the discussions are dealt with distance from Bahr Wahby as water source, to the boundary of the Project Area. As is seen in the former paragraph, extent of difference in height and distance between contour lines 28 and 32 meters is relatively large as compared with the acreage to be expanded.

As a result, the reclamation areas in North Wahby and Com Osheem are planned at 5,100 feddan (2,140 ha) and 3,700 feddan (1,550 ha) in gross, respectively. The total reclamation area is 8,800 feddan (3,690 ha) in gross.

#### (2) Wahby Downstream Area

Wahby Downstream Area is located considerably downstream of Bahr Wahby and is defined as an area suffering from shortage of irrigation water. For the rehabilitation of the existing irrigation system in the area, first of all, additional water resources will be required. As mentioned in the former paragraph, the available water resources for the area would be created at the diversion point of Bahr Wahby to Bahr Unsi by drainage water of Batts Drain to be lifted at Tamiah.

For the rehabilitation of the system by the Project, the Project boundary would be considered somewhere downstream of the intake for Bahr Unsi. According to the measurement of the area on maps, the said area covers about 17,200 feddan (7,220 ha) in gross.

#### (3) South Area of Lake Qarun

The South Area of Lake Qarun is a long belt with 50 kilometers long and one to two kilometers wide along the south shore of Lake

Qarun. The area suffers directly or indirectly the high water level of Lake Qarun. The area can be divided into three sub-areas from topographical point of view as follows;

- a. The area without dikes between Batts Drain and Bats Said Drain;
- b. Complete dike area between Bats Said Drain and Shakshok; and,
- c. Western area of Shakshok.

The first area (a) is located between Batts Drain and Bats Said Drain, and is provided with no dike at the western coastal area. The elevation of coastal area is very low at (-)43.9 to (-)43.7 meters below the mean sea level. Two drainage channels, Abu Harawa Drain and Abd El-Rahman Drain, are the main drainage canals in the area. However, the water level of Lake Qarun is higher than the coastal area, resulting in inundation of this area specially in winter season. Batts Drain in this area sometimes overflows the dike caused by back water of the Lake Qarun since Batts Drain has no complete dike.

The second area (b) is located between Bats Said Drain and Shakshok. In the coastal area, a dike with asphalt paved road is provided, and the lake and farm lands are completely separated by this dike. Bats Said Drain, Abu Tarfaya Drain, Khor el-Hitan Drain, and small drains inflow to the lake, and a drainage pump station is operated near mouth of Khor el-Hitan drain. Because of high water levels of Lake Qarun, these drains do not function well, specially in winter season.

Most coastal area forming a belt of about one kilometer wide is submerged, and directly affected by ill-drainage. The successive belt area of one to two kilometers wide is indirectly affected by a high groundwater table, resulting in a high salt accumulation on the top soil. The improvement of drainage facilities is vital important for this area for restoring the agricultural production.

The last area (c) is located in the western part of the South Area of Lake Qarun from Shakshok. The area is higher than the water level of Lake Qarun except some coastal areas of Shakshok and Ez el-Namus. Influence of a high water level of the lake in this area is rather small in comparison with former the two areas (a) and (b).

Taking into consideration the affected area and degree of damages by ill-drainage, the two areas such as (a) and (b) are considered as the Project Area. It is concluded also by the economic point of view.

#### 4.2.4. Development Plan

A development plan of the Project would be formulated through the analyses of data and information collected during the first and second field works, field survey and investigation, discussions made with officials of Fayoum Governorate and Egyptian Government and the home office work in Japan.

Feasibility study and detailed study on the pump station at Tamiah as water resources and the pipeline from the pump station to Bahr Wahby have been conducted by Kingdom of the Netherlands Dutch Bilateral Technical Development Cooperation Program.

##### (1) Reclamation of North Wahby and Com Osheem Areas

As mentioned in the previous paragraph 4.2.1. "Land Use Plan", the reclamation of North Wahby and Com Osheem areas is scheduled at 5,100 feddan (2,140 ha) and 3,700 feddan (1,550 ha) in gross, respectively. The areas are desert, therefore, the development of the areas should be started from deep harrowing of the top-soil. Prior to this work, the construction of road system consisting of the trunk road, branch roads, and farm roads will be implemented, and the construction of irrigation network and social infrastructures would be followed.



The major Project components in the reclamation area are planned as follows;

a. Construction of irrigation facilities and infrastructure

Reclamation works:	Deep Harrowing Soil Dressing Leaching
Irrigation networks:	Pump stations Pipelines
On-farm facilities:	Sprinkler system Drip system Farm lots
Social infrastructure:	Road system with windbreaks Water supply and sewage facilities Villages and houses Shops, hospital and schools, Mosques

b. Agricultural Development

Planting crops:	Fruits Upland crops
Cattle Breeding and Fattening Farm:	Cattle shed and offices Agricultural equipment
Agro-industries:	Tomato paste factory Slaughterhouse Milk processing factory

c. Model Farm

Provision of irrigation facilities  
    Pump station and pipelines  
    Drip and sprinkler irrigation facilities  
Agricultural machinery and materials  
Training and demonstration facilities  
Research, laboratory, and administrative buildings

(2) Rehabilitation of Wahby Downstream Area

As mentioned in the previous paragraph, Wahby Downstream area is defined as the area suffering from the shortage of irrigation water. Taking into consideration the causes of insufficient supply of irrigation water, rehabilitation of Wahby Downstream area is planned by the following components;

a. Construction of branch canals

Unification of vents served directly by Bahr Wahby  
Additional branch canals

b. Rehabilitation of canals and canal structures

Ministry of Irrigation, Fayoum Office of Irrigation Department has a plan to construct pumping station at Casr Rashwan to supplement irrigation water from Batts Drain to the area of Hayar and Koddoba canals. However, it is considered that the said pumping facilities will be transferred to the other after completion of the Project.

(3) Improvement of Drainage in South Area of Lake Qarun

Protection of farm land from inundation caused by high water level of Lake Qarun and improvement of agricultural land by lowering groundwater table are the major strategy in relation to the Project. The major components are as follows:

a. Harawa Sub-area

Pump Station: Abd el-Rahman Pump Station  
Abu Harawa Pump Station

Dike: Dike with main drainage  
Batts Drain

Drainage: Lateral drain  
Sub-lateral drain

b. Bats Said Sub-area

Pump Station: Bats Said Pump Station

Drainage: Main drainage  
Lateral drainage  
Sub-lateral drainage