


**THE ARAB REPUBLIC OF EGYPT**  
**MINISTRY OF DEVELOPMENT, HOUSING AND LAND RECLAMATION**  
**GENERAL AUTHORITY FOR REHABILITATION**  
**PROJECTS AND AGRICULTURAL DEVELOPMENT**

**FEASIBILITY STUDY**  
**ON**  
**THE NORTH HUSSINIA VALLEY & SOUTH PORT SAID**  
**AGRICULTURAL DEVELOPMENT PROJECT**  
**VOLUME.II**

- C. AGRICULTURE
- D. ANIMAL HUSBANDRY
- E. FISHERIES
- F. AGRO-INDUSTORY
- G. NATURAL CONDITIONS

**JUNE 1984**

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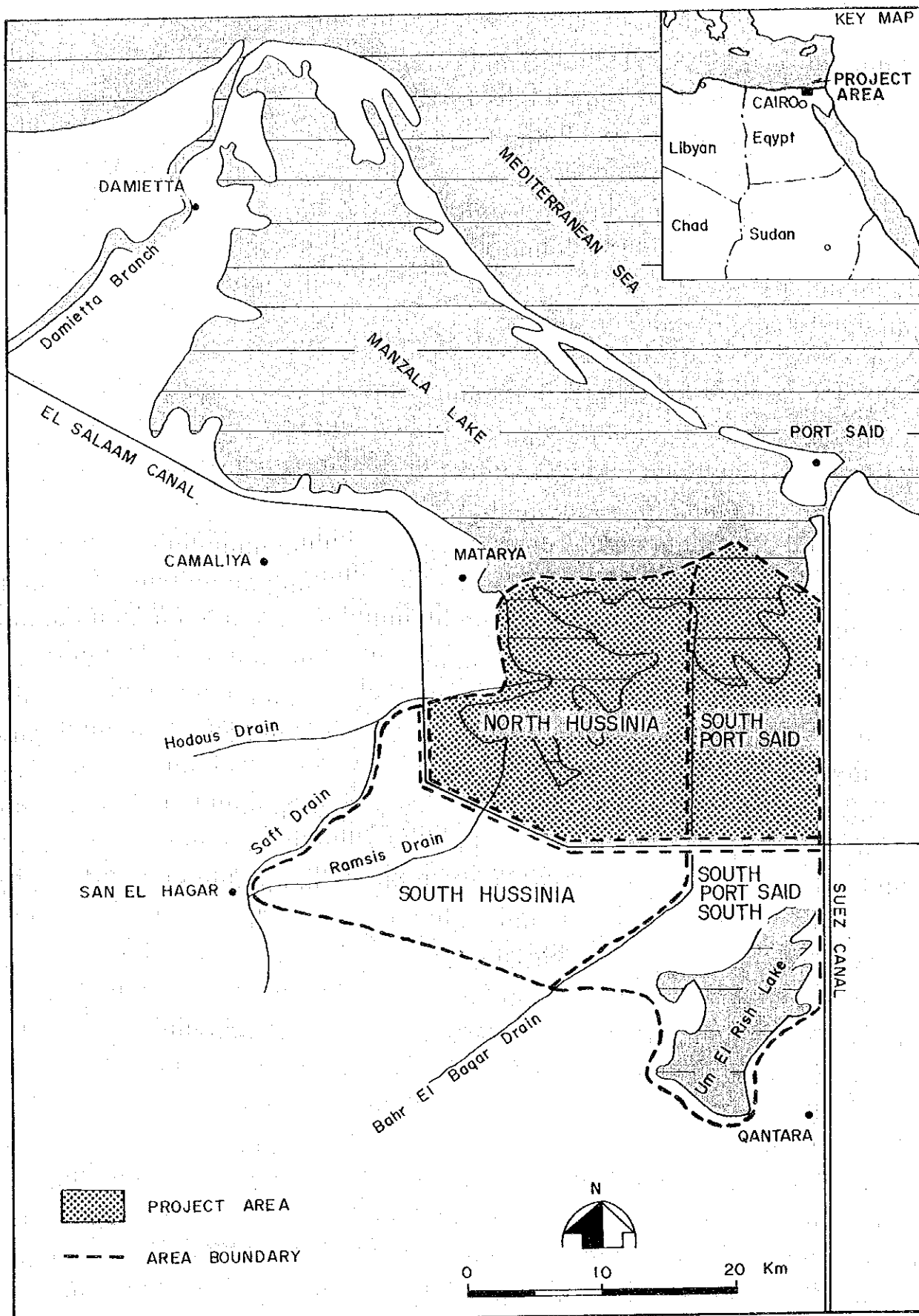
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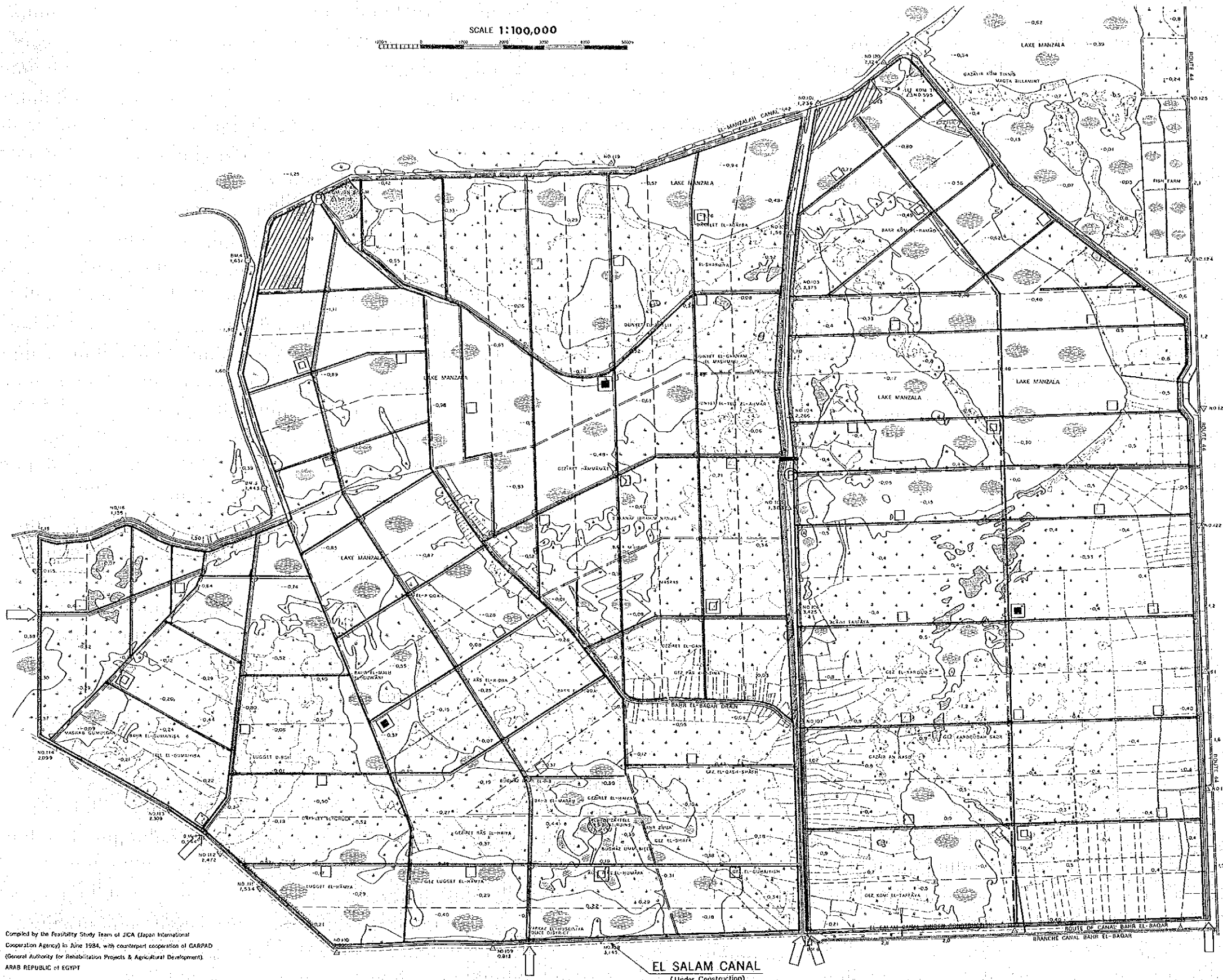
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NORTH HUSSINIA VALLEY AND SOUTH PORT SAID  
 AGRICULTURAL DEVELOPMENT PROJECT  
 LOCATION MAP



# NORTH HUSSINIA VALLEY AND SOUTH PORT SAID AGRICULTURAL DEVELOPMENT PROJECT GENERAL PLAN

SCALE 1:100,000



## I. LEGEND

- Project Boundary
- Main Road
- Main Irrigation Canal
- Main Drainage Canal
- Secondary Irrigation Canal
- Secondary Drainage Canal
- Agro-Industrial Zone
- Ruin
- Central Village
- Service Village
- Satellite Village
- Drainage Pumping Station
- Intake of Main Canal
- Intake of Secondary Canal
- Bridge on Bashitir Drainage Canal

Compiled by the Feasibility Study Team of JICA (Japan International Cooperation Agency) in June 1984, with counterpart cooperation of GARPAD (General Authority for Rehabilitation Projects & Agricultural Development), ARAB REPUBLIC OF EGYPT

EL SALAM CANAL  
(Under Construction)





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- ANNEX D. ANIMAL HUSBANDRY**
- ANNEX E. FISHERIES**
- ANNEX F. AGRO-INDUSTRY**
- ANNEX G. METEOROLOGY AND HYDROLOGY**



ANNEX

C. AGRICULTURE



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## C. AGRICULTURE

### 1. Present Agriculture

#### 1-1 Land Use

##### (1) Present Condition

At present, 92 percent of the Project Area is covered with lake/swamp and only 8 percent is up-land. In the area, cultivated land occupies 4,940 feddan of the up-land area, and fishery ground occupies 33,620 feddan of the lake/swamp area. Details are shown in Table C-1-1.

Table C-1-1 Present Land Use of the Project Area

(Unit: feddan)

Land Use	North Hussinia	Port Said South	Total
Cultivated land	3,390	1,550	4,940
Uncultivated land	2,800	400	3,200
Open fisheries	10,650	1,850	12,500
Closed fisheries	10,920	10,200	21,120
Lake, watered	20,610	11,770	32,380
Swamp	20,440	14,960	35,400
Ruins	190	270	460
Total	69,000	41,000	110,000

##### (2) Agricultural Land

Distribution of land ownership by farm size in the neighboring districts of both Sharkhia and Port Said Governonates, and in Egypt as a whole is shown in Table C-1-2.

Table C-1-2 Distribution of Land Ownership by Farm Size

Area	Whole Egypt		Sharkhia				Port Said Governonate	
	(000')		Governonate		District		number of owners	ratio
	number of owners	ratio	number of owners	ratio	number of owners	ratio		
1 fed			159532	50.5	4034	17.2	150	19.0
1 - 3 fed	3223	95.0	122851	38.1	10358	44.2	138	17.7
3 - 5 fed			21867	6.8	4090	17.5	210	26.6
5 - 10 fed			93	2.7	10520	3.3	2736	11.7
10 - 20 fed	44	1.3	7698	2.4	2207	9.4	119	15.1
20 - 50 fed	23	0.7					18	2.3
> 50 fed	8	0.3					4	0
Total	3391	100	322468	100	23425	100	790	-

In Egypt, farm size is small, 2.1 feddan on the average. Although Sharkhia has the almost same farm size as the average in Egypt, Port Said and the neighboring districts have somewhat larger farm size than the national average.

From the survey carried out for 34 farms, existing farmers in the area settled 1 to 60 years ago, 22 years ago on the average. Farm size in the area is 1.5 feddan as the minimum, 30.0 feddan as the maximum, and 7.5 feddan on the average. Relatively large scale farms have hired labourers living in the same farm area.

## 1-2 Agricultural Production

### (1) General

In Egypt, the average yields of main crops are high in general.

Table C-1-3 shows that the yields in Egypt are higher than in Europe or North America. The probable reasons are the labor intensive farming and management based on the smallness in farm scale, the stable weather and favorable climate. The durable crop intensity is high, about 200 percent.

The main winter crops are Berseem and wheat, the second main is Broad bean; the main vegetables are tomato, potato, and water melon; the main fruits are citrus (orange, etc.), grape and mango. Recently guava is being increased.

In general, crops are grown in the three-year or the two-year rotational cropping system with intercropping and mixed cropping. The crop rotation is adopted to minimize the injury from continuous cropping, such as frequent occurrence of a mass invasion of diseases and pests, and increase of weeds. Inter cropping and mixed cropping are adopted to hamper disease and pest injury.

Table C-1-3 Comparison of Average Yield per Unit Area of  
Main Crops in Egypt, Europe and North America

Crops	Average Yield (ton/ha)		
	<u>Egypt</u>	<u>Europe</u>	<u>North America</u>
Wheat	3.138	2.969	1.957
Maize	3.776	3.591	5.258
Rice	5.287	4.159	5.080
Sorghum	4.092	3.732	3.315
Barley	2.642	3.192	2.187
Cotton (fiber)	0.756	0.619	0.609
Flax (fiber)	0.889	0.595	-
Flax (seed)	1.150	0.624	0.713
Broad bean	2.361	1.378	-
Lentil	1.862	0.755	1.275
Sesame	1.274	0.349	0.590
Ground nut	2.094	2.000	2.491
Sugar cane	88.200	66.220	83.950
Onion (winter crop)	9.398	15.490	32.606

From: Agency for International Development, op. cit., 1982

(2) The Project Area

Most of the cultivated land in the Project Area is located along the existing main drains with 500 to 1,500m in width and the rest is scattered over Kom Ibn Salam and the districts along smaller drains.

People have been settled in the unsuitable land for agriculture and have made their efforts with a help of the co-operative association to reclaim and improve the saline land by introducing organic matter and suppling adequate water to the soil, over several decades.

However, the present agriculture in the Project Area is backward in its development compared with other Delta districts.

And also it can be said that the co-operative association is poor to satisfy the required credit or marketing.

## 2. Agricultural Development Plan

### 2-1 General Description

The agricultural policy of Egypt was to export profitable crops such as paddy rice, vegetables, cotton, etc., and to import low priced main food crops such as wheat, maize, etc., for efficiently using the small area of arable land. However, with the rapid rise in the population, exports of rice have declined and imports of food crops have risen to worsen the balance of international payments.

This project selects the plants suitable to the area, including main crops, vegetables and others having a great demand for subsistence, and profitable vegetables, fruit trees, industrial crops and others which having a great export demand.

Furthermore, mechanization focusing on cultivation and pest control, etc., was planned to assist recent extensions of agricultural machinery in the less developed environments. Accordingly, systematization of agricultural activities by farm groups was planned to efficiently utilize the machinery.

### 2-2 Selection of Crops

A domestic demand, marketability and suitability to the area were discussed among the crops being plantable or extendable over the Delta region. General evaluation of crops is listed in Table C-2-1 and their particular description is given below:

#### (1) Cereals and Industrial Crops

Paddy rice requires a big water supply, but reduces the damage to soil and assists leaching by flooding, to be mandatory crop in determining the crop rotation. Furthermore, rice has potential importance as an export. Barley has a high salt tolerance, and thus, can be included in the crop rotation during the period right after the project completion. However, it has low profitability. Wheat has a lower salt tolerance trait than barley though it is one of the main food crops in Egypt. It is imported for the lack of production. However, good quality products cannot be obtained under high atmospheric temperature. Corn is also

Table C-2-1 Evaluation of Selected Crops

Crop	Domestic Demand	Export	Salinity tolerance	Drought resistance	Water requirement	Applicability to heavy clay soil
Berseem	a		b	b		b
Sorghum	b		a	a	c	c
Sudan Grass	b		a	a		c
Wheat	a		a	b	b	b
Barley	b		a	a	b	b
Rice	b	a	b	c	a	a
Cotton	b	a	a	b	b	a
Maize	a		c	b	b	a
Soybeans	a		a	c	c	b
Sesame	a		b	b		c
Sun Flower	a		b	b		c
Sugar beet	a		a	b	b	a
Beans	a		c	c	c	b
Peas	a		c	b	b	b
Tomatoes	a	a	b	a	b	b
Onions	a	a	c	b	c	c
Cabbages	b		c	b		b
Broccoli	b		c	b		b
Lettuces	b		c	c	c	b
Spinach	b		b	a	c	b
Cucumbers	a		b	b	c	b
Dates	a	b	a	b		c
Guava	b		c	b		b
Grapes	b		c	b		b
Lemons	b	a	c	b		b

a	Big	Big	High	High	Much	High
b	Medium	Medium	Medium	Medium	Medium	Medium
c	Small	Small	Low	Low	Little	Low



imported although it is one of the chief food crops.

As for oil crops, sesame is extensively grown in the desert regions but not suited to heavy clay soil. Sunflower is more suited to highly permeable soil than to heavy clay, and good quality products are not obtained under high temperatures at harvest. Soybeans are suited to somewhat clayey type soils and the oil extracted thereof has a good quality although the yield is not high because of the temperatures.

Cotton, grown extensively in the delta region and with a high salt tolerance, can be a typically suitable crop to the area; however, the extremely labor-intensive trait in harvesting imposes a big problem of farming, and thus, mechanization in harvesting is mandatory. However a small machinery-intensive harvesting method suited to Egypt has not yet been found.

Sugar beet has a big root depth (about 2 m as the maximum) and are suited to the proposed area, since they can grow in any type of soil, and also has an extremely high salt tolerance. However, they suffer easily from disease/insects, and thus, three-year crop rotation should be planned. The combined crop with the beet in rotation should be paddy rice. Neither crops of rice/beans will suffer from the common disease/insect to sugar beets; otherwise, careful pest control should be provided. The time of sowing and harvesting depends on the temperature, because the sugar content in the root increases with low temperature and decreases with high temperature, while the root weight increases for high temperature and decreases with low.

## (2) Fodder Crops

Berseem is a winter crop suited to the area. It is extensively grown in the delta region and has a high salt tolerance trait. For summer crops, sorghum and the related Sudan grass are suggested. They are suited to permeable soil, and, can also be grown in heavy clay soils if not submerged. As regards their suitability as fodder crops, they can be given priority to corn because of

high salt tolerance trait and several harvests. Of them, sorghum is somewhat more productive than Sudan grass.

(3) Vegetables

Winter crops include tomatoes, cabbages, broccoli, lettuces, spinach, onions, beans, peas, etc., and summer crops include tomatoes, cucumbers, French beans, okra, corn, etc. Generally, vegetables suffer easily from salinity. Tomatoes and melon-neighbors have a relatively high salt tolerance among other vegetables but should not be planted in the soil having a high content of salinity. Furthermore, careful protection against diseases/insects should be provided to eliminate any damage to the sugar beet which will be combined for rotation.

Extension of vegetable growing is limited from the high labor-intensive trait. The variety of vegetables being grown changed according to the large elasticity of demand. Thus, in this project, cultivation of vegetables is planned not only for sales as fresh but also as processed/preserved ones. Further, tomatoes harvested in winter are expected to be exported.

(4) Fruit Trees

The proposed area is not suited for growing fruit trees, being mostly covered with heavy clay soil, and having a high ground water table. Grapes, guava, etc., often planted in the garden of farmers, can be grown in heavy clay soil. Date palms may also be grown though less suited to the heavy clay soil. The reason seems to be that it has a high salt tolerance trait. However, it was not chosen because it is not extensively grown.

2-3 Cropping Pattern

The arable land within the proposed area occupies a total area of 95,800 feddan, including 65,406 feddan (about three-fourths of the total) in the southern section of clay soil type, and 20,394 feddan (about one-fourth of the total) in the northern section of loamy soil type. The market accessibility of the northern section suggests the priority of growing labor-intensive crops such as vegetables, etc. to the southern.

Heavy clay soil is predominant in the area, which has a high salinity content. For leaching, paddy rice and berseem should be maintained for the first three years of rotation. After three years, the salinity content will have been declined so that middle-leveled salt tolerance crops can be grown. The cropping patterns from the fourth year onwards have been decided in three-year rotation, as follows:

Cropping pattern-1

Summer crops	Winter crops
Rice	Berseem
Soybeans	Sugar beet
Sorghum	Vegetables

Cropping pattern-2

Summer crops	Winter crops
Rice	Berseem
Soybeans	Sugar beet
Sorghum (1/2) + Vegetables (1/2)	Vegetables

In the above patterns, winter vegetables include tomatoes, onions, cabbages, beans, peas, spinach, etc. Summer ones include tomatoes, corn, kidney beans, okra, etc. These are traded as fresh or processed products, and tomatoes and onions are partly exported.

Cropping pattern-1 is established for the southern clay soil section, and pattern-2 is established for the northern loam soil section.

In both cases, the drainage capacity of the soils would naturally be improved through continued cultivation over several years, thus enabling farmers to carry out labor-intensive farming within their own manpower ceilings.

2-4 Farm Production

The time of planting and the cultivation method for each crop is shown in the C-9 appendix.

Probable trends of increases in yield, output of each crop for the area as a whole after starting the planned farming, and normal output of each crop are shown in Tables C-2-2, C-2-3 & C-2-4. Trends in output for each block are shown in the C-10, C-11 appendices.

Table C-2-2 Crop yield increase through Trial Cropping/Full Cropping  
until Reaching Full Development

(Unit: Ton/feddan)

Crops	Trial Cropping Year 1		T/C 2		T/C 3		Full Cropping Year 1		F/C 2		F/C 3		F/C 4		Full Development	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
Rice	0.5	0.5	1.0	1.0	1.3	1.4	1.8	1.9	2.3	2.4	2.5	2.6	2.8	2.8	3.0	3.0
Berseem	0.8	0.8	10.0	10.0	13.0	13.0	16.0	17.0	19.0	20.0	21.0	22.0	24.0	24.0	25.0	25.0
Sugar Beet							16.0	16.0	18.0	18.0	20.0	20.0	23.0	23.0	25.0	25.0
Soya Bean							0.6	0.7	0.8	0.9	1.0	1.1	1.1	1.2	1.2	1.2
Sorghum							10.0	13.0	12.0	16.0	14.0	18.0	16.0	18.0	18.0	18.0
(Winter Vegetables)																
Tomato							8.0	9.0	9.0	11.0	11.0	13.5	13.5	15.0	15.0	15.0
Onion							6.0	7.0	7.0	8.0	8.0	9.0	9.0	10.0	10.0	10.0
Cabbage							10.0	12.0	12.0	15.0	15.0	18.0	18.0	20.0	20.0	20.0
Beans							0.7	0.9	0.9	1.2	1.2	1.4	1.4	1.5	1.5	1.5
Peas							0.5	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0	1.0
Spinach							4.5	5.0	5.5	6.0	6.0	6.5	6.8	7.5	8.0	8.0
(Summer Vegetables)																
Tomato							-	9.0	-	11.0	-	15.0	-	15.0	-	15.0
Corn							-	5.0	-	6.0	-	7.0	-	8.0	-	8.0
French Beans							-	2.5	-	3.0	-	3.5	-	4.0	-	4.5
Okra							-	4.0	-	4.8	-	5.3	-	5.6	-	6.0

Notes: (I) = Clayey Soil (II) = Loamy Soil

Table C-2-3 Planted Area, Yield per Feddan, and Production by Crops

Whole Area: 110,000 feddan Soil-wise Distribution of Cultivable Area  
 Gross Area owned by Farmers: 88,200 feddan (80%) Clayey Soil: 65,406 feddan  
 Net Cultivable Area: 85,800 (78%) Loamy Soil: 20,394 feddan

Crops	Clayey Soil (I): 65,406 feddan			Loamy Soil (II): 20,394 feddan			Total: 85,800 feddan	
	Ratio	Area (Feddan)	Yield (ton)	Production (ton)	Ratio	Area (feddan)	Yield (ton)	Production (ton)
Rice	1/3	21,802	3.0	65,406	1/3	6,798	3.0	20,394
Berseem	1/3	21,802	25.0	545,050	1/3	6,798	25.0	169,950
Sugar beet	1/3	21,802	25.0	545,050	1/3	6,798	25.0	169,950
Soya Bean	1/3	21,802	1.2	26,162	1/3	6,798	1.2	8,158
Sorghum	1/3	21,802	18.0	392,436	1/6	3,399	18.0	61,182
Winter Veg.	1/3	(21,802)			1/3	(6,798)		(28,600)
- Tomatoes	(15%)	3,270	15.0	49,065	(15%)	1,019	15.0	15,285
- Onions	(15%)	3,270	10.0	32,710	(15%)	1,019	10.0	10,190
- Cabbages	(5%)	1,090	20.0	21,800	(5%)	339	20.0	6,780
- Beans	(30%)	6,541	1.5	9,812	(30%)	2,040	1.5	3,060
- Peas	(20%)	4,361	1.0	4,361	(20%)	1,360	1.0	1,360
- Spinach	(15%)	3,270	8.0	26,168	(15%)	1,019	8.0	8,152
Summer Veg.					1/6	(3,399)		(3,399)
- Tomatoes					(20%)	680	15.0	10,200
- Corn					(50%)	1,700	8.0	13,600
- French Beans					(10%)	340	4.5	1,530
- Okra					(20%)	680	6.0	4,080

Table C-2-4 Build-up of Agricultural Production

Project Year	(Unit: ton/year)											
	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th
Rice	7,443	20,640	46,163	60,390	79,269	73,361	76,447	70,909	78,032	82,447	84,717	85,802
Berseem	119,083	240,927	544,314	634,987	690,392	678,781	672,830	600,569	657,109	691,450	709,594	715,018
Sugar Beet				79,383	150,694	325,437	440,562	577,524	634,624	678,881	704,173	715,018
Soya Bean				3,174	6,468	14,336	20,297	27,379	30,740	33,048	34,046	34,320
Sorghum				42,733	90,042	196,380	274,189	359,311	400,956	433,585	448,182	453,663
<u>Winter Veg.</u>												
- Tomatoes				6,024	11,678	26,935	36,161	49,171	56,126	61,226	63,781	64,397
- Onions				6,556	8,957	19,441	26,839	31,855	38,353	41,002	42,499	42,911
- Cabbages				2,673	5,185	11,439	16,026	21,806	24,915	27,178	28,312	28,586
- Beans				1,159	2,322	4,079	7,662	10,030	11,500	12,413	12,794	12,876
- Peas				545	1,053	2,308	3,230	4,369	4,526	5,402	5,651	5,719
- Spinach				3,396	6,830	14,570	20,065	26,496	29,585	32,081	33,634	34,328
<u>Summer Veg.</u>												
- Tomatoes				1,774	2,218	4,596	5,455	8,242	9,206	9,811	10,214	10,214
- Corn				2,461	2,953	6,134	7,163	11,058	12,267	12,939	13,610	13,610
- French Beans				340	399	612	715	1,153	1,273	1,400	1,461	1,528
- Okra				814	961	1,922	2,158	3,420	3,703	3,884	3,985	4,086

2-5 Farm Mechanization

Present farm mechanization among the farms in the proposed area is that 27 farms out of 34 of the total (79 percent) are using plows, and 13 farms (38 percent) are using threshers. Most farms do not possess them and so a contract system by big farms or cooperatives has been developed. Based on the existing high crop intensity of 200 percent, extension of labor-intensive crops as vegetables, etc. and the difficulty of hiring additional labor, this project will assist the development of efficient mechanization.

Most of the area is covered with heavy clay, which cannot be cultivated by light-weight tractors when dry. Thus, 90 Ps tractors for cultivation, and 40 Ps tractors for farming such as leveling and others were suggested. The utilization of machinery for each crop is shown in Table C-2-5.

Table C-2-5 Utilization of Machinery for Each Crop

Item \ Crops	Sugar beet	Rice	Soy-beans	Ber-seem	Sor-gum	Tomato
Primary Plowing	Tractor >90 Ps, Chisel plow					
Manure Spreading	Trailer					
Harrowing		Puddler	Tractor 40 Ps, Disk harrows, levellers			
Fertilizing and seeding	Tractor Broadcasters, Seeders					
Transplanting		Trans-planter				
Weeding and thinning	Sprayer, Hoe					
Protection	Sprayer, Trailer					
Cultivating	Tractor, Cultivator, Ridger					
Harvesting	Har-vester	Combines		Bean harvesters		
Transportation	Tractor, Trailer					

The utilization of transplanters for paddy rice is limited to those who are well educated or have much experience in farming, because of the technology of operation required. Heavy and middle-weight machinery are managed by the cooperatives, and light-weight machinery by individual farms.

The planned distribution of machinery by cooperatives is shown in Table C-2-6, and the machinery efficiency is shown in Table C-2-7.

Table C-2-6 Machinery Distribution Plan

Machinery	Agri-cultural coop	Agr. Coop. for Land Reclamation	Total
Tractors 90 Ps	168	72	240
Tractors 40 Ps	137	59	196
Chisel Plows 3 m	51	22	73
Disk harrows 18"x24	39	16	55
Levellers	39	16	55
Puddlers 3 m	29	12	41
Seeders 8 rows	31	14	45
Sprayers 600 l	18	5	23
Transplanters 8 rows	20	8	28
Cultivators 3 rows	28	12	40
Ridgers 8 rows	31	14	45
Combines 135 cm	23	10	33
Beet harvesters 4.5 m	17	8	25
Broadcasters 4.5 m	8	3	11
Trailers	37	16	53
Trucks	37	16	53

#### 2-6 Commodities

The requirements per feddan for selected seeds, fertilizers and weeding chemicals are shown in the Appendix C-9.

Herbicides are applied only in the first stage of growing, and mechanical weeding is applied in the following stages. The chemicals were selected only from those which have a low toxicity to men and animals.



Table C-2-7 Machinery Efficiency

Machinery	Ope. Width (m)	Ope. Speed (km/hr)	Field Efficiency (%)	Field Ope. (hr/ha)	Capacity (hr/fed)
Chisel Plows	3.00	5	70	1.05	0.41
Disk Harrows 14" x 36	3.66	7	80	0.49	0.21
Puddlers 40 Ps	2.70	4	80	1.16	0.49
Broadcasters 40 Ps	10.00	5	60	0.30	0.13
Transplanters 8 rows	2.40	2.5	50	3.00	1.26
Cultivaters	1.50	6	80	1.72	0.72
Combines	1.35	4	55	3.36	1.41
Sprayers				0.29	0.12

## 2-7 Farm Management (Labor Forces)

Breeding is practiced by feeding on berseem, sorghum and other fodder crops recommended under the proposed cropping patterns, and beet pulps and other by-products. The aggregate labor requirements for growing, breeding and others are shown in Table C-2-8. The estimated labor force available in a standard-sized farm corresponds to about two male adult workers, that is one male adult, one female adult, and one child (one female/child is estimated as a half male adult). Thus, where the farm has five feddan and is breeding cattle for meat/milk, the farm can take care of the farming work itself, based on a 25-day month. Where a farm has more than 15 feddan and has only one male adult, it is to hire one to three laborers at any time.

## 2-8 Alternative Study on Cropping Patterns

The most economical cropping pattern suited to the natural and human-agricultural situations of the proposed area is to be selected from several alternatives. These alternatives should be suggested in the light of current agricultural trends by reviewing the existing cropping patterns in the project area as well as in the neighboring regions having a situation similar to the proposed area.

Table C-2-8 Labour distribution by cropping pattern by size

Farm Size	Pattern	Crops or Animals	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Oct.	Dec.	Total	
Small 5 feddan	Pattern No. 1	Crops	12.0	6.4	17.6	29.6	38.4	24.8	14.4	15.6	11.2	12.8	4.8	33.6	221.2	
		Animals	11.5	10.4	11.5	11.3	11.5	11.3	11.5	11.5	11.5	11.3	11.5	11.3	11.5	136.1
		Total	23.5	16.8	29.1	40.9	49.9	36.1	25.9	27.1	22.5	24.3	16.1	45.1	357.3	
	No. 2	Crops	12.0	7.2	18.4	44.5	37.9	24.8	19.2	25.6	21.8	12.8	4.8	33.6	262.6	
		Animals	11.5	10.4	11.5	11.3	11.5	11.3	11.5	11.5	11.3	11.3	11.3	11.5	11.5	136.1
		Total	23.5	17.6	29.9	55.8	49.4	36.1	30.7	37.1	33.1	24.3	16.1	45.1	398.7	
Medium 15 feddan	Pattern No. 1	Crops	36.0	19.2	52.8	88.8	76.8	45.6	28.8	48.0	28.8	33.6	9.6	93.6	561.6	
		Animals	34.5	31.1	34.5	33.3	34.5	33.3	34.5	34.5	33.3	34.5	33.3	34.5	405.8	
		Total	70.5	50.3	87.3	122.1	111.3	78.9	63.3	82.5	62.1	68.1	42.9	128.1	967.4	
	No. 2	Crops	36.0	21.6	55.2	133.4	75.4	45.6	43.2	76.8	60.7	33.6	9.6	93.6	684.7	
		Animals	34.5	31.1	34.5	33.3	34.5	33.3	34.5	34.5	33.3	34.5	33.3	34.5	405.8	
		Total	70.5	52.7	89.7	166.7	109.9	78.9	77.7	111.3	94.0	68.1	42.9	128.1	1,090.5	
Large 20 feddan	Pattern No. 1	Crops	48.0	25.6	70.4	118.4	102.4	60.8	38.4	64.0	38.4	44.8	12.8	124.8	748.8	
		Animals	45.9	41.5	45.9	44.5	45.9	44.5	45.9	45.9	44.5	44.5	44.5	45.9	45.9	540.8
		Total	93.9	67.1	116.3	162.9	148.3	105.3	84.3	109.9	82.9	90.7	57.3	170.7	1,289.6	
	No. 2	Crops	48.0	28.8	73.6	166.4	100.6	60.8	57.6	102.4	80.9	44.8	12.8	124.8	901.5	
		Animals	45.9	40.5	45.9	44.5	45.9	44.5	45.9	45.9	44.5	44.5	44.5	45.9	45.9	540.8
		Total	93.9	70.3	119.5	210.9	146.5	105.3	103.5	148.3	125.4	90.7	57.3	170.7	1,442.3	

Based on the above discussions, four alternative cropping patterns were suggested and their suitability examined by which farms would also breed cattles for meat/milk by feeding on their harvested crops including fodder crops and others.

The arable land within the proposed area occupies a total area of 85,800 feddan, including 65,406 feddan (about three-fourths of the total) in the southern section of clay soil type, and 20,394 feddan (about one-fourth of the total) in the northern section of loamy soil type. The market accessibility of the northern suggests the priority of growing labor-intensive crops such as vegetables, etc. to the southern.

Heavy clay soil is predominant in the area which has a high salinity content. For leaching, paddy rice and berseem should be maintained for the first three years in rotation. After three years, the salinity content will have declined so that middle-leveled salt tolerant crops can be grown.

Alternative No. 1 is a relatively economical pattern among the existing patterns for growing sugar beets in the Nile delta region. Alternative No. 2 is the most general pattern in the delta region. Alternative No. 3 is a pattern focusing on growing sugar beets combined with breeding. Alternative No. 4 is an extremely simple pattern for growing paddy rice.

The outputs of crops based on a five-feddan farm consisting of 4.9 feddan net arable land are as shown in Table C-2-9. The family labor requirements are also as shown in Table C-2-10.

The estimated manpower available in a standard farm having two male adult workers is 50 working-days per month based on a 25-day month, and the required manpower in any alternative is less than 50 days. Thus, on any pattern, farming can be managed with the available family labor force. Among alternatives, Alternative No. 1 requires the maximum number of working days; it shows the available labor force is most efficiently utilized by this pattern. Alternative No. 2 has its peak in labor requirement in September for harvesting cotton; a large gap in labor requirement between the busy farming season and slack season arises by this pattern. Alternative No. 4 has also its peak in June for

Table C-2-9 Production of Crops Based on Small Size Farm (5 fed)

Crops	Project	Alternative			
	heavy clay No. 1	No. 1	No. 2	No. 3	No. 4
Sugar Beet (ton)	37	37		37	
Rice "	4.4	4.4	4.4	4.4	13.3
Soybeans "	1.8	1.8			
Wheat "		2.6	2.6		
Cotton "			1.9		
Maize "			5.2	5.2	
Sorghum "	26	26		26	
Berseem "	37	37	44	74	111
Vegetable "	22				

Table C-2-10 Labour Distribution by Month

Description	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
(heavy clay) Crops	12.0	6.4	17.6	29.6	38.4	24.8	14.4	15.6	11.2	12.8	4.8	33.6	221.2
No. 1 Animals	11.5	10.4	11.5	11.3	11.5	11.3	11.5	11.5	11.3	11.5	11.3	11.5	136.1
Total	23.5	16.8	29.1	40.9	49.9	36.1	25.9	27.1	22.5	24.3	16.1	45.1	357.3
Crops	6.4	6.4	3.9	5.7	31.1	29.5	14.7	16.3	11.4	11.4	10.3	8.3	155.4
No. 1 Animals	12.2	11.1	12.2	12.0	12.2	12.0	12.2	12.2	12.0	12.2	12.0	12.2	144.5
Total	18.6	17.5	16.1	17.7	43.3	41.5	26.9	28.5	23.4	23.6	22.3	20.5	299.9
Crops	5.8	10.0	14.9	5.8	33.7	34.1	16.6	17.7	49.7	30.8	8.6	5.8	233.5
No. 2 Animals	6.5	5.6	6.5	6.4	6.5	6.4	6.5	6.5	6.4	6.5	6.4	6.5	76.7
Total	12.3	15.6	21.4	12.2	40.2	40.5	23.1	24.2	56.1	37.3	15.0	12.3	310.2
Crops	4.9	4.9	4.9	4.1	12.6	10.3	18.7	17.0	14.2	14.7	4.1	4.9	115.3
No. 3 Animals	13.7	12.4	13.7	13.4	13.7	13.4	13.7	13.7	13.4	13.7	13.4	13.7	161.9
Total	18.6	17.3	18.6	17.5	26.3	23.7	32.4	30.7	27.6	28.4	17.5	18.6	277.2
Crops	4.9	4.9	4.9	4.9	17.1	39.2	24.5	19.6	14.7	19.6	2.4	2.4	159.1
No. 4 Animals	14.4	13.0	14.4	14.1	14.4	14.1	14.4	14.4	14.1	14.4	14.1	14.4	170.2
Total	19.3	17.9	19.3	19.0	31.5	53.3	38.9	34.0	28.8	34.0	16.5	16.8	329.3

Alternative

transplanting paddy rice; this pattern is not recommendable because it requires much water supply and strenuous labor in weeding water plants which would grow thick by cultivating paddy rice every year.

In the analysis made in the preceding discussions and the economical consideration, cropping pattern No. 1 and No. 2 were adopted for the Project cropping pattern.

Fig. C-2-1 Cropping Pattern No. 1

Year	Jah.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Vegetables							Rice				
	Berseem					Soy bean						
	Sugar Beet						Sorghum					
2nd	Berseem					Soy bean						
	Sugar Beet						Sorghum					
	Vegetables						Rice					
3rd	Sugar Beet						Sorghum					
	Vegetables						Rice					
	Berseem					Soy Bean						

Fig. C-2-2 Cropping Pattern No. 2

Year	Jah.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Vegetables							Rice				
	Berseem					Soy Bean						
	Sugar Beet					Vegetables		Sorghum				
2nd	Berseem					Soy Bean						
	Sugar Beet					Vegetables		Sorghum				
	Vegetables						Rice					
3rd	Sugar Beet					Vegetables		Sorghum				
	Vegetables						Rice					
	Berseem					Soy Bean						

Fig. C-2-3 Cropping Pattern Alternative Plan No.1

Year	Jah.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Wheat							Rice				
	Berseem					Soy Bean						
	Sugar Beet					Sorghum						
2nd	Berseem					Soy Bean						
	Sugar Beet					Sorghum						
	Wheat							Rice				
3rd	Sugar Beet					Sorghum						
	Wheat							Rice				
	Berseem					Soy Bean						

Fig. C-2-4 Cropping Pattern Alternative Plan No.2

Year	Jah.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Berseem							Rice				
	Berseem					Cotton						
	Wheat						Maize					
2nd	Berseem					Cotton						
	Wheat						Maize					
	Berseem							Rice				
3rd	Wheat						Maize					
	Berseem							Rice				
	Berseem					Cotton						



Fig. C-2-5 Cropping Pattern Alternative Plan No.3

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Sugar Beet							Rice				
	Berseem							Maize				
	Berseem							Sorghum				
2nd	Berseem							Maize				
	Berseem							Sorghum				
	Sugar Beet							Rice				
3rd	Berseem							Sorghum				
	Sugar Beet							Rice				
	Berseem							Maize				

Fig. C-2-6 Cropping Pattern Alternative Plan No.4

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1st	Berseem							Rice				
	Berseem							Rice				
	Berseem							Rice				
2nd												
3rd												

**A P P E N D I X - C**

C-1 Comparison of the yields of some crops per unit area, among Egypt, Europe and North America

Crop	Average yield (ton/ha)		
	Egypt	Europe	North America
Wheat	3.138	2.969	1.957
Maize	3.776	3.591	5.258
Rice	5.287	4.159	5.080
Sorghum	4.092	3.732	3.315
Barley	2.642	3.192	2.187
Cotton	0.756	0.619	0.609
Bean	2.361	1.378	
Lentile	1.862	0.755	1.275
Sesame	1.274	0.349	0.590
Ground nuts	2.094	2.000	2.491
Sugar cane	88.200	66.220	83.950
Onion (winter)	19.398	15.490	32.606

Source: Agency for International Development

C-2 Sharkia Governorate Crop Rotation System

a) Sandy Land, 2-year rotation

Year or plot	Winter	Summer
1	Wheat, barley, vegetable, lupine	Groundnuts, watermelon
2	Berseem clover, beans, onion, garlic	Sesame, watermelon

b) Loamy Land, 3-year rotation

Year or plot	Winter	Summer
1	Berseem clover, beans, vegetables	Cotton, soybeans
2	Berseem clover, beans, vegetables, garlic	Watermelon, vegetables, groundnuts, maize
3	Wheat, linen, barley, lupine	Rice, vegetables, groundnuts

After Sharkia Governorate, Dept. of Agriculture

C-3 Port Said Governorate Crop Rotation System

3-year rotation

Year or plot	Winter	Summer
1	Berseem clover	Cotton
2	Berseem clover	Rice
3	Berseem clover	Maize and vegetables

After Port Said Governorate, Dept. of Agriculture

C-4 Planted Area, Yield, Production of Main Crops by Year (Whole Egypt)

(1) Field Crops (Summer and Nili Season)

Crops.	Area ('000 fed.)				Yield (ton/fed.)				Production ('000 ton)						
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Cotton	1,248	1,424	1,189	1,196	1,245	0.9	0.8	1.0	1.1	1.1	1,084	1,099	1,188	1,288	1,408
Maize	1,891	1,765	1,899	1,885	1,905	1.6	1.5	1.6	1.6	1.7	3,047	2,724	3,117	2,938	3,231
Rice	1,079	1,040	1,031	1,040	972	2.1	2.2	2.3	2.4	2.5	2,300	2,272	2,351	2,511	2,384
Vegetables	703	701	712	759	772										
Millet	474	408	433	407	409	1.6	1.6	1.6	1.6	1.0	759	648	681	635	635
Total*	5,856	5,832	5,499	5,832	5,841										

\*Summer and Nili Crops total

(Winter Season)

Crops	Area ('000 fed.)				Yield (ton/fed.)				Production ('000 ton)						
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Berseem clover	2,757	2,854	2,782	2,777	2,711										
Wheat	1,396	1,207	1,380	1,391	1,326	1.4	1.4	1.4	1.3	1.4	1,960	1,697	1,933	1,856	1,796
Beans	298	325	275	288	276	0.9	0.8	0.8	0.8	0.8	254	270	231	236	213
Vegetables	215	214	225	260	272										
Barley	104	95	114	107	96	1.2	1.2	1.2	1.1	1.1	123	111	132	122	107
Total*	5,042	4,958	5,029	5,063	4,929										

\*Winter Crops Total

(2) Vegetables

Crops	Area ('000 fed.)				Yield (ton/fed.)				Production ('000 ton)						
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Tomato	308	293	311	329	332	6.7	6.7	7.1	7.3	7.4	2,066	1,967	2,197	2,420	2,468
Potato	128	152	128	142	157	7.0	6.6	6.0	7.1	7.7	893	1,010	772	1,019	1,214
Watermelon	122	114	121	125	119	11.1	10.4	10.8	10.0	9.7	1,362	1,187	1,312	1,219	1,157
Marrow	49	51	56	57	56	7.7	7.7	7.6	8.0	7.8	378	393	427	455	439
Snake Cucumber	35	35	36	40	45	6.4	6.1	6.4	6.8	6.5	224	215	231	272	294
Total*	931	932	951	1,033	1,044										

\*All Kinds of Vegetables Total

(3) Fruit Crops

Crops	Area ('000 fed.)				Yield (ton/fed.)				Production ('000 ton)						
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Oranges	152	155	159	160	162	5.0	4.3	5.3	6.6	5.7	775	671	843	1,050	921
Grapes	46	48	50	52	57	6.1	5.2	5.5	4.7	5.2	279	248	274	242	299
Mango	25	25	27	27	28	3.4	2.3	3.3	4.3	3.5	84	57	90	115	98
Tangerine	15	15	15	15	17	5.7	5.1	5.7	6.5	4.1	85	76	85	98	70
Lemon	11	11	13	14	17	4.1	4.2	4.5	4.6	4.2	45	46	58	64	72
Guana	12	13	14	15	16	7.6	6.3	7.0	7.9	6.7	91	82	98	119	107
Total*	313	321	332	342	360						2,011	1,902	2,084	2,373	2,282

\*All Kinds of Fruit Trees Total



C-5 Planted area of main crops by year

(1) Dakahlia Governonate

Crop	Area ,000 fed.			Crop	Area ,000 fed.		
	1979	1980	1981		1979	1980	1981
Field crops				Cucumber	3	3	4
Berseem Clover	403	383	334	Watermelon	3	3	3
Rice	266	269	266	Cabbage	2	1	2
Cotton	187	217	209	Fruit trees			
Wheat	153	134	141	Citrus	5	15	15
Maize	94	97	108	Grape	3	4	5
Barley	7	9	49	Peach	1	1	2
Vegetables							
Tomato	3	23	21				
Potato	9	9	8				

After Dakahlia Gov. Dep. of Agriculture

(2) Shalkhia Governonate

Crop	Area ,000 fed.			Crop	Area ,000 fed.		
	1980	1981	1982		1980	1981	1982
Field crops (summer)				Egy. Clover	13	14	13
Maize	208	208	229	Lentil	6	6	5
Rice	142	150	165	Vegetables (summer)			
Cotton	143	138	115	Tomato	14	14	14
Onion	17	11	11	Cucumber	5	6	6
Ground nuts (winter)	5	6	6	Watermelon (winter)	4	4	4
Wheat	180	188	178	Tomato	18	20	19
Beans	18	17	19	Squash	7	7	7
Barley	12	12	16	Green peas	2	3	3

After Sharkhia Gov. Dep. of Agriculture

(3) Port Said Governonate

Crop	Area ,000 fed.			Crop	Area ,000 fed.		
	1980	1981	1982		1980	1981	1982
Field crop (summer)				(winter)			
Maize	1.2	1.5	2.0	Berseem	2.8	3.7	3.7
Rice	0.8	0.6	1.0	Clover			
Cotton	0.6	0.6	0.5	Vegetables			
				Tomato	0	0	0

After Port Said Governonate, Dep. of Agriculture



C-6 Input materials per feddan

	Rice	Soy bean	Sorghum	Sugar beet	Egyptian clover	Tomato
Seed	40 kg	20 kg	3 kg	7 kg	25 kg	0.1 kg (seedling 10,000 trees)
Fertilizers (1)						
Urea	100 kg	20 kg	100 kg	80 kg	-	800 kg
Super-phosphate	95 kg	100 kg	100 kg	100 kg	200 kg	350 kg
Protection						
Herbicides	1 time	1 time	1 time	2 times	-	1 time
Fungicides and pesticides	6 times	3 times	-	5 times	1 time	8 times

(1) Lime fertilizers (CaCO<sub>3</sub>) must be added, to adjust P.H value of soil moderately.

C-7 Insecticides and Chemical Fertilizers Applied to Agriculture

Year	Insecticides (ton)	Azot and Ammonic Fertilizers ('000 ton)	Phosphatic Fertilizers ('000 ton)	Potassium Fertilizers ('000 ton)
1953	2,143	648	92	-
1975	27,055	2,578	303	3,935
1976	25,593	2,646	382	6,179
1977	28,344	2,797	441	5,621
1978	26,074	3,135	606	7,397
1979	22,715	3,224	644	11,546
1980	20,192	3,764	783	29,024
1980/81	19,046	3,684	696	19,626

Source: Statistical Yearbook, Egypt

C-8 Protection Materials

	Rice	Soy bean	Sorghum	Sugar beet	Berseem	Tomato
Herbicides						
	Oxadiazon 12% 2 L (pre emergency)	Alachlor 43% 0.8 L Linuron 50% 0.5 kg (pre emergency)	Atrazine 47.5% 0.5 kg (pre emergency)	Pyramine 60% 2 L TCA 88% 2 kg (pre emergency)		Alachlor 43% 0.8L (pre emergency)
				Betanol 13% 3 L (post emergency)		
Fungicides and Pesticides						
	Copper sulfate (nursery bed)	Malathion 50% (3 times)		Dipterex 50% (3 times)	Kerosine with irrigation water (1 time)	Benlate (seed) Zineb 72% (4 times)
	BPMC 50% (2 times) MEP 50% (3 times)			Pyresroid (2 times)		Acephate 50% (3 times)

C-9 Cropping Method

Crop	Rice	Soy Beans	Sorghum	Berseem (Baladi)	Sugar Beet	Tomato (Winter)
Varieties	Giza 159, Giza 171, Filippino, etc.			Socalvar	Busa Mono G, Busa Mono Fort, etc.	Pitchard, Money maker, Ais, etc.
Seed	40 kg/fed. Self supply or bought from the MA through COOP	20 kg/fed. with root noduk bacteria	30 kg/fed.	25 kg/fed. dressed with Captan 0.2 kg, root nodule bacteria	7 kg/fed. from sugar beet company	0.1 kg/fed. bought from private company through COOP
Nursery bed	0.12 fed/fed. middle of May 20 m /fed. manure and 100 kg/fed. ammonium sulfate applied, plowed in.					0.01 fed./fed.
Field preparation	Plowing and harrowing	Plowing and harrowing	Plowing and harrowing		Sep.-Oct. Plow twice, one with subsoil, harrow, level, and ridge at 60 cm distance.	Sep.-Oct. Plowing; harrowing leveling and ridging.
Seeding or transplanting	June-July when seedling becomes 20 to 35 days old, trans- planted, the distance of seedling 15 cm.	Seeding Apr.-May the distance of seed 20 to 30 cm.	May, Broadcasting	Sep.-Oct. broad- cast seed before rice harvest	Oct.-Nov. 7 to 10 kg/fed. Plant density 45,000/fed.	Dec. Transplant 10,000 trees/fed.
Fertilization	Superphosphate before planting and urea after planting 1 to 2 times.	Lime fertilizer and superphos- phate before planting, and urea after planting.	Superphosphate before planting, and after cutting.	Superphosphate after rice harvest.	During land pre- paration superphosphate. After thinning 2 to 3 times Urea.	Before trans- planting manure 20 to 30 m <sup>3</sup> /fed, superphosphate after transplant- ing Urea at 4 to 5 times.
Weeding	Nursery when the seedling becomes 25 days old manually. Field after trans- planting (3 days) chemically, and afterwards manually.	Immediately after planting chemi- cally, and after- wards manually.	After seeding chemically, practiced.		Pre-emergency and post- emergency, chemically 2 times.	Pre-emergency chemical and afterwards manually.
Protection	Nursery, using coppersulphate Field, espe- cially to prevent stemborer.	Chemically, 3 times.		During May.	Chemically 5 times.	Chemically 8 times, and Jan. cover plants against cold.
Irrigation	Periodically till 20 days before maturity.	Periodically.	Periodically.	Periodically till 10th May.	Periodically.	Periodically till harvest time.
Harvesting	6 months after seeding, Oct.	4 months after seeding, Aug.	2 months after seeding, 1st cutting, and then 2nd and 3rd cutting at 1.5 months period.	1st cutting, 60 days after seed- ing and then 2nd to 5th cutting at 40 days period.	Mid. March to Apr. 6 months after seeding.	Mar. to May.
Yield (ton/fed.)	3 tons	1.2 tons	18 tons	25 tons	Root 25 tons	20 tons

C-10 Crop Production for Each Block by Each Year

Block	Area (fed.)	Year												
		crops	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th
<u>Clay Soil</u>														
PS No.1	8,980	Rice	4,490	8,981	11,674	5,388	6,885	7,484	8,382	8,981	8,981	8,981	8,981	8,981
		Berseem	71,844	89,805	116,747	47,896	56,877	62,864	71,844	74,838	74,838	74,838	74,838	74,838
		Sugar Beet			47,896	53,883	59,870	56,202	74,838	74,838	74,838	74,838	74,838	74,838
		Soy Beans			1,518	2,395	2,994	3,293	3,592	3,592	3,592	3,592	3,592	3,592
		Sorghum			29,935	35,922	41,909	47,896	53,883	53,883	53,883	53,883	53,883	53,883
		Vegetables												
<u>NH No.1 11,509</u>														
		Rice	5,755	11,509	14,962	6,903	8,825	9,591	11,509	11,509	11,509	11,509	11,509	11,509
		Berseem	92,074	115,092	149,620	61,383	72,892	80,565	95,910	95,910	95,910	95,910	95,910	95,910
		Sugar Beet			61,383	69,055	76,728	95,910	95,910	95,910	95,910	95,910	95,910	95,910
		Soy Beans			2,302	3,069	3,837	4,604	4,604	4,604	4,604	4,604	4,604	4,604
		Sorghum			38,364	46,036	53,717	69,055	69,055	69,055	69,055	69,055	69,055	69,055
		Vegetables												
<u>PS No.2 10,653</u>														
		Rice	11,511	23,023	29,930	13,813	17,658	19,186	21,485	23,023	23,023	23,023	23,023	23,023
<u>NH No.2 12,369</u>														
		Berseem	184,181	230,226	299,294	122,788	145,810	161,159	184,181	191,856	191,856	191,856	191,856	191,856
		Sugar Beet			122,788	138,136	153,484	176,507	191,856	191,856	191,856	191,856	191,856	191,856
		Soy Beans			4,604	6,140	7,675	8,442	9,209	9,209	9,209	9,209	9,209	9,209
		Sorghum			76,745	92,091	107,439	122,788	138,136	138,136	138,136	138,136	138,136	138,136
		Vegetables												
<u>NH No.3 13,672</u>														
		Rice	6,837	13,672	17,773	8,204	10,482	11,393	12,760	13,672	13,672	13,672	13,672	13,672
		Berseem	109,377	136,712	177,738	72,918	86,591	95,705	109,377	113,935	113,935	113,935	113,935	113,935
		Sugar Beet			72,918	82,033	91,147	104,819	113,935	113,935	113,935	113,935	113,935	113,935
		Soy Beans			2,734	3,646	4,557	5,014	5,468	5,468	5,468	5,468	5,468	5,468
		Sorghum			45,574	54,689	66,263	72,918	82,033	82,033	82,033	82,033	82,033	82,033
		Vegetables												
<u>NH No.4 3,506</u>														
		Rice	4,111	8,222	10,688	4,933	6,302	6,851	7,674	8,222	8,222	8,222	8,222	8,222
<u>NH No.5 3,506</u>														
		Berseem	65,773	82,216	106,881	43,849	52,070	57,551	65,773	68,514	68,514	68,514	68,514	68,514
		Sugar Beet			43,849	49,330	54,811	63,032	68,514	68,514	68,514	68,514	68,514	68,514
		Soy Beans			1,644	2,192	2,741	3,055	3,289	3,289	3,289	3,289	3,289	3,289
		Sorghum			30,909	37,561	43,042	46,185	49,330	49,330	49,330	49,330	49,330	49,330
		Vegetables												
<u>Loamy Soil</u>														
PS No.3	5,905	Rice	2,952	5,905	8,267	3,740	4,527	5,117	5,512	5,905	5,905	5,905	5,905	5,905
		Berseem	47,238	59,301	76,763	33,461	39,366	43,302	47,238	49,206	49,206	49,206	49,206	49,206
		Sugar Beet			31,492	35,429	39,366	45,271	49,206	49,206	49,206	49,206	49,206	49,206
		Soy Beans			1,378	1,772	2,165	2,362	2,362	2,362	2,362	2,362	2,362	2,362
		Sorghum			12,836	15,747	17,714	17,714	17,714	17,714	17,714	17,714	17,714	17,714
<u>PS No.4 6,441</u>														
		Rice	3,012	6,441	9,017	4,079	5,153	5,582	6,012	6,441	6,441	6,441	6,441	6,441
		Berseem	51,531	64,413	83,737	36,501	42,942	47,236	51,531	53,678	53,678	53,678	53,678	53,678
		Sugar Beet			34,354	38,648	42,942	49,383	53,678	53,678	53,678	53,678	53,678	53,678
		Soy Beans			1,503	1,932	2,362	2,576	2,576	2,576	2,576	2,576	2,576	2,576
		Sorghum			13,957	17,177	19,324	19,324	19,324	19,324	19,324	19,324	19,324	19,324
		Vegetables												
<u>NH No.4 8,048</u>														
		Rice	4,024	8,048	11,267	5,097	6,438	6,975	7,511	8,048	8,048	8,048	8,048	8,048
		Berseem	64,382	80,477	104,620	45,603	53,651	59,016	64,382	67,064	67,064	67,064	67,064	67,064
		Sugar Beet			42,921	48,286	53,651	61,699	67,064	67,064	67,064	67,064	67,064	67,064
		Soy Beans			1,878	2,415	2,951	3,219	3,219	3,219	3,219	3,219	3,219	3,219
		Sorghum			17,437	21,461	24,143	22,143	22,143	22,143	22,143	22,143	22,143	22,143
		Vegetables												



C-11 Crop Production for Each Block by Year (Vegetables)

	Area fed.	Crops	Ratio %	Area fed.	Year								
					11th	12th	13th	14th	15th	16th	17th	18th	19th
Winter Clayey soil PS No.1	8980 Vegetables 2994	Tomato	15	449	3592	4041	4939	6062	6735	6735	6735	6735	6735
		Onion	15	449	2694	3143	3592	4041	4490	4490	4490	4490	4490
		Cabbage	5	150	1497	1796	2245	2694	2994	2994	2994	2994	2994
		Beans	30	898	628	808	1077	1257	1357	1357	1357	1357	1357
		Peas	20	599	299	359	479	539	599	599	599	599	599
		Spinach	15	499	2021	2469	2694	3054	3592	3592	3592	3592	3592
NH No.1	11509 Vegetables 3837	Tomato	15	576		4604	5180	6331	7769	8633	8633	8633	8633
		Onion	15	576		3453	4029	4604	5186	5755	5755	5755	5755
		Cabbage	5	192		1918	2302	2878	3453	3837	3837	3837	3837
		Beans	30	1151		805	1036	1381	1612	1727	1723	1727	1723
		Peas	20	767		384	461	613	690	767	767	767	767
		Spinach	15	576		2590	3165	3453	3914	4604	4604	4604	4604
PS No.2 NH No.2	10653 12369 23022 Veg. 7685	Tomato	15	1153			9225	10378	12684	15567	17297	17297	17297
		Onion	15	1153			6919	8072	9225	10378	11531	11531	11531
		Cabbage	5	385			3847	4617	5771	6925	7695	7695	7695
		Beans	30	2305			1614	2409	2766	3227	3458	3458	3458
		Peas	20	1537			768	922	1229	1383	1565	1565	1565
		Spinich	15	1153			5189	6342	6919	7841	9225	9225	9225
NH No.3	13672 Vegetables 4558	Tomato	15	684				5473	6157	7525	9236	1026	1026
		Onion	15	684				4104	4789	5473	6157	6841	6841
		Cabbage	5	228				2277	2732	3415	4098	4554	4554
		Beans	30	1367				957	1230	1640	1914	2051	2051
		Peas	20	912				456	547	729	821	912	912
		Spinach	15	684				3079	3763	4104	4652	5473	5473
NH No.4 NH No.5	3506 4716 8222 Veg. 2741	Tomato	15	411					3289	3700	4522	5550	6166
		Onion	15	411					2466	2878	3289	3700	4111
		Cabbage	5	137					1370	1644	2055	2466	2741
		Beans	30	822					576	740	987	1151	1233
		Peas	20	548					274	329	438	493	548
		Spinach	15	411					1850	2261	2466	2795	3289

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Crop Production for Each Block by Year (Vegetables)

	Area fed.	Crops	Ratio %	Area fed.	Year								
					11th	12th	13th	14th	15th	16th	17th	18th	19th
Loamy Soil PS No.3	5905 Vegetables 1968	Tomato	15	295	2656	3246	3984	4427	4427	4427	4427	4427	4427
		Onion	15	295	2066	2361	2656	2951	2951	2951	2951	2951	2951
		Cabbage	5	98	1176	1470	1764	1961	1961	1961	1961	1961	1961
		Beans	30	590	531	708	826	885	885	885	885	885	885
		Peas	20	393	236	314	354	393	393	393	393	393	393
		Spinach	15	295	1476	1771	1918	2214	2361	2361	2361	2361	2361
PS No.4	6441 Vegetables 2147	Tomato	15	322			2902	3548	4354	4838	4838	4838	4838
		Onion	15	322			2258	2580	2903	3225	3225	3225	3225
		Cabbage	5	108			1290	1613	1935	2150	2150	2150	2150
		Beans	30	644			580	773	901	967	967	967	967
		Peas	20	429			257	257	344	386	429	429	429
		Spinach	15	323			1613	1935	2097	2419	2580	2580	2580
NH No.4	8048 Vegetables 2683	Tomato	15	403					3624	4429	5436	6040	6040
		Onion	15	403					2819	3221	3624	4026	4026
		Cabbage	5	134					1606	2008	2410	2677	2677
		Beans	30	810					725	967	1128	1208	1208
		Peas	20	622					373	498	560	622	622
		Spinach	15	403					2013	2416	2617	3020	3221
Summer PS No.3	5620 Vegetables 984	Tomato	20	197	1774	2168	2665	2957	2957	2957	2957	2957	2957
		Corn	50	492	2461	2953	3446	3938	3938	3938	3938	3938	3938
		French beans	10	99	248	297	347	396	446	446	446	446	446
		Okra	20	197	788	947	1045	1104	1183	1183	1183	1183	1183
PS No.4	6111 Vegetables 1074	Tomato	20	215			1935	2365	2903	3225	3225	3225	3225
		Corn	50	538			2688	3225	3763	4301	4301	4301	4301
		French beans	10	108			269	323	376	430	484	484	484
		Okra	20	215			860	1032	1139	1204	1290	1290	1290
NH No.4	7635 Vegetables 1342	Tomato	20	269					2419	2957	3629	4032	4032
		Corn	50	671					3357	4029	4700	5371	5371
		French beans	10	134					335	402	469	535	603
		Okra	20	269					1075	1290	1425	1505	1603



ANNEX

D. ANIMAL HUSBANDRY



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## D. ANIMAL HUSBANDRY

### 1. Present Animal Husbandry

#### 1-1 Number of Livestock and Feed Stuff

Livestock and poultry in Egypt are raised not only for milk, meat, and egg production but for farming tasks. The number of livestock in Egypt totals to 7.29 million in 1981, of which cows and buffalos account for the largest 58 percent. In the eight-year period from 1974 to 1981, the number of livestock declined by five percent from the largest number of 9.23 million head in 1978, though the buffalo and goat are on the slightly rising trend in the last few years (See Table D-1-1). The number of poultry, on the other hand, increased by about four percent. The local chicken accounts for 77 percent of the whole poultry (See Table D-1-2).

The decline of livestock and increase in poultry appear to be attributed to the fact that the livestock primarily consume forage crops whose production volume is largely influenced by the availability of irrigation water which is rather limited (See Tables D-1-3 and D-1-4) whereas most of the poultry are fed with the concentrated feed whose ingredient, viz or maize, has been imported with a remarkably large volume in recent years. In addition, the government subsidy in the concentrated feed produced by the public enterprise also helps lower the supply price of feed.

#### 1-2 Production of Livestock

FAO estimates show that in 1981 Egypt produced 434,000 ton of meat (of which red meat shares 295,000 ton), 2,023,000 ton of milk, and 92,000 ton of egg whose rate of increase between 1969 and 1971 is 13 percent (red meat), 26 percent, and 67 percent, respectively (See Table D-1-5).

The low rate of increase in red meat production is accounted for the fact that the cattle raising is not very popular yet in Egypt and that 0.7 million head of veals and calves are slaughtered yearly because the supply of quality feed is insufficient in summer, which gives rise to the lack of milk to be fed to calves, and also because the Egyptians prefer soft calf meat (See Table D-1-6).