ARAB REPUBLIC OF EGYPT

# South Hussinia Valley Agriculture Development Project Phase II Survey

## Replies to Comments

MAY, 1984

Survey Team

of

Japan International Cooperation Agency

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1. Irrigation

Comments 1) To revise calculation of water requirement taking into consideration the following;

a) Calculate the leaching requirement using various equations.
b) That after completion of reclamation the total cultivated area after eliminating the area occupied by open drains will reach about 63,000 fed.

Agreements 1) Water Requirement

a) The leaching requirement will be checked again using various equation.
b) The cultivated area, cropping pattern, and water requirement after replacing open drains with pipe drains will be studied. The upper limit of 40 cubic meters per feddan per day will be considered as the maximum daily water requirement.

Replies 1)

a) - This study has employed the equation quoted in FAO's Irrigation/drainage note No.24.

- In addition, nine empirical equations have been studied. (ref. ICID materials)

- Among the above nine equations, those of USA, Salinity Laboratory, Bernstein (USA) and of R.S. Ayers et al (FAO) have been found in accordance with FAO's equation, whereas two equations used by the Republic China and Volobuev found

inapplicable to the Project. On the other hand, data/information are insufficiently provided for employing these three equations by Duranad (North Africa), Darab (Hungary) and Bresler (Israel).

- Leaching water requirements were calculated in referring to the equation used by Deleman et al (Iraq) and shown in the table attached hereto.

b) - The acreage of farm land at the Stage I (1986 - 1990) when leaching is made by open drains, will be about 44,600 feddan (18,730 ha).

This acreage, however, will be expanded to 55,740 feddan (23,410 ha) by replacing open drains with pipe drains (1991 - 1996).

- The irrigation water requirements were estimated based on the acreage of objective land by 55,740 feddan with pipe drains completed. The maximum daily water requirements was estimated at 39.8 $m^3$/feddan.

Comments 2) In the case of using gravity irrigation, the source of the earth needed for construction of the high embankment should be studied, also the economic of such practices on the project cost.

Due to problems encountered and the high cost involved of lining of canals and erecting of large pumping stations, it is suggested that other alternatives for substituting the three main pumping stations by small field lift units should be considered. The comparison can be attached to the appendix.

Agreements 2) Earth Volumes for Embankment

In case of the gravity irrigation system, the shortage of earth volumes for embankment of irrigation canals will be planned to compensate within the Project Area, that is, by excavation of drainage canals and by side borrow. Further studies on the method of side borrow, area of spoiled lands, thickness of surface soil cutting, distance of earth movement, and the cost will be made so that earth balance can be computed.

Replies 2)

- About 3.7 million cubic meters of earth materials should be hauled for embankment works of 323 km long irrigation canal construction. The borrow areas available in the Project Area will be those areas unsuitable to farming, residual materials by drainage canal construction, and side-borrows. For the first two methods, the cost will become high due to longer hauling distance of materials. Since the land in the Project Area is not reclaimed yet, the side borrow will be most economical for embankment materials for irrigation canal construction to be implemented in the Project Area.

- Earth materials should be bulldozed by about one meter deep from the both sides of the canal banks. The area required for the side-borrowing will be about 950 feddan (400 ha), which will be able to be filled back for farm land after completion of the irrigation canals.

Agreements 3) Comparison of Irrigation Methods by Gravity with Small Field Lift Units taking into consideration the cost of lining of the 45 percent of canal length.

Advantages and disadvantages of each method will be studied, and the way how to overcome the disadvantages of gravity irrigation will be clarified.

Replies 2)

- Traditionally, the Egyptian farmers have practised irrigation by the way that the water level in the canals has been lowered below ground surface elevation, and water distribution to fields has been made by uplifting with small-size pumps owned by farmers. This is advantageous in reducing the amount of seepage into canal bodies, preventing embankment damages given by farmers, and comparatively low construction cost, whereas disadvantageous in farm economy by purchase and operation/maintenance costs of pump units.

- About 46 percent of farm land will be irrigated by gravity system through El Salam Canal.

- A comparative study for the area of about 9,670 ha to commanded by M2 canal system was made on gravity irrigation with main pumping station and on-farm level small-pumping system by farmers, resulting in finding that the annual expenditure by gravity system (LE $1,617 \times 10^3$) is advantageously less than that by small-pumping system (LE $2,967 \times 10^3$).

- The Project should adopt the gravity irrigation system in due consideration of economic advantage, parallel land consolidation works with construction works to provide intake notches with each plot and favourable clayey soil condition to prevent canal seepage.

- Ml irrigation canal system (covering 6,650 ha), when taking the slope of main canal by 1/20,000, can totally command lining should be implemented in taking into account embankment stability against relatively high designed water level ranging from 1.0 m to 2.5 m from ground surface.

- A comparative study of the above plan was made with a plan of introducing the on-farm level small-size pumping irrigation for reducing the high cost of concrete lining of Ml canal system by lowering water level in the canal. Such a plan using on-farm level pumping irrigation method was found uneconomical due to expensive installation and O & M costs of pumping facilities, although advantageous in saving the canal construction cost.

- The details of the comparative study are annexed hereto as Appendix.

Comments 3) Study of the non-weeding velocity. Therefore, the canal profile and hydraulic gradient should be revised.

Agreements 4) Countermeasures against Weeds and Canal Gradients

It is difficult to control weeds by Egyptian traditional irrigation methods. Due to the topographic conditions of the Project Area, the canals have to be unavoidably designed to have very small gradients. It is necessary to increase the flow velocity to more than 70 centimeters per second for weed control. In order to increase the flow velocity by steepening the canal gradients, the Project cost should increase to a great extent owing to the increasing number of pumping stations and pump head. Weed control should depend upon the other methods, accordingly. Various methods such as use of chemicals, specially by fish speceis or machinery, etc., will be studied, and the initial cost and running cost in case of increasing the canal gradient for a higher flow velocity will be studied.

Replies 3)

- As for M1, M2 and M3 irrigation canal systems, comparative studies were made on their initial costs and running costs with the canal slope varied in range from 1/10,000 to 1/25,000. The canals with steeper slope is found high in initial cost and running cost due mainly to high cost of pumping facilities. Therefore, the slope of 1/20,000 has been proposed for the Project. In this case, the maximum velocity is in a range from 0.35 m/s to 0.55 m/s, which will not be expected to serve for weed control in the canals.

- In the districts where chemical weed control has been carried out, the government has been stringently controlling the kinds and types of chemicals, dosing amount and methods.

- Efficacy of chemical weed killers works very selectively to the limited kind of weeds and the chemicals are different in their effects from each other in a variety of conditions such as aridity, standing water or running water, and so forth. A thorough test of chemicals should be practised on residual efficacy and toxicity to fish prior to dosing so as to established a guideline for chemical weed killers dosing.

- Liberation of grass fish/tilapia will successfully control some kind of weeds. Such fish liberation, however, will not be practised in the Project that will do an interval water conveyance.

- The Project will employ man-power and mechanical weed control, and chemical control to discussed in Appendix.

Comments 4) A coloured map showing the irrigation rotation (winter and summer rotations) for the main and branch canals, also including the duration of each rotation must be included in the report.

Agreements 5) Colored Map showing Irrigation Rotation

Taking one irrigation unit as an example, irrigation rotation and its duration in winter and summer for the main, branch, and tertiary canals will be shown on maps.

Replies 4)

- In summer, the peak of irrigation, water conveyance through the main and lateral canals will be practised in the interval method by four-day operation and four-day interruption, according to the rule prepared by Ministry of Irrigation.

- In summer, therefore, the whole farm land in the Project Area should be irrigated within four days; in other words, 1/4 of the whole farm land should be irrigated in a day. In winter when the water requirements are small non-irrigation intervals, although varying by crops, will range from 10 days to 12 days.

- The irrigation facilities are so designed as to secure such interval irrigation.

- The objective farm land to be irrigated in one day should be located sporadically in the Project Area, so as to alleviate the heavy duty of the drainage canals.

- A colored figure on rotational operation of M1 canal system is attached in Appendix B as an example.

Comments 5) If possible, study of design for improved water offtake for improving the water management in the Project Area.

Agreements 6) Rotational Water Management

Structures which are easy to handle and have sufficient accuracy will be studied.

Replies 5)

- The diversion works of the canals will be provided with slide gates which, widely used at present will be able regulate the amount of water to be diverted.

- The diversion by this method is economical in construction cost and advantageous in flexible operation, although instable in diverted water amount as compared with the quantitative regulating method that will require to keep the water at a certain level constantly in the canal.

- The quantitative regulating facilities which provide a diverted water amount regulating devious on the canals are expensive in construction cost, although comparatively precise in regulating amount of water.

Comments 6) To revise discharge of tertiary canals according to irrigation rotation and its duration and estimation of the cost. The water management should accordingly be taken into consideration.

Agreements 7) Discharge of Tertiary Canals

Back data for discharge computation of tertiary canals (380 liters per second) and its irrigation duration will be shown in detail.

Replies 6)

- The branch irrigation canals will command the farm land of 50 feddan (21 ha) although referred to by 100 feddan (42 ha) in draft report.

- The canal capacity will be determined according to peak water requirements in summer and canal operation rule of four-day interval principle. The peak water requirements in summer was estimated at 12.7 mm/day (1.470 lit./s/ha) at the level of main and lateral level, while 10.8 mm/day (1.25 lit./s/ha) at the on-farm level.

- A branch canal can cover an irrigation area of 21 ha as one day target. Irrigation by such branch canals will be repeatedly carried out at eight day intervals. Consequently, the branch canal capacity was estimated at 210 lit./s/21 ha. (8 x 1.25 x 21)

Comments 7) To submit a detailed execution plan to reclaim submerged lands and dry the surface soils and enable the subsoil plowing with a minimum cost and equipment.

Agreements 8) Execution Plan of Reclamaing Submerged Lands

A detailed execution plan will be included in the Final Report.

Replies 7)

- During the survey, about 12,000 ha were innundated by 0.5 m deep on an average. The inundated water will be reduced in its amount, as the construction works of El Salam canal is made progress together with a large amount of evaporation.

- Construction of the drainage canals and operation of pumping facilities will eliminate the inundation water and expedite drying up the ground surface. Implementation of there works will require the further detailed survey, and the standard penetration tests carried out at 10 points revealed that the bearability of the ground would be enough to operate marsh type construction machines.

- The main report discusses the drainability of the soils of the Area.

Comments 8) To clarify the reasons of lining of about 45 percent of main canals while the seepage losses shall be very small due to low permeability of the soil.

Agreements 9) Reasons for Lining of Main Canal

The lining of 45 percent of the main canal was design aiming to expand the irrigable area as much as possible without pumping up through reducing the head loss of the canal. A comparative study on irrigation facilities, irrigable area, and cost in cases with and without lining will be included in Appendix of the Final Report.

Replies 8)

- As shown in Replies 2), M1 system, with the whole canals lined by concrete, will be able to irrigate the total commanding area by gravity system. The concrete lining in this case does not aim at reducing conveyance loss by seepage, but securing adequate water head and stability of canal embankments.

- The comparative study of expensive concrete lining with alternative plans revealed that any alternatives would not be economically advantages to the former due to high initial cost of pumping stations and O & M cost of the relevant facilities. The details are discussed in Appendix.

Comments 9) Indicate the best economic dimensions of the basin when using basin irrigation method, taking into consideration land grading and mechanization.

Agreements 10) Dimension of Basin

From both aspects of construction and farm management, the best dimension of the basin will be shown for a few cases with different land slopes.

Replies 9)

- The major factors limiting the length of run of the plots are hydraulic features of flow, operation & maintenance of irrigation facilities and farming management, and the cost required for land levelling.

- Hydraulically, the maximum of the length of run was estimated as follows:

| Slope | Max. Length (m) |
|---|---|
| Level | 500 |
| 0.02 | 800 |
| 0.03 | 1,100 |

- The above maximum length was obtained as hydraulical value based mainly on soil permeability. Practically, however the length of run will be shorter than the above so as to reduce the irrigation hours, water losses and to save patroling hours. Experience tells that the maximum of the length of run is 400 m.

- In this Project, the farm land owned by typical farm household consists of three plots of 100 m x 70 m is size and as a whole, the size is 210 m x 100 m.

  Such shape and size of the farm land will not bring about any obstacles in irrigation practices.

Comments 10) Berm width of eight meters for main canals is big, five meters may be sufficient.

Agreements 11) Berm Width

The term "berm width" in the text will be revised to "top width of embankment".

Replies 11) - The berm width of the main canals shall be 5.0 m.

- The width of 8.0 m shown in the report indicates the width of the farm roads.

Comments 11) Parshall flumes as measuring structures at the head of main and secondary canals seem costly, if possible study another cheaper alternatives.

Agreements 12) Water Measurement Structure at Turnouts

Parshall flumes are planned to be installed to the main canal where necessary. For secondary, any other alternatives which are more economical will be studied.

Replies 11)

- Water regulating devices include not only parshall flumes but overflow weirs, drop works, and open canal meters.

- Selection of an adequate regulating devices was made in taking into account the following items.

  ° Comparatively large amount of discharge (1 - 10 $m^3/s$).

  ° To secure water head as much as possible in considering the flat topographical condition.

  ° To be free from troubles by sediments because of earth canals.

- ° To be easy in measuring and rendering operation and maintenance services.

- ° To be economical in installation cost.

- Regulating by overflow depth with drop works is deemed unsuitable because very gentle slope canals. Open canal meters are used for small amount of discharge, being unsuitable to the Project, and considerably expensive as well.

- The alternative is by overflow weirs, by which measuring is made easily. Construction cost is relatively low in the concrete lining canals, but there will be several problem expected as follows:

  - ° For complete overflow, water head should be larger than that by parshall flume.

  - ° In earth canal, preciseness of measuring will become low due to vegetation and sand deposits in the canals.

  - ° After overflow, the flowing energy of water may cause scouring in the canals to result in endange the weirs in the stability.

  - ° Lining at immediate upstream and downstream securing preciseness of measuring and stability of the facilities. The cost estimate made for this method revealed that the necessary cost of parshall flumes in the similar scale to the weirs would be the same or lower.

- The analysis has resulted in adopting parshall flumes in this Project, which will require construction works with prudence because of more complicated structure than weirs, although advantageous in the following points.

  ° Head loss is small.

  ° No sand deposits are expected in the devices.

  ° Measuring is easy with high precision.

Comments 12) It is asked to add escape-table at the end of main and branch canals.

Agreements 13) Escape-Tails

Escape-tails will be additionally designed in the Final Report.

Replies 12)

- The downstream ends of the main and lateral canals will be directly connected with drainage canals or table escape canals to be provided. About 14,500 m long tale escape canals will be constructed, accordingly.

Comments 13) As to implementation schedule

a) To study the possibility of carrying out the execution of the Project Area to cope with the general plan of reclamation.

Comments 20) Project Cost

a) Revision of project implementation schedule according to the Government Five-year Plan, as this will affect the escalation value and hence the project cost.

Agreements 14) Implementation Schedule

a) From the viewpoint of reducing the cost escalation, the alternative with a construction period as short as possible will be studied to cope with the schedule of Five-Year Plan.

Replies 13 1. GARPAD offered the schedule of Five-Year Plan.

a) Developed Acreage (Feddan)

| | 1982/83 to 1986/87 | 84/85 | 85/86 | 86/87 | Remaining |
|---|---|---|---|---|---|
| South and North Hussinia Valley | 90,000 (100%) | 12,000 (13.3) | 22,000 (24.5) | 16,000 (17.8) | 40,000 (44.4) |
| South and North Port Said | 60,000 | 5,000 | 10,000 | 15,000 | 30,000 |

b) Project Cost

South and North Hussinia Valley 154.793 Million L.E.
South and North Port Said 103.200 "
(Foreign cost is 7.3% of total project cost)

2. Acreage project in the Feasibility Study Report carried out by JICA is as follows.

South Hussinia Phase II 74,700 feddans
North Hussinia Block of North Hussinia 69,000 feddans
Block of South Port Said 41,000 "
Total 110,000 "

Though the Five-Year Plan scheduled as 90,000 feddans on South and North Hussinia Valley excluding South Port Said, the said acreage in the Feasibility Study is estimated at 143,700 feddans (74,700 feddans of South Hussinia + 69,000 feddans of North Hussinia).

In order to study alternative on implementation schedule, an annual implementation schedule of 143,700 feddans shall be assumed to be implemented under the annual percentage in the Five-Year Plan mentioned above.

| | 1984/85 | 85/86 | 86/87 | Remaining | Total |
|---|---|---|---|---|---|
| South and North Hussinia Valley | | | | | |
| (Fed.) | 12,000 | 22,000 | 16,000 | 93,700 | 143,700 |
| (%) | 8.4 | 15.3 | 11.1 | 65.2 | 100.0 |

3. Annual cost by sector in the original project and price escalation cost are shown as follows.

Table 1. Annual Investment Cost and Price Escalation Cost by Year

(Unit: Million L.E)

| | Agri.Land Reclamation | | | House & Social Infla. | Agri. Process. | Total | Price Escalation Value | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Stage I | Stage II | Total | | | | Agri. Land Reclam. | House Infla | Process | Total |
| 1985 | 5.8 | - | 5.8 | 2.9 | - | 8.7 | 0.7 | 0.4 | - | 1.1 |
| 1986 | 2.4 | - | 2.4 | 3.2 | - | 5.6 | 0.4 | 0.6 | - | 1.0 |
| 1987 | 25.0 | - | 25.0 | 8.3 | - | 33.3 | 6.2 | 2.0 | - | 8.2 |
| 1988 | 41.1 | - | 41.1 | 7.7 | 7.4 | 56.2 | 12.3 | 2.4 | 2.3 | 17.0 |
| 1989 | 43.9 | - | 43.9 | 57.5 | 14.0 | 115.4 | 15.4 | 21.0 | 4.6 | 41.0 |
| 1990 | 26.0 | - | 26.0 | 49.4 | 41.6 | 117.0 | 10.4 | 20.7 | 15.3 | 46.4 |
| 1991 | 10.7 | 4.9 | 15.6 | 39.1 | 60.3 | 115.0 | 7.2 | 18.3 | 24.8 | 50.3 |
| 1992 | - | 49.3 | 49.3 | 41.8 | 34.7 | 125.8 | 26.3 | 14.5 | 15.3 | 56.1 |
| 1993 | - | 62.7 | 62.7 | 36.0 | - | 98.7 | 35.9 | 19.9 | - | 55.8 |
| 1994 | - | 40.6 | 40.6 | - | - | 40.6 | 24.8 | - | - | 24.8 |
| 1995 | - | 38.4 | 38.4 | - | - | 38.4 | 24.7 | - | - | 24.7 |
| 1996 | - | 15.2 | 15.2 | - | - | 15.2 | 10.2 | - | - | 10.2 |
| Total | 154.9 | 211.2 | 366.1 | 245.9 | 158.0 | 770.0 | 174.5 | 99.8 | 62.3 | 336.6 |

Note: Annual price escalation rate is estimated at 6% for foreign currency and 10% for local currency.

4. Alternative on implementation schedule shall be studied under the following hypothesis.

   a. Implementation to start in 1986 would be able to advanced one year if original schedule on loan negotiation and selection of consultants is not considered.

   b. Annual expenditure percentage of project cost is replaced by annual developed acreage in the Five Year Plan.

      On the agricultural land reclamation Project Stage I, engineering and administration would be carried in 1984 and annual project cost in 1985, 1986 and 1987 would be estimated using annual percentage of developed acreage in the Five Year Plan.

5. Annual cost for alternative is estimated as follows.

Table 2. Base Cost + Technical Contingency and Price Escalation Cost

(Unit: Million L.E)

| | Base Cost + Physical Contingency | | | | | | Price Escalation Value | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Agri.Land Reclamation | | | House & | Agri. | | Agri. | House | Pro- | |
| Year | Stage I | Stage II | Total | Social Infla. | Pro-cess | Total | Land Reclam. | Infla | cess | Total |
| 1984 | 5.04 | - | 5.04 | 5.18 | - | 10.22 | 0.24 | 0.23 | - | 0.47 |
| 1985 | 8.36 | - | 8.36 | 6.21 | - | 14.57 | 1.09 | 0.81 | - | 1.90 |
| 1986 | 15.24 | - | 15.24 | 5.33 | - | 20.57 | 3.43 | 1.20 | - | 4.63 |
| 1987 | 11.05 | - | 11.05 | 36.45 | 5.14 | 52.64 | 3.64 | 12.27 | 1.68 | 17.59 |
| 1988 | 35.38 | - | 35.38 | 28.71 | 9.45 | 73.54 | 15.64 | 13.04 | 3.60 | 32.29 |
| 1989 | 20.91 | - | 20.91 | 20.72 | 26.30 | 67.93 | 11.83 | 12.22 | 12.47 | 36.52 |
| 1990 | 8.63 | 2.53 | 11.16 | 20.31 | 35.42 | 66.89 | 8.03 | 14.93 | 20.67 | 43.63 |
| 1991 | - | 23.05 | 23.05 | 16.17 | 19.40 | 58.62 | 21.89 | 14.18 | 13.61 | 49.68 |
| 1992 | - | 26.79 | 26.79 | - | - | 26.79 | 30.33 | - | - | 30.33 |
| 1993 | - | 15.88 | 15.88 | - | - | 15.88 | 21.16 | - | - | 21.16 |
| 1994 | - | 13.73 | 13.73 | - | - | 13.73 | 21.31 | - | - | 21.31 |
| 1995 | - | 4.96 | 4.96 | - | - | 4.96 | 8.89 | - | - | 8.89 |
| Total | 104.62 | 86.93 | 191.55 | 139.07 | 95.71 | 426.33 | 147.49 | 68.88 | 52.03 | 268.40 |

6. According to the following table, the project cost and price escalation value of alternative plan should be expected at about 10 percent and 20 percent less than original value respectively.

| | Original Plan (A) | Alternative (B) | (B)/(A) |
|---|---|---|---|
| | ------- million L.E. ------ | | % |
| A. Entire Project Cost | | | |
| Agri. Land Reclamation | | | |
| Stage I | 154.9 | 146.5 | 94.5 |
| Stage II | 211.2 | 192.5 | 91.1 |
| Sub-total | 366.1 | 339.0 | 92.6 |
| Houses and Social Infra. | 245.9 | 207.9 | 84.5 |
| Farm Products Processing | 158.0 | 147.7 | 93.5 |
| Total | 770.0 | 694.6 | 90.2 |
| B. Price Escalation Value | | | |
| Agri. Land Reclamation | | | |
| Stage I | 50.3 | 41.9 | 83.3 |
| Stage II | 124.2 | 105.5 | 84.9 |
| Sub-total | 174.5 | 147.4 | 84.5 |
| Houses and Social Infra. | 99.8 | 68.9 | 69.0 |
| Farm Products Processing | 62.7 | 52.0 | 83.5 |
| Total | 336.6 | 268.3 | 79.7 |

Comments 13) As to Implementation Schedules

b) To start execution with roads, potable water, electricity and housing, etc.

Agreements 14) Implementation Schedule

b) Execution of rads, potable water, electricity, and housing should be started without delay to cope with the general plan of land reclamation.

Replies Implementation schedule on houses and social infrastructure was revised to cope with the settlement schedule as follows.

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|
| Road | | | | | | | |
| Electricity | | | | | | | |
| Potable Water | | | | | | | |
| Sewage | | | | | | | |
| Houses | | | | | | | |
| On-Farm (Initial Leaching) | | | | | | | |
| Settlement | | | Start | | | | |
| Training | | | Start | | | | |
| Farming | | | | Start in M1 Block | | | |

Comments 14) To determine the sources of raw construction materials for building houses and other constructions if possible.

Agreements 15) Sources of Raw Construction Materials

Taking into consideration the present tendency of shortage of bricks, the sources will be studied. Both plans, that is, a plan to build a small factory of cement blocks within or in the vicinity of the Project Area a plan to procure them from existing factories will be studied.

Replies

1) Estimation of unit production cost in Case of plan to build a small factory of cement blocks within the Project Area.

Target of production:

- Number of cement block in necessary to build one farm house including losses of transportation and construction ..... size 20cm x 40cm x 15 cm..... 1,800 pieces

- The largest number of houses build per year ..... 2,500 houses

- Average number of houses per day ..... 2,500 houses/12 month/25 day/month = 8.3 house/day

- Target of block production per day 8.3 house x 1,800 pieces/house x 1.2 (including losses) = 18,000 pieces

Capacity of new factory:

- Number of blocks produced per day ..... 18,000 pieces

- Land site of factory ..... 24 feddans (10 ha)

- No. of conceret mixer .... Capacity per one set mixer: 0.5 $m^3$ Concrete volume mixed per day: 28 $m^3$/day No. of mixer: 7 set (include spare of 2 set)

- No. of Tanklorry: 4 set with 5 $m^3$ capacity

° No. of Truck: 10 set with 10t capacity

° No. of Mold: It is assumed that one mold shall be used to provide 100 blocks per day. Hence mold of 200 sets is necessary.

° Acreage of site of building and others.
Office: 100 $m^2$, Storage 50 $m^2$, cement storage: 200 $m^2$, 400 $m^2$
small pound 40 $m^3$, curing pound 5 places, 7,500 $m^2$

° Staffs and lobor
staffs: 16 persons, skilled labor 200 persons.
Casual labor 400 persons

Production cost accumulated in construction period of five year.

| | |
|---|---|
| Raw materials ..... | 2,382 LE x $10^3$ |
| Building ..... | 570 |
| Fuel ..... | 310 |
| Equipment and facilities. | 648 |
| Salary and wage ..... | 8,100 |
| Others ..... | 20% |
| Total Cost ..... | 14,412 |

Unit original cost per 1,000 blocks ... 795 L.E.

2) Market price in case of procuring blocks from existing factories

A Company (Ex-factory price)

| | | |
|---|---|---|
| 10cm x 20cm x 40cm ..... | 200 | L.E./1,000 pieces |
| 20cm x 20cm x 40cm ..... | 300 | " |
| 25cm x 20cm x 40cm ..... | 330 | " |

B Company (Ex-factory price)

(i) Egyptian Standard
12cm x 20cm x 40cm .. 300 LE/1,000 pieces

(ii) ASTM Standard
C-129 (No load) ..... 350 LE/1,000 pieces
C-91 (Load) ..... 400 LE/1,000 pieces

Average transportation cost from factory to the Project Area is assumed at 300 LE/1,000 pieces Losses of transportation is 15%.
Using above information, wholesale price (ex-factory price + transportation cost) per 1,000 piece is estimated at average 705 LE/1,000 pieces.

3) As the results, the unit production cost in new factory is larger about 13% than the purchasing price from existing factory.

4) The purchasing system from existing factory seems to bring merit by cost down in compared with the self-sufficient system.

The Five Year Development Plan has the projection to increase the production quantities of bricks in construction sector from 2,627 million pieces, 1981/82 to 4,055 million pieces, 1986/87.

Building will be constructed 80 million unit from 1982/83 to 1986/87, maximum 185,000 unit per year in 1985/86. In consideration with the wholecountry demand to building materials in future, it seems as so difficulty that the cement blocks used in the Project Area shall be supplied from general market to

meet with the implementation schedule. The market price of blocks shall rise up because of expansion of domestic demand. The steady supply of blocks is an important matter. Hence, even through block price supplied is higher in some degreed, to produce cement block in timely by the new factory established within the Project Area is recommendable for promotion of the Project.

Unit cost described above is estimated considering production process depend upon labor as much as possible.

Hence labor cost occupy 67 percent of total cost. This is one reason to rise block price.

The further study is necessary whether cost down is possible to attain in the large block factory equipped by automatic mold. The block supply plant jointed with the North Hussinia and South Port Said Project is recommended.

Comments 15) It is required to study separate way of irrigation and drainage for the cultivated land held by squatters.

Agreements 16) Since the boundaries of squatters' cultivated lands are not clear, a qualitative study on these lands will be carried out taking into consideration the present cultivated land tenure conditions.

Replies

- As a conclusion, the method including the existing farm lands in the Project Area and making the farmers presently engaging in agriculture at such lands participate in the Project would be most recommendable.

The important items to be arranged for participation of the squatters are four items such as land holding, on-farm work and irrigation and drainage facilities, rural development and farm organization & marketing. Decision of an executing methods should be controlled by the regulation or law of the Government. The following study is carried out as a reference.

a. Land Holding

The boundaries of squatter's cultivated land are not clear. It is impossible to compel the standarized size of 5 feddans to the squatters or existing farmers, that is, to reduce farm area of squatters from larger size than 5 feddan to 5 feddans. The squatters with smaller size than 5 feddans shall be able to enlarge up to 5 feddans. Final plan should be made after confirmation of squatter's minds. Hence in an initial stage of settlement the squatters should be participated keeping the present cultivated land tenure conditions.

b. On-Farm Work and Irrigation and Drainage Facilities

The irrigation water sources for existing cultivated land are Bahr Saft Drain, Bahr Baqar Drain and drainage water discharged from outside of the Project Area. Since qualities and quantities of these water sources are instability, the stabilized water source have to be urgently developed. The irrigation water for the existing field of 7,800 feddans shall be taken from El Salam Canal. The on-farm works and irrigation and drainage facilities in the 7,800 feddans should be re-implemented based on the Project contents. However, actual on-farm works have to be carefully carried out through confirmation of squatter's willingness and land register survey to be carried out during the construction period in respect to keep the present cultivated land tenure system.

c. Rural Development

The squatter's houses have been built since the past 15 years. It is actually impossible to settle the existing inhabitants into new villages after abandonment of their buildings. Hence the existing inhabitants shall participate the Project keeping the existing situation of building. However, the social functions given new villages, that is, administration, education, commerce, public welfare, transportation, police and fire fighting could be used by the squatters. The roads to connect new villages with existing villages shall be planned in the rural development plan.

d. Farm Organization and Marketing

Irrigation water requirement and cropping pattern which are operated by the squatters shall be controlled by the Government under same rule adapted to new settlers. Existing farmers shall be requested to establish an irrigation group for operation and maintenance of terminal facilities.

2. Rural Development

Comments 16) Village Facilities Plan

Mosques are to be constructed by the Government and not by settlers. It is required, whenever possible, to modify the location of the villages to be far from drains.

Agreements 1) Mosques

The construction plan of mosques will be revised so that these will be built by the Government, and the cost will be included in the Project.

Agreements 2) Location of Villages

A study on water feeding facilities to domestic animals at emergent time and sanitary facilities will be carried out in the Final Report. An alternative study will be made to locate villages as much as possible next to the main canals without upsetting maximum walking distance of the farmers.

Replies The construction plan of mosques was revised to be built by the Government. The cost was included in the Project Cost. The water feeding facilities to domestic animals at emergent time will be facilitated in irrigation canal side. Sewage discharged from small farm houses and communal taps is sent to sewage plant. Composite is collected by vacuum car.

The location of the villages was revised to locate along irrigation canal.

| | |
|---|---|
| Irrigation Comments 17) | As to Land Disposal |
| | The Five-Year Plan is 1982 - 1987 and not 1980 - 1984. |
| Replies | Changed as commented |
| Irrigation Comments 18) | Roads |
| | The estimated cost for roads should be revised. |
| Irrigation (Comments 20) | b. To revise cost of electricity networks. Present estimated cost per feddan L.E. 54 is low. |
| Agreements 3) | Roads and Electricity |
| | The construction cost of roads and electricity will be checked. |
| Replies | The crossing works of road were planned as bridges. The cost of electricity was checked and revised properly. |
| Irrigation Comments 19) | Sewage Disposal |
| | System of sewage disposal should be revised possibly using the second alternative to reduce cost. |

Agreements 4) Sewage Disposal

In accordance with a comment given to the Field Report, the sewage disposal plan was formulated to introduce the latest method. The other methods will be studied for comparison.

Replies Sewage treatment method planned in the Draft Final Report is the activated sludge process method which has been ordinary used in the terminal plants of city sewage system. The activated sludge process method is advantageous in a case of around several ten thousands, because the compact facilities can serve and acreage of facilities sites in not necessary so much as compared with size of people. But in a case of 2,000 to 5,000 persons, this method is over investment and comparatively bring high cost. Unit cost of 464 L.E./feddan is proper value as the sewage treatment facilities with the activated sludge process method. However it is a reason of high cost because of high technical method to decrease target of BOD until 20 ppm.

Hence, in the Final Report, cost was downed due to the making of target of BOD with 60 ppm.

Alternative methods of activated sludge process, rotary disk process, soil-type contact aeration and oxidation ditch (OD) were studied.

Methods excluding BOD are compact and advantageous in a case of surplus land, while comparatively bring high cost due to over investment.

As the OD method can form very simple facilities, it bring low cost though needs larger land sites at three or four times than other three methods. The Project is planned with wide acreage. Hence, it is considered that OD method in the most suitable for the Project Area. Unit cost is estimated at 292 L.E./feddans.

3. Soils

Agreements 1) Maps

Clear maps will be prepared for the Final Report

Replies The following maps were prepared after clearing up.

| | | Scale | Remarks |
|---|---|---|---|
| 1. | Location of Investigation Sites | 1:100,000<br>1:50,000 | |
| 2. | Geomorphology and Land Slope Classification Map | " | Colored |
| 3. | Present Land use Map | " | |
| 4. | Soil Classification Map | " | Colored |
| 5. | Drainability Classification Map | " | |
| 6. | Surface Salinity Classification Map | " | |
| 7. | Subsoil Salinity Classification Map | " | |
| 8. | Groundwater Depth and Salinity Map | " | |
| 9. | Land Reclaimability Classification Map | 1:100,000<br>1:50,000<br>1:10,000 | Colored |

Comments 1) The soil analyses show that some soil samples may be alkali soils since the ESP is higher than 15. Yet the gypsum requirement was not determined to show if the gypsum present may be sufficient to cover the alkalinity.

Agreements 2) Soil Alkalinity and Gypsum Requirement

After checking soil alkalinity, the gypsum requirement will be estimated.

Replies According to the following formula (FAO/UNESCO, (1973) Irrigation, Drainage and Salinity, An International (Source Book p.436), the Gypsum requirement for the alkali soils (ESP 15) was estimated using the soil chemical analysis data;

$$\text{Gypsum Requirement in meq/100 g soil} = \left(\frac{\text{ESP} - \text{ESP final}}{100}\right) \times \text{CEC}$$

Here, a final ESP of 10 was considered as not resulting in any noticeable peptisation of the soil.

As the results, some portions of the Project Area require the gypsum 2 - 4 tons/feddan.

Comments 2) In all the family names, the particle size class should be clearly mentioned. In addition, a geomorphological map is needed. Moreover, the salinity maps (surface and subsurface soils) should show different mapping units for all the studied area.

Agreements 3) Nomenclature of Family Category

A term of "clayey" will be added following to "very-fine" or "fine" in order to clarify the particle size class.

Replies To clarify the particle size class, the term of "Clayey" was added as below;

LEGEND

| Map Symbol | Subgroup | Family |
|---|---|---|
| 1 a | Typic Salorthids | Fine clayey, Montmorillonitic, Thermic |
| 1 b | Typic Salorthids | Fine clayey, Montmorillonitic, Thermic |
| 2 | Typic Salorthids | Fine silty, Montmorillonitic, Thermic |
| 3 | Typic Gypsiorthids | Very-fine clayey, Montmorillonitic, Thermic |
| 4 | Typic Torriothents | Fine loamy, Montmorillonitic, Thermic |
| 5 a | Sulfic Hydroquents | Very-fine clayey, Montmorillonitic, Thermic |
| 5 b | Sulfic Hydraquents | Very-fine clayey, Montmorillonitic, Thermic |

Agreements 4) Geomorphological Map

A geomorphological map will be prepared although its accuracy will not be so high as other maps.

Replies As shown in Item 1) Maps, the geomorphology and land slope classification maps at the scales of 1:50,000 and 1:100,000 were prepared.

Agreements 5) Salinity Classification Maps

Soil salinity changes abruptly due to the local micro-topographical and groundwater conditions. Nevertheless, mapping units will be shown on the maps for the Final Report.

Replies Mapping units were shown on the maps, and the areas were measured by a degigrammer.

| Class | Surface Salinity | ECe (mS/cm) | Area (feddan) | Area (%) |
|---|---|---|---|---|
| 1 | Slightly Affected | 4 - 8 | - | - |
| 2 | Moderately Affected | 2 - 16 | 8,120 | 10.9 |
| 3 | Strongly Affected | 16 - 32 | 23,690 | 31.7 |
| 4 | Very Strongly Affected | 32 - 64 | 35,500 | 47.5 |
| 5 | Abnormally Affected | 64 | 7,390 | 9.9 |
| | Total | | 74,700 | 100.0 |

| Class | Surface Salinity | ECe (mS/cm) | Area (feddan) | Area (%) |
|---|---|---|---|---|
| 1 | Slightly Affected | 4 - 8 | 1,290 | 1.7 |
| 2 | Moderately Affected | 8 - 16 | 5,200 | 7.0 |
| 3 | Strongly Affected | 16 - 32 | 37,580 | 50.3 |
| 4 | Very Strongly Affected | 32 - 64 | 25,530 | 34.2 |
| 5 | Abnormally Affected | 64 | 5,100 | 6.8 |
| | Total | | 74,700 | 100.0 |

Comments 3) The bottoms of the swamps and inundated area are not soils and therefore they cannot be classified according to the soil taxonomy.

Agreements 6) Classification of Swamp and Inundated Lands

Only some paragraphs concerning the classification of the are will be changed in the text.

Replies The swamp and inundated lands are important in the North Hussinia and South Port Said Project Area.

Although there is a conflict about the adaptability of the Soils Taxonomy system for the permanent submerged lands, these lands were classified into a member of Entisols in order to adjust the classification strategy with the North Hussinia and South Port Said Project.

4. Agriculture

Comments 1) The suggested crop rotation in Stage two and three are similar in many respects. Both include vegetables which may not be successful in the second stage due to the high soil salinity. Moreover, in the permanent rotation the percent of fodder crops during the winter season is higher than the summer. It is suggested that the percent of fodders be balanced between both seasons.

Agreements 1) Crop Rotation in Second Stage

GARPAD accepted the Teams explanation that some vegetables will not be included in the crop rotation for summer cropping in the second stage despite of their high profitability due to a high soil salinity in this stage.

Agreements 2) Percent of Fodder Cropping Area

Open drains will be replaced with pipe drains, resulting in an increase in the total cropping area. A further study will be carried out to balance the fodder cropping areas in both seasons in the way to utilize the increased cropping area for this purpose.

Replies The total cropping area of 48,500 feddans increase in 55,740 feddans (incremental acreage of 7,240 feddans) after replacement of open drain with pipe drains. As results, the sorghum cropping areas of 2,380 ha would be extent to supply smoothly the fodder in summer season.

The fodder balance between both seasons was studies in the Appendix C.

Comments 2) The introduction of broccoli in the rotation although it is intended for export, yet a part will be consumed locally. Broccoli does not suit the taste of the Egyptian Consumers.

Agreements 3) Introduction of Broccoli

The destination of all broccoli will be revised to export in consideration of Egyptian's taste. The possibility to substituting cauliflower for broccoli will be studied.

Replies The cropping of broccoli was changed to cauliflower. Cauliflower is an ordinary crop in Egypt. Farmers in adjacent village of the project crop it. Hence it is considered that the cropping of cauliflower is adaptable to settler.

As the Germany and Netherlands import about 60 percent and 40 percent of domestic consumption quantities for cauliflower respectively, cauliflower produced in the Project Area would be expected as the strategy crop to promote an export.

Comments 3) No grading and packing plants for vegetables were included in the agro-industrial part of the report.

Agreements 4) Grading and Packing Plants

The cost for grading and packing plants for vegetables will be included in the Final Report.

Replies The cost for grading and packing plants for vegetables was included in the Final Report.

Comments 4) Very little was presented on the mechanization of the small field of settlers although Japan is advanced in this field. The training needed for operation and maintenance of machines is important. Moreover, some crops such as tomatoes if picked by hand will be very costly.

Agreements 5) Small Machines for Settlers' Field

The small scale mechanization of settlers' field will be mentioned in more detail in the Final Report. Training for operation and maintenance of farm machinery will be important. A training center will be studied to be set up in the Project Area.

Agreements 6) Picking Methods of Some Crops Like Tomatoes

Mechanization of picking tomatoes will be studied.

Replies The small scale mechanization was mentioned in more detail. An establishment of training center was recommended in the chapter of supporting service. An example of outline of center was described in Appendix C.

The picking machine of tomatoes is ordinary big size. Length, width, weight and horsepower are 6.5 to 10.0 m, 2.5 to 4.4 m, 3.8 to 9 ton and 60 to 160 PS, respectively (Refer to the attached figure).

The picking process of tomatoes is carried out as follows: trunk of tomatoes is cuted by machine at about 10 cm above the field and stalk, leaf and fruits are lifted by conveyer and fruits only drop from conveyer to selection board which unripe fruits

are taken off and over ripe fruits are crushed.

This process needs an equality of ripe period of tomatoes. Same kind of breeds, standardization of cropping method and technique are the premise conditions to introduce this machine. The big size machine like this type is easily operated on a wide acreage of tomatoes cropped by large group farmer.

One unit group farming is estimated as follows.

Efficiency per day of machine ..... 4 feddans
Operation period ..... 125 days (This is harvesting period of tomatoes and operation period of tomatoes processing factory).
Workable acreage of harvestor per season .... 4 feddans x 125 = 500 feddans

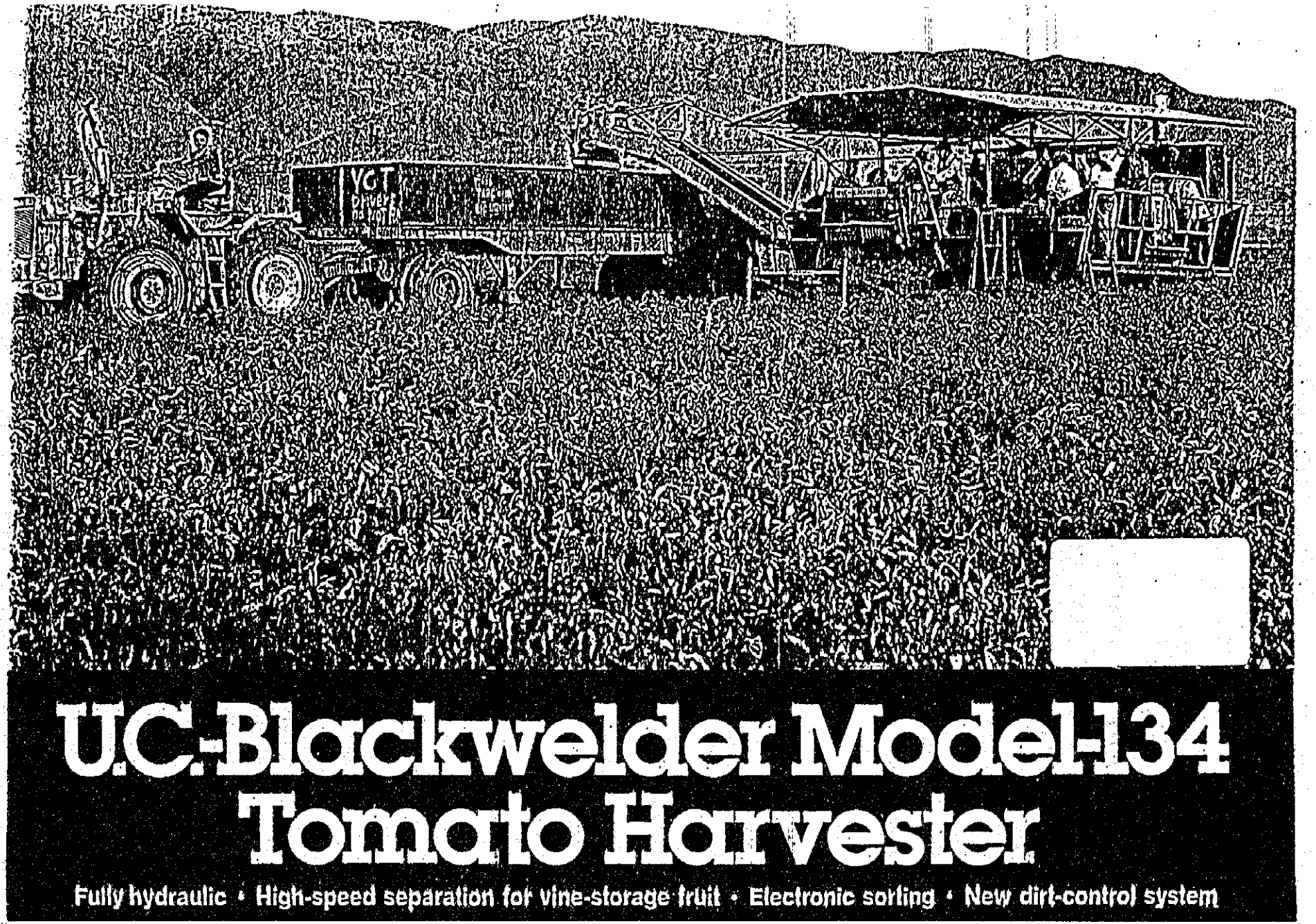
Number of farmers per unit group farming ... 300 farmers

In order to introduce the tomato harvestor, both side on cropping technique and farm management have to be considered. Hence, the harvesting method of tomatoes described in the Final Report was concluded that mechanization of picking tomatoes should be studied in future and the Final Report adopt an use method of man power.

Table 3. Crop production with open Drainage and Underdrainage

| Crops | Area (feddan) | | | Productivity (tons) | | |
|---|---|---|---|---|---|---|
| | Open Drainage | Underdrainage | Increase | Open Drainage | Underdrainage | Increase |
| Rice | 16,200 | 18,580 | 2,380 | 48,600 | 55,740 | 7,140 |
| Soybean | 16,100 | 18,580 | 2,480 | 19,320 | 21,630 | 2,310 |
| Sorghum | 8,200 | 10,580 | 2,380 | 147,600 | 190,440 | 42,840 |
| Berseem | 16,200 | 18,580 | 2,380 | 405,000 | 464,500 | 59,500 |
| Sugarbeet | 16,100 | 18,580 | 2,480 | 402,500 | 455,210 | 52,710 |
| Tomato | 8,000 | 8,000 | 0 | 160,000 | 156,800 | 3,200 |
| Onion | 11,400 | 13,000 | 1,600 | 114,000 | 127,400 | 13,400 |
| Cauliflower | 0 | 2,800 | 2,800 | 0 | 13,720 | 13,720 |
| Broccoli | 2,400 | 0 | Δ 2,400 1/ | 28,800 | 0 | Δ 28,800 1/ |
| Cabbage | 2,400 | 2,780 | 380 | 48,000 | 54,490 | 6,490 |
| Total | 97,000 | 111,480 | 14,480 | | | |

Note; 1/ ; Decrease


U.C.-Blackwelder Model-134
Tomato Harvester
Fully hydraulic • High-speed separation for vine-storage fruit • Electronic sorting • New dirt-control system

5. Animal Husbandry

Comments 5) The animal husbandry section, buffaloes will excluded primarily because of their large need of water. Moreover, in the report it was suggested to import only a small number of friesian cows for milk production, which it concentrated on a large number of local cows for meat production. It is suggested to import a large number of friesian cows for milk production. Fattening for meat production will be through the calves born on the farm.

Agreements 7) Buffaloes Breeding

A further study on buffaloes breeding will be made.

Agreements 8) Number of Friesian Cows to be Imported.

The profitability of friesian breeding is larger than that of baladi breeding. Hence, the possibility to increase the number of imported friesian cows and breed them will be studied.

Replies (1) Breeding of Buffaloes

Milk productivity of buffalo is inferior to that of Friesian as is compared under 4.4.5 of the Main Report. Admitting that the fat ratio of the buffalo milk is higher by 6 - 9 percent, the lactation period of buffalo ranges only for 150 - 200 days and, judging from the annual milk productivity point-of-view, Friesian gives more benefit than buffalo. Comparison between Buffalo and Friesian in their income estimates is tabulated in attached Tables 4 and 5.

Table 4. Estimated Income from Buffalo

Gross Income

| | Unit | Yield | Production | Unit Price | Gross Income |
|---|---|---|---|---|---|
| Milk | 1 | 540 kg | 540 kg | 450 LE/ton | 243.00 LE |
| Cull | 0.13 | 500 | 65 | 600 | 39.00 |
| Bull Calf | 0.25 | 50 | 13 | 2,000 | 26.00 |
| Heifer | 0.13 | 300 | 39 | 1,500 | 58.50 |
| Manure | - | | 9,000 | 3 | 27.00 |
| Total | | | | | 393.50 |

Production Cost

| | | |
|---|---|---|
| Berseem | 7.0 tons x 12 LE/ton = | 84.00 |
| Rice Straw | 1.6 x 25 = | 40.00 |
| Berseem Hay | 0.2 x 80 = | 16.00 |
| Maize Leaves | 1.8 x 12 = | 21.60 |
| Sorghum Straw | 0.8 x 20 = | 16.00 |
| Labor | 0.1 x 2LE/day x 365 = | 73.00 |
| Medicine | | 3.00 |
| Others | | 13.35 |
| Total | | 266.95 |

Net Income 126.55 LE

Table 5. Estimated Income from Friesian

Gross Income

| | Unit | Yield | Production | Unit Price | Gross Income |
|---|---|---|---|---|---|
| Milk | 1 | 3,655 kg | 3,655 kg | 250 LE/ton | 913.75 LE |
| Cull | 0.14 | 500 | 70 | 600 | 42.00 |
| Bull Calf | 0.42 | 55 | 23 | 2,000 | 46.00 |
| Heifer | 0.14 | 300 | 42 | 1,500 | 63.00 |
| Manure | - | - | 9,000 | 3 | 27.00 |
| Total | | | | | 1,091.75 |

Production Cost

| | | |
|---|---|---|
| Berseem | 9.1 tons x 12 LE/ton = | 109.20 |
| Rice Straw | 1.3 x 25 = | 32.50 |
| Berseem Hay | 0.6 x 80 = | 48.00 |
| Maize Leaves | 3.3 x 12 = | 39.60 |
| Sorghum Straw | 3.4 x 20 = | 68.00 |
| Concentrate | 1.6 x 40 = | 64.00 |
| Labor | 0.2 x 2LE/day x 365 = | 146.00 |
| Medicine | | 4.00 |
| Others | | 33.88 |
| Total | | 545.18 |

Net Income 546.57 LE

(2) Import of Friesian

Import of Friesian will need to be planned in accordance with its export capabilities from the Netherlands, Austria, etc., on the one hand, and the foreign exchange situation and the annual fodder production in the Project Area on the other. Number of cattle and sheep to be bred in the Project Area was calculated based on fodder production in the proposed crop production. However, taking into consideration in case it is not possible to import the necessary number of Friesian cow as commented by GARPAD to the North Hussinia Project, some case study as shown below including buffalo was carried out.

| | Friesian (%) | Buffalo (%) | Baladi (%) |
|---|---|---|---|
| Original | 30 | - | 70 |
| Case-1 | 40 | - | 60 |
| Case-2 | - | 45 | 55 |
| Case-3 | 15 | 70 | 15 |
| Case-4 | 15 | 15 | 45 |

Note: In any case five percent of fodder production shall be utilized for sheep breeding.

Animal products from each cases are shown below.

(Unit: tons)

| | Original | Case-1 | Case-2 | Case-3 | Case-4 |
|---|---|---|---|---|---|
| Beef | 4,130 | 4,100 | 5,060 | 4,440 | 4,480 |
| Milk | 63,830 | 70,590 | 33,530 | 50,270 | 48,400 |
| Mutton(Lamb) | 53 | 53 | 53 | 53 | 53 |
| Wool | 13 | 13 | 13 | 13 | 13 |

Comments 6) Although the report discussed the possibility of sheep production yet nothing was presented on the sheep production economy.

Agreements 9) Economic Approach to sheep Breeding

Economic approach to sheep breeding will be made in the Final Report.

Replies Adult sheep breedable in the Project Area would be 10,000 head but their lamb and wool production amounts to about 53 tons/year, and 13 tons/year, respectively.

Economic approach will be devised in the Final Report on the basis of Table 6 and it will be reflected on economic evaluation.

Comments 7) The number of cows on the Project Area during the full production stage should be determined according to the acreage of fodders. Since one third of the area will be planted with fodder crops, hence it will be possible to increase the number of imported friesian cows.

Agreements 10) Feedable Number of Friesien Cows

The feddable number of friesian cows will be reviewed.

Replies In the report, the feedable number of Friesian, Baladi, sheep at the full development stage was determined according to fodder production based on the proposed cropping pattern and it is same in case study mentioned above.

Table 6. Estimated Income from Sheep(Ewe)

| | | |
|---|---|---|
| **Gross Income** | | |
| Farm-gate Price | 55.00 LE/head | 6 month old |
| Manure | 5.00 | |
| Wool | 1.00 | 1 kg x 1 LE=1 LE |
| Total | 61.00 | |
| **Production Cost** | | |
| Forage | 13.3 LE | |
| Cocentrate | 6.7 | |
| Labor Cost | 6.0 | |
| Veterinary Care | 7.0 | |
| Others | 2.0 | |
| Total | 35.00 | |
| **Net Income** | 26.00 LE/head | |

Comments 8) The report has only covered marketing of fresh vegetables to the near-by Arabian countries, while no study was made for the European market which is better market for off-season vegetables especially for broccoli which is not common for Arabic market.

Agreements 11) European Market for Fresh Vegetables

A study on European market for off-season vegetables will be included in the Final Report.

Replies 1) Broccoli planned in the Dratt Final Report was changed by cauliflower in the Final Report. Having respect to the comments, that is, broccoli does not suit the taste of the Egyptian consumers, broccoli was changed. The trading statistics on broccoli in the European countries are not available. This is another reason. The statistics on cauliflower is available on an annual average consumption of Egyptian and trading information in the European countries.

2) Consumption or supply quantities per capita on the planning vegetables as cabbage, cauliflower and onion are compared between Egyptian and European as the following table.

- Supply Qauntity of Vegetable per Capita (kg) -
(1975 - 1977 average)

| Country | Vegetable Total Qt. | Cabbage | Caulfilower | Onion | Tomatoes |
|---|---|---|---|---|---|
| Egypt | 116.9 | 7.7 | 1.9 | 14.1 | 50.7 |
| Denmark | 39.9 | 7.4 | 0.1 | 5.5 | 4.6 |
| France | 100.6 | 4.6 | 5.2 | 3.9 | 9.0 |
| Germany | 55.4 | 7.4 | 2.6 | 3.5 | 4.6 |
| Italy | 151.5 | 9.2 | 7.2 | 6.2 | 49.7 |
| Netherland | 52.5 | 7.7 | 5.5 | 3.1 | 2.2 |
| Sweden | 44.5 | 5.1 | 1.1 | 2.7 | 5.3 |
| England | 62.3 | 10.0 | 3.6 | 6.0 | 5.0 |

Source: Food Balance Sheet, 1975 - 1977, FAO, 1980.

Consumption of cauliflower by Egyptian is less than that in the European countries. Cauliflower produced in the South Hussinia Project Area in future would be marketable to domestic purpose.

Consumption of onion and tomatoes by the Egyptian are larger than those in the European countries. According to the Food Balance Study, FAO, the exported quantities on cabbage, cauliflower and dry onion are shown as follows.

- Imported Quantities -
(1975 - 1977 average)

(Unit: 1,000 tons)

| Country | Cabbage | Cauliflower | Onion |
|---|---|---|---|
| Denmark | 3 ( 7.1%) | 8 (50.0%) | 12 (38.7%) |
| France | 15 ( 5.2%) | 10 ( 3.3%) | 117 (48.1%) |
| Germany | 114 (19.4%) | 128 (63.0%) | 263 (94.9%) |
| Italy | 1 ( 0.2%) | - - | 6 ( 1.5%) |
| Netherland | 5 ( 3.9%) | 33 (39.3%) | 37 (56.1%) |
| Swedan | 13 (26.5%) | 5 (45.5%) | 17 (70.8%) |
| England | 20 ( 2.8%) | 21 ( 7.8%) | 170 (48.2%) |

Note: Percent in the parentheses indicates ratio of imported quantities of crops compared with domestic gross consumption.

Germany will be expected as the most hopeful importable country for three crops mentioned above. Main import countries are Netherland with cauliflower and with onion, England, France and Italy with onion.

6. Economical Justification

Comments 1) The life time of the project was taken to be 50 years. Calculation for shorter life-time should be made for comparison.

Agreements 1) Analysis Period

The analysis period in estimating the Economic Internal Rate Return (EIRR) is internationally 50 years. The periods applied for EIRR on the agro-industry projects will be revised to 50 years in the Final Report.

Replies The Project Life should not be more than 50 years, because of the great uncertainties involved and the negligible present worth value of the future benefits and costs beyond 50 (or even 30) years. The life of the land reclamation project is assumed at 50 years, because major investment consists of permanent facilities such as canals. The life of pump and operation & maintenance facilities are assumed at 15 and 10 years, respectively. Their costs are listed as the replacement cost.

The life of the houses and social infrastructure is assumed at 50 years. Although the technical life of the major investment in the agro-processing project is quite long, the economic life is expected to be much shorter because of obsolescence. However, it is assumed that the major investment does not become obsolete over a medium-term period of twenty to twenty-five years.

The economic evaluation of the comprehensive Project consisting of three projects of land reclamation, houses & social infrastructure and agro-processing would be estimated using the project life of 50 years. The major investment in the agro-processing project is considered as the replacement cost.

Comments 2) The EIRR for the overall project was given as 16.6 percent, which is high for such project. Meanwhile, when housing, infrastructure and cost of El Salam canal (Phase I) are included, the EIRR drops to 8.1 percent which low and cannot cover the rate of interest on the loan prevailing at the present time.

Agreement 2) EIRR

a. This Project is an integrated project which consists of three components; land reclamation, housing & social infrastructure, and agro-industry. The benefits of both land reclamation and agro-industry projects are tangible by monetary terms. Although the housing and social infrastructural projects could bring about a great deal of benefits, those are intangible by monetary terms. However, by using some hypothetic methods, EIRR of the integrated project consisting of these project components will be estimated in the Final Report. The EIRR of 15.5 percent shown in Page IV-10 is the rate in case of the joint project of land reclamation and agro-industry without taking into consideration the cost of El Salam Canal Phase I.

b. The isolated EIRR for the land reclamation project without and with the cost of El Salam Canal Phase I has been estimated at 16.6 percent and 13.0 percent, respectively. From the viewpoint of national economy, the logical or real EIRR of the land reclamation project shall be found at 13.0 percent. These EIRR will be re-estimated since the total cultivated area will be revised.

c. EIRR in case of combining the land reclamation project and the housing & infrastructure project in consideration of the cost of El Salam Canal Phase I has been estimated at 8.1 percent. This figure was computed only for reference since the benefits from the housing and infrastructure project cannot be expressed in monetary term without hypothetic method. This EIRR will be re-estimated.

d. More detailed analysis will be made for various combination of the project components.

Replies

1. Agricultural Land Reclamation Isolated
(reply on Agreement b.)

| | Final Report EIRR | Draft Report EIRR |
|---|---|---|
| ° Include the Cost of EL-Salam Canal allocated to the Project | 13% | 13% |
| ° Exclude the Cost mentioned above. | 15.4% | 16.6% |
| ° Economic Project Cost (Exclude the El Salam Canal Cost) | 165.86 Million LE | 80.60 Million LE |
| ° Annual Incremental NPV (Full development stage) | 48.82 Million LE | 37.18 Million LE |
| ° Net Cultivation Area | 55,740 feddans (23,410 ha) | 48,500 feddan (20,370 ha) |

2. Economic evaluation on potable water project and electricity project (reply on Agreement a)

Water Supply Project:

In the Project Area, if the investment in village water supply is not made, the settlers should look for alternative supply system, that is, to use irrigation water or to purchase drinking water from outside town. The quality of irrigation water is 800 ppm. Hence the irrigation water to be used in the Project Area is unsuitable for drinking purpose. Another alternative is to purchase drinking water of 12,650 tons per day. This huge quantity in every day shall be impossible to be supplied from outside. Satisfactory alternative does not exist in this Project Area. This is similar to the case where there are no satisfactory alternatives to a public system in most urban areas. Revenues from water changes in urban systems as sufficient to meet all costs and provide a reasonable rate of return. These revenues can be used as a minimum approximation of economic benefits.

Annual benefit is expected at 0.46 million LE using 10 piaster per ton in order to derive the moderate benefit.

Electric Facilities:

There is normally a substitute for publicly supplied electricity in the form of diesel engines. The net advantage of electricity over the substitutes is counted as benefits.

The electric charge is lower than the fuel cost of operating diesel engines. The difference is assumed as annual benefit. The conversion factor of electricity is 3.321 based on the World Bank Papers No.521. In order to estimate a moderate benefit, the conversion factor of fuel is 1.01 of crude oil. Annual economic benefit is estimated at 0.8 million LE.

3. Economic evaluation on Entire or Comprehensive Project (reply on Agreement a, c, f)

° Land Reclamation + Houses & Social Infrastructure

i. Benefit on potable water and electricity are accounted ..... EIRR 7.3%

ii. Benefit mentioned above are not accounted (Land Reclamation Project include the El Salam Canal Cost)

° Land Reclamation + Houses & Social Infrastructure + Farm Products Processing

Unit Price of Raw Materials

| | Beet 20 LE/t Milk 0.2 LE/kg | Beet 20 LE/t Milk 0.2 LE/t Tomatoes 80 LE/t | Beet 30 LE/t Milk 0.2 LE/t | Beet 30 LE/t Milk 0.2 LE/t Tomatoes 80 LE/t |
|---|---|---|---|---|
| | | EIRR | | |
| i. Benefit on Potable water and electricity are accounted | 10.7% | 10.9% | 9.1% | 9.4% |
| ii. Benefit mentioned above are not accounted | 10.5% | 10.7% | 8.9% | 9.2% |

Comments (Orally)

Pay-back study of investments is not studied.

Agreements 2) EIRR

g. Pay-back study of investment will be made.

Replies Repayment on the foreign currency of the project cost was studied using the following loan conditions.

Loan period ..... 30 years
Grace period .....10 years
Interest ..... 4%

| | Agri. Land Reclamation (include pipe) drain | Agri. Land Reclamation (exclude pipe) drain | Agri. Land Reclamation + Houses & Social Infra. | Agri. Land Reclamation + Houses |
|---|---|---|---|---|
| | ----- Million L.E. ----- | | | |
| 1. Capital bollowed | 92.9 | 62.3 | 163.5 | 95.1 |
| 2. Grace Period Total value of interest | 37.1 | 24.9 | 65.4 | 38.0 |
| Maximum interest per year | 3.6 | 2.4 | 6.3 | 3.7 |
| 3. Repayment Period of Capital Maximum interest ibid the Year repaid | 6.1 | 4.0 | 11.2 | 6.3 |
| | 22 to 30 years | 17 to 30 years | 22 to 30 years | 22 to 30 years |

Comments 3) The EIRR for the sugarbeet factory and the milk processing factory as calculated in the report are 14.3 percent and 11.0 percent respectively seem to be low and should be revised.

Agreements d. The EIRR for sugarbeet factory and milk processing factory will be re-estimated based on the revised cultivated area.

Replies Profitability of farm products depends on price of raw material.

° EIRR on sugarbeet processing factory

i. Raw beet 20 LE/t ..... 22.5%
ii. Raw beet 30 LE/t ..... 19.0%

° EIRR on milk processing factory

i. Raw milk 0.2 LE/kg .....37.5%
ii. Raw milk 0.2 LE/kg .... 16.5%
iii. Raw milk 0.3 LE/kg .... - 1%

° EIRR on tomato processing factory
Raw beet 80 LE/t ..... 37.4%

Table 7. Agricultural Land Reclamation Cost

(Unit: 1,000 L.E)

| Year | Stage I | | | Stage II | | | Agri. Land Reclamation | | |
|---|---|---|---|---|---|---|---|---|---|
| | L.C. | F.C. | Total | L.C. | F.C. | Total | L.C. | F.C. | Total |
| 1985 | 4,988 | 900 | 5,888 | - | - | - | 4,988 | 900 | 5,888 |
| 1986 | 1,726 | 693 | 2,419 | - | - | - | 1,726 | 693 | 2,419 |
| 1987 | 17,001 | 8,717 | 25,718 | - | - | - | 17,001 | 8,717 | 25,718 |
| 1988 | 25,681 | 16,790 | 42,471 | - | - | - | 25,681 | 16,790 | 42,471 |
| 1989 | 27,856 | 17,746 | 45,602 | - | - | - | 27,856 | 17,746 | 45,602 |
| 1990 | 16,903 | 10,346 | 27,249 | - | - | - | 16,903 | 10,346 | 27,249 |
| 1991 | 7,052 | 4,231 | 11,283 | 4,775 | 705 | 5,480 | 11,827 | 4,936 | 16,763 |
| 1992 | - | - | - | 48,775 | 6,765 | 55,540 | 48,775 | 6,765 | 55,540 |
| 1993 | - | - | - | 63,471 | 8,257 | 71,728 | 63,471 | 8,257 | 71,728 |
| 1994 | - | - | - | 42,134 | 5,139 | 47,273 | 42,134 | 5,139 | 47,273 |
| 1995 | - | - | - | 40,811 | 4,665 | 45,476 | 40,811 | 4,665 | 45,476 |
| 1996 | - | - | - | 16,503 | 1,767 | 18,270 | 16,503 | 1,767 | 18,270 |
| Total | 101,207 | 59,423 | 160,630 | 216,469 | 27,298 | 243,767 | 317,676 | 86,721 | 404,397 |

Note: L.C.: Local Currency F.C.: Foreign Currency
Annual escalation rates are estimated at 5% for foreign currency and 12% for local currency.

Table 8. Repayment Plan of Foreign Currency (Agri. Land Reclamation) (Unit: 1,000 LE)

| Borrowing year / Borrowing Money / paying year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Interest during grace period | Annual Repayment | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 900 | 693 | 8,717 | 16,790 | 17,746 | 10,346 | 4,936 | 6,765 | 8,257 | 5,139 | 4,665 | 1,767 | | | |
| 1 (1985) | 36 | - | - | - | - | - | - | - | - | - | - | - | 36 | - | 36 |
| 2 (1986) | " | 27.7 | - | - | - | - | - | - | - | - | - | - | 63.7 | - | 63.7 |
| 3 (1987) | " | " | 348.7 | - | - | - | - | - | - | - | - | - | 412.4 | - | 412.4 |
| 4 (1988) | " | " | " | 671.6 | - | - | - | - | - | - | - | - | 1,084.0 | - | 1,084.0 |
| 5 (1989) | " | " | " | " | 709.8 | - | - | - | - | - | - | - | 1,793.8 | - | 1,793.8 |
| 6 (1990) | " | " | " | " | " | 413.8 | - | - | - | - | - | - | 2,207.6 | - | 2,207.6 |
| 7 (1991) | " | " | " | " | " | " | 197.4 | - | - | - | - | - | 2,405.0 | - | 2,405.0 |
| 8 (1992) | " | " | " | " | " | " | " | 270.6 | - | - | - | - | 2,675.6 | - | 2,675.6 |
| 9 (1993) | " | " | " | " | " | " | " | " | 330.3 | - | - | - | 3,005.9 | - | 3,005.9 |
| 10 (1994) | 36 | " | " | " | " | " | " | " | " | 205.6 | - | - | 3,211.5 | - | 3,211.5 |
| 11 (1995) | 63.9 | 27.7 | " | " | " | " | " | " | " | " | 186.6 | - | 3,362.1 | 63.9 | 3,426.0 |
| 12 (1996) | " | 47.2 | 348.7 | " | " | " | " | " | " | " | " | 70.7 | 3,405.1 | 113.1 | 3,518.2 |
| 13 (1997) | " | " | 618.9 | 671.6 | " | " | " | " | " | " | " | " | 3,056.4 | 732.0 | 3,788.4 |
| 14 (1998) | " | " | " | 1,192.1 | 709.8 | " | " | " | " | " | " | " | 2,384.8 | 1,924.1 | 4,308.4 |
| 15 (1999) | " | " | " | " | 1,259.9 | 413.8 | " | " | " | " | " | " | 1,675.0 | 3,184.0 | 4,859.0 |
| 16 (2000) | " | " | " | " | " | 734.6 | 197.4 | " | " | " | " | " | 1,261.2 | 3,918.6 | 5,179.8 |
| 17 (2001) | " | " | " | " | " | " | 350.5 | 270.6 | " | " | " | " | 1,063.8 | 4,269.1 | 5,332.9 |
| 18 (2002) | " | " | " | " | " | " | " | 480.3 | 330.3 | " | " | " | 793.2 | 4,749.4 | 5,542.6 |
| 19 (2003) | " | " | " | " | " | " | " | " | 586.3 | 205.6 | " | " | 462.9 | 5,335.7 | 5,798.6 |
| 20 (2004) | " | " | " | " | " | " | " | " | " | 364.9 | 186.6 | " | 257.3 | 5,700.6 | 5,957.9 |
| 21 (2005) | " | " | " | " | " | " | " | " | " | " | 331.2 | 70.7 | 70.7 | 6,031.8 | 6,102.5 |
| 22 (2006) | " | " | " | " | " | " | " | " | " | " | " | 125.5 | - | 6,157.3 | 6,157.3 |
| ⋮ | " | " | " | " | " | " | " | " | " | " | " | " | - | " | " |
| 30 (2014) | 63.9 | " | " | " | " | " | " | " | " | " | " | " | - | 6,157.3 | 6,157.3 |
| 31 (2015) | - | 49.2 | " | " | " | " | " | " | " | " | " | " | - | 6,093.4 | 6,093.4 |
| 32 (2016) | - | - | 618.9 | " | " | " | " | " | " | " | " | " | - | 6,044.2 | 6,044.2 |
| ⋮ | - | - | - | " | " | " | " | " | " | " | " | " | - | ⋮ | ⋮ |
| 36 (2020) | - | - | - | - | - | - | 350.5 | " | " | " | " | " | - | 2,238.7 | 2,238.7 |
| ⋮ | - | - | - | - | - | - | - | - | - | - | " | " | - | ⋮ | ⋮ |
| 40 (2024) | - | - | - | - | - | - | - | - | - | - | 331.2 | " | - | 456.7 | 456.7 |
| 41 (2025) | - | - | - | - | - | - | - | - | - | - | - | 125.5 | - | 125.5 | 125.5 |