Basic Design Study Report
on
The Project for The Improvement
of
Rice Storage Center
in
Arab Republic of Egypt

March 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the government of Arab Republic of Egypt, the Government of Japan decided to conduct a basic design study on the project for the improvement of rice storage center and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Egypt a study team headed by Mr. Masashi Fujita, Grant Aid Study & Design Department, JICA, from November 15th to December 9th, 1991.

JICA team held discussions with the officials concerned of the Government of Egypt, and conducted a field study at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

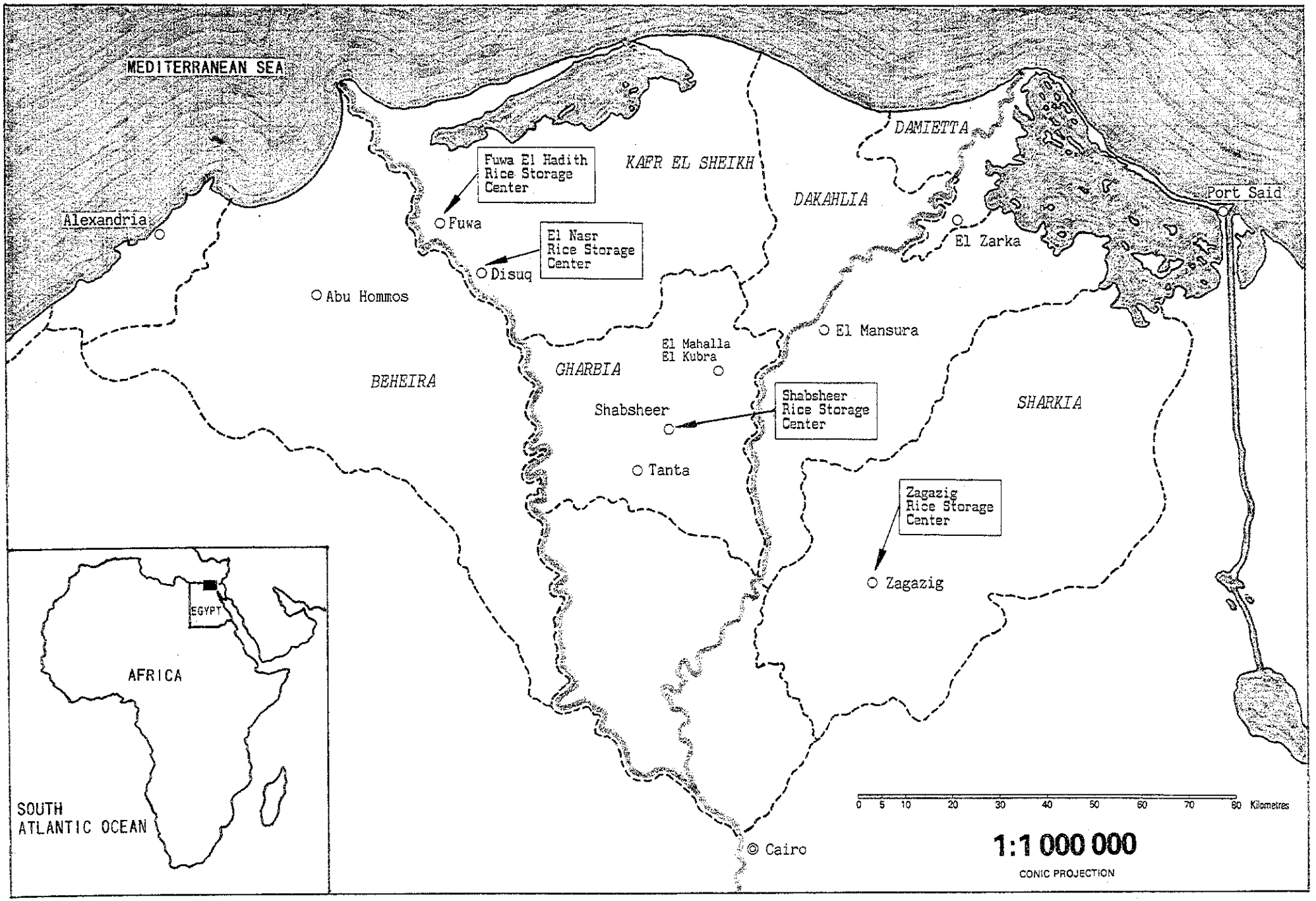
I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Arab Republic of Egypt for their close cooperation extended to the team.

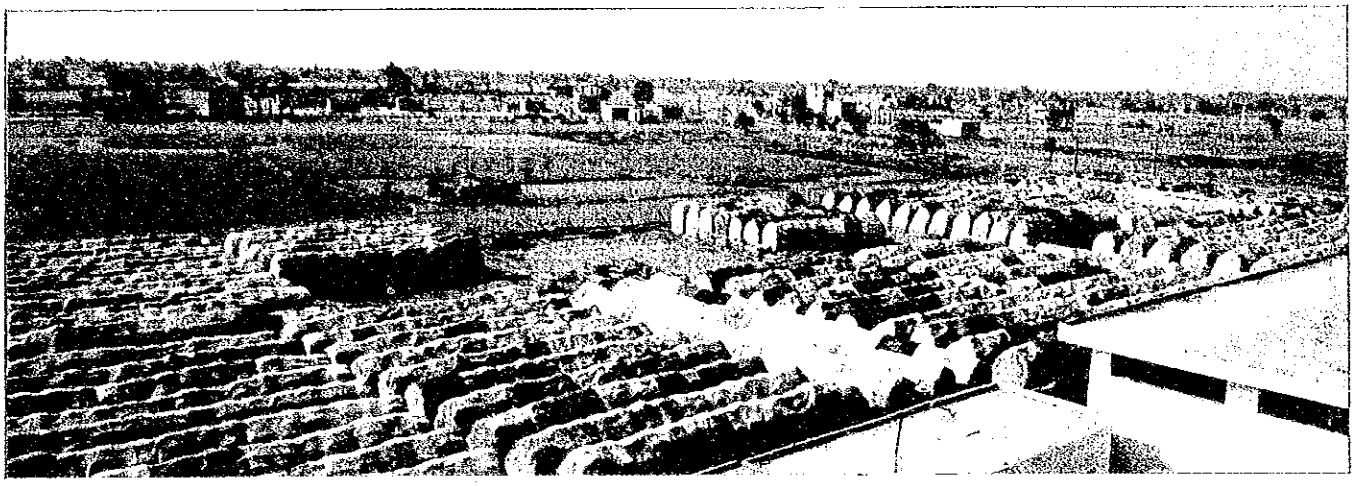
March, 1992

Kensuke Yanagiya

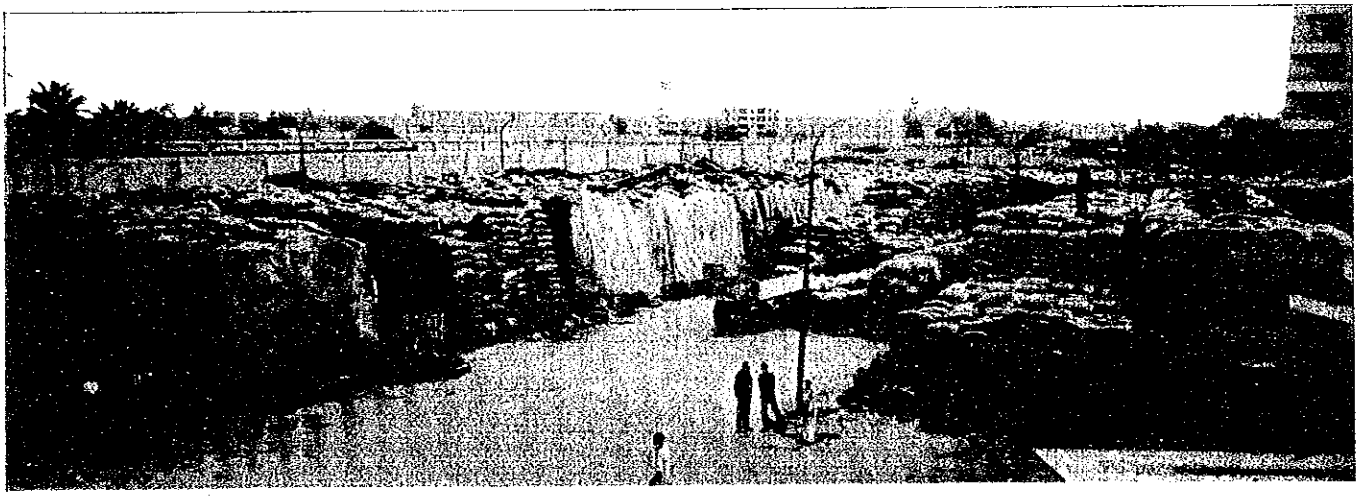
Kensuke Yanagiya
President
Japan International Cooperation Agency


LOCATION MAP
MEDITERRANEAN SEA
Alexandria
Fuwa El Hadith Rice Storage Center
Fuwa
KAFR EL SHEIKH
DAMIETTA
DAKAHLIA
Port Said
El Nasr Rice Storage Center
Disuq
El Zarka
Abu Hommos
El Mansura
El Mahalla El Kubra
GHARBIA
BEHEIRA
Shabsheer Rice Storage Center
Shabsheer
SHARKIA
Tanta
Zagazig Rice Storage Center
Zagazig
EGYPT
AFRICA
SOUTH ATLANTIC OCEAN
Cairo
0 5 10 20 30 40 50 60 70 80 Kilometres
1:1 000 000
CONIC PROJECTION

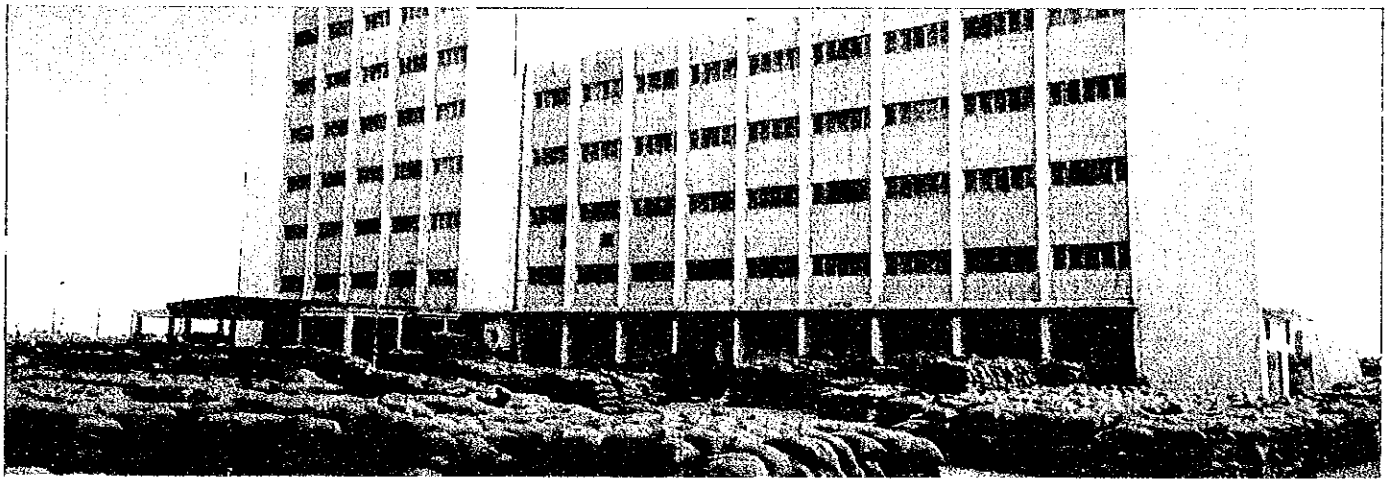
Bagged Paddy Being Stowed in Open Yard



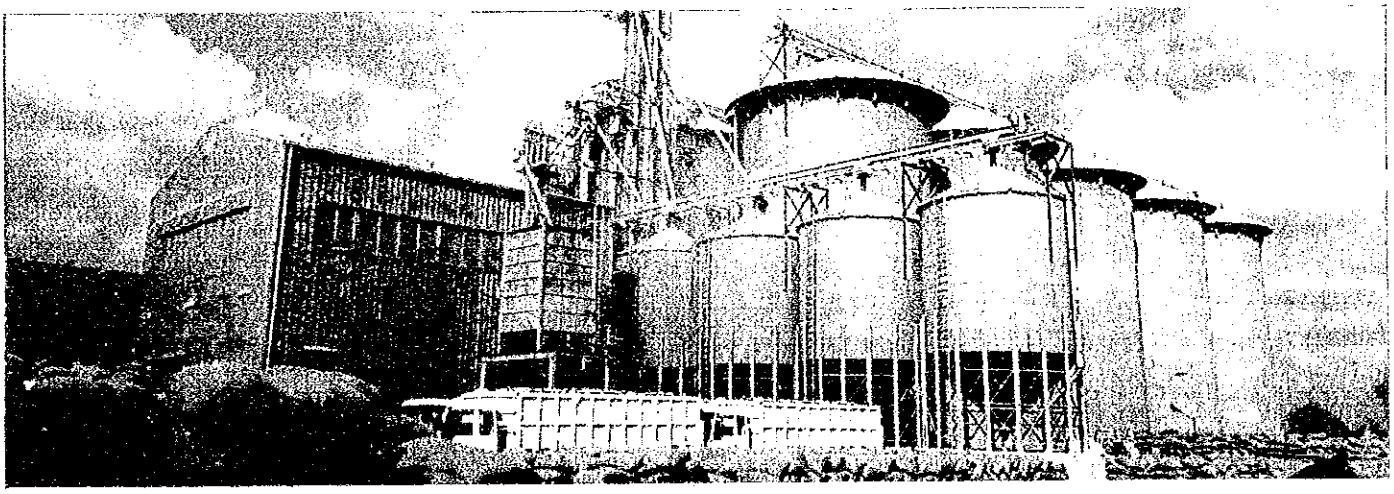
bagged paddy piled up in the paticular form in the open yard ; Fuwa El Hadith Project Site, Rice Mill buildings in front



size of the pile becoming larger in size due to lack of space for paddy storage



bagged paddy stowed in the open yard, in front of El Zarka Rice Mill



El Zarka Rice Storage Center constructed by KR2 Program in 1986

SUMMARY

SUMMARY

In Egypt during 1989/90, paddy production amounted to 2.68 million tons, of which 95% was produced mainly in the Nile delta area spreaded to the north of the Cairo metropolis.

Rice is considered to be a staple food, next to wheat, for the Egyptian people and it is also shipped to neighbouring countries. Accordingly, it is accounted to be one of the agricultural products expected to increase in exports as a foreign exchange earner.

However, due to her rapid 2.8% (1976/1986) yearly increase of population, her food self-support percentage has declined to a certain extent and, as a result, the situation was forcing increased import of wheat.

In view of the above, the government of Egypt has initiated various policies concerned, under this severe situation to increase food production, with coordination of increased food producing area as well as yield per unit of production.

Meanwhile, the responsible Ministry of Supply in charge of food supply and demand of the country has requested the government of Japan to assist in an increase of rice production through the rationalization of rice distribution, as well as a decrease of quantitative losses which might occur during paddy storage, by constructing paddy silos for eight Rice Mills Companies called the SHUNA PROJECT.

In response to this request, the government of Japan has assisted them in the past, by supplying machinery and equipment required for four(4) paddy silos to the rice mills companies as mentioned hereunder:

Fiscal Year	Rice Mills Co. & Rice Storage Center	Present Condition
1986	Damietta and Belkas Rice Mill Co. El Zarka Rice Storage Center	under operation
1987	Alexandria Rice Mill Co. El Hadissa Rice Storage Center	under operation
1988	Dakahlia Rice Mill Co. Behrant Rice Storage Center	to be completed by Jan. 1992
1990	Beheira Rice Mill Co. Abu Hommos Rice Storage Center	to be completed by Aug. 1993

In consideration of the effects obtained and effective use of the mechanism and function of the existing silos as primarily expected, the government of Egypt again requested the government of Japan for General Grant Aid assistance to accelerate the silo construction being implemented by the government of Egypt through the SHUNA PROJECT.

For this additional request, the government of Japan dispatched the Basic Design Study Team to Egypt, from November 15 to December 9, 1991. The team studied the existing silos and proposed sites for the project. The study included series of discussion with Egyptian officials and technical engineers. In this study, the serviceability of the silo granted and operation and management of the entire silo facilities being executed by the Egyptian authority has been evaluated. As the result of the study, the study team recognized the necessity of constructing silos at the proposed sites.

The proposed sites for this project are as follows:

No.	Sites	Rice Mills Co.
1	Shabsheer	Gharbia
2	El Nasr	Kafr El Sheikh
3	Fuwa El Hadith	Rosetta
4	Zagazig	Sharkia

Infrastructures such as roads and power supply in general has been sufficient in each site for the project. Land acquisition for the silo construction has also been completed.

For each site, one(1) set of machinery and equipment needed for metal silos with a capacity of 10,000 tons should be procured. The materials which include machinery and equipment are as follows:

Receiving Hopper	(12t x 2 units)
Cleaner	(12t/hr x 2 units)
Destoner	(4t/hr x 6 units)
Hopper Scale	(24t/hr x 2 units)
Dryer	(24t/hr x 1 unit)
Silo Bin	(1,000t/bin x 10 units)
Truck Scale	(for receiving 80t & for loading 30t)
Conveyor	(belt, chain, & screw type)
Ancillary Equipment	(control panel, tank, shoot, pipe etc.)
Inspection Equipment	

The government of Egypt is responsible for all the cost of the installation and construction works, including building for machinery and civil engineering foundation. From past experiences and results, the implementing authority is found to be capable for technical execution of the above required construction. The cost of construction is estimated as approx. 4 million Egyptian pound (¥139 million) for each site. The budget has been ensured for each Rice Mills Company for the project.

Two sites, namely Shabsheer and El Nasr, are scheduled for phase I while the balance of 2 sites, namely Fuwa El Hadith and Zagazig, are fixed for phase II. The project implementation shall be tentatively scheduled for 5 months for phase I and for 4.5 months for phase II, detail designing and tender inclusive, and 7.5 months for procurement of machinery and equipment. Meanwhile, the term scheduled for installation and construction works shall be coordinated in collaboration and will run parallel with machinery and equipment procurement which will take several months for its implementation.

With the completion of four rice storage centers, there will be eight rice storage centers in total, providing one each for all the rice mills companies. The eight rice storage centers will handle an average 160,000 tons of rice annually, which will be approximately 16% of the total 1 million tons of rice being handled by the rice mills companies.

At present some 3.0% of quantitative loss is estimated due to an open yard rice storage practice, and deterioration of rice quality is significant due to severe weather conditions. However, by realization of the project, rice quality control will be enhanced and improved considerably. On the other hand, the open yard rice storage practice takes up land space which can be utilized by rice mills companies or farmers. The silos of this rice storage center need only one fifth to one third of the land space presently used for rice storage.

Moreover, the silos will also be beneficial on saving the cost of materials such as jute bags and pallets used for open yard storage, and the silos provide air tight storage space so that the environmental effect of fumigation can be minimized. Likewise, the implemented project will improve the food self-support capability of Egypt and at the same time minimize any negative influences caused by insecticide residue and environmental problems related to fumigation practice.

Considering the above-mentioned benefits, the study concludes that this project should be granted as Japan's Grant Aid. For the smooth implementation of this project, the effort of Egyptian side to complete the construction in a timely manner is necessary. Also, speedy processing of ratification by the people's assembly of Egypt is required for the prompt implementation.

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CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

Egyptian agriculture depends on its arable land which accounts for only about 3% of the total land of the country. Due to the rapid increase in population the food self-support percentage has declined considerably, causing serious food shortages.

In consideration of the situation prevailing in the country, the government of Egypt has requested Grant Aid Fund assistance from the government of Japan to improve a rice storage center project through rehabilitation of rice storage facilities and post-harvest loss prevention and to solve the food shortage problem of the country.

In response to the request of the government of the Arab Republic of Egypt, the government of Japan has decided to conduct a basic design study on the project. The study has been entrusted to the Japan International Cooperation Agency (JICA).

The JICA sent a study team headed by Mr. Masashi Fujita, First Basic Design Study Division, Grant Aid Study and Design Department, JICA to Egypt from November 16 to December 9, 1991.

The team had discussions with the concerned government of Egypt officials and confirmed the contents of the request, background of the project and requisition details of the machinery and equipment, and explained the system of the Japan's Grant Aid and requested its full understanding. At the same time, the team discussed and confirmed each responsibility and allotment of the scope of the work in their preparation for implementation of the project.

As the result, the minutes had been duly compiled between the government of Egypt and the study team for the basic agreement confirmed on December 3, 1991.

The minutes was duly signed between Mr. Hassan M. Shabana, director general of Holding Company for Rice Marketing & Rice Products and the team leader, under the supervision of Mr. Hamed Mostafa, deputy secretary of Ministry of International Corporation.

This basic design study report has been compiled based on analysis of the data collected in the field survey. The results of discussion between the Egyptian officials and the member of the study team are summarized in the report to plan the most applicable basic design toward the realization of the project.

CHAPTER 2

BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Background of the Project

2-1-1 Agricultural Conditions

(1) General condition of agriculture

Egypt is situated in the northeastern part of the African continent, located between latitude 32° north and 22° north. It has 100.2 million km^2 area with a population of 53,153,000 (1990 tentative figure), out of which 56.0% of people are living in farm villages.

Arable land of Egypt is 4.94 million ha (1980), accounting for only 4.9% of the total area of the country, of which the major part is situated along the Nile and the delta area located in the northern part of Cairo, with some parts located on the northwestern sea coast and the western desert, which is called Oasis.

1986/87 census showed 12.28 billion Egyptian pounds (EL) for the gross domestic products (GDP) of agriculture, which accounted for 17% of a total GDP of 72.92 billion EL. As shown in the following table, principal agricultural products are maize, wheat, rice and millet. Other than the cereal, production of cotton is also large in quantity. Egyptian cotton known as Long Staple Cotton is famous. Exports of raw cotton accounted for 560 million EL in 1990 (tentative figure), which is equivalent of 8% of the total export turn out of 6.95 billion EL. Including cotton yarn and cotton fabrics, cotton produce will turn out 26.3% of the export amount.

Rice cultivation is mainly observed in the northern part of the delta district and the Japonica variety is widely cultivated. It is not only consumed domestic all, but some of the quantity is exported to get foreign exchange. In 1990 the result of rice exports came to 49 million LE.

Principal Agricultural Products in Egypt

type of crop	1988		1989		1990 (tentative)	
	Cultivated Area	Production	Cultivated Area	Production	Cultivated Area	Production
rice	838	2,132	983	2,679	1,037	3,168
wheat	1,422	2,838	1,533	3,182	1,955	4,266
barley	89	120	118	138	127	142
maize	1,960	4,088	2,004	4,529	1,975	4,798
millet	315	586	306	585	320	629
beans	363	362	368	460	345	451
cotton raw	1,014	882	1,006	820	993	838
potatoes	207	3,239	176	1,657	189	1,638
oranges	202	1,199	202	1,398	N.A	N.A
sugar cane	268	10,795	275	11,213	274	11,144

Unit : Cultivated Area 1,000 feddan (420ha), Production 1,000 tons

Source : Statistical year Book, June 1991

(2) Implementation of agricultural policy

As stated in the foregoing, the agricultural sector is taking an important role in the national economy and agricultural life. It is, for most of the people, not only a source of income, but also as an important part of the foreign trade of Egypt.

Accordingly, the government of Egypt has initiated its implementation through the horizontal extension of arable land as well as the vertical extension of yield per unit. The horizontal extension is implemented in the extension of dryland and its development. In 1952 - 67, there was 821,400 feddan (1 feddan = 0.42ha) of developed land, and it was increased to the extent of 1,768,000 feddan in 1968 - 89 meaning that it had absorved extra laboures in villages. It also contributed greatly to increased agricultural produce through land development.

The vertical extension is to increase productivity per unit (feddan) through the improvement of irrigation and drainage systems. More in detail, through "basin irrigation" through the year, as part of a comprehensive project. At the same time, it includes development of agricultural equipment, extermination of insects diversification of agricultural crops and introduction of hybrid as well as new varieties.

As a result, production of sugar cane, ramie (ramee), rice and maize have been greatly increased, resulting in an increase of yield per feddan of the principal agricultural crops.

Meanwhile, great effort is also being made in development of the live stock industry. In this effort, a specialized research institute has been taking the initiative for development of a multiple of domestic animals and implementing breeding programme improvements to that effect.

Through the assistance of subsidiaries, the government is taking the intiative for the development and organizatin of stock breeding corporation among concerned parties. In addition, through recent improvement of fowl varieties, production of these categories have also been greatly improved and multiplied.

Agricultural Renovation Acts No. 178/1952 and its relative regulations have stipulated a allotment of the requisition of land and contributed to improved relationships between landlords and tenant farmers.

The government, by applying the regulations in cases, where the alloted arable land or cultivated area exceed the limit concerned, will confiscate the farm land violated and redistribute the lot concerned to the need farmers.

From 1953 to 1990, the land which was found objectional to taled 1,078,687 feddan out of which 864,521 feddan was obtained through land reformation, 184,411 feddan by the governmental organization, while 29,755 feddan was obtained through land improvement.

The allotment of the land is aiming at arranging all the farmers to receive equal incomes through the relevant land. Usually the allotment is limitted to the extent of 2 to 5 feddan.

The Agricultural Renovation Acts are the effective policy for redistribution of the confiscated land to the benefitiaries, at the same time, aiming at the development of the agricultural corporation among the farmers. This means that among the villages, no farmer is available who has more than 5 feddan of land in his possesion, and it is also implemented through the farmers' group consciousness and the effort made by the farmers who have obtained the confiscated land throught the allotment operations.

In addition, the farmers corporation will provide a service to the member farmers, who can not receive any sort of benefits that the individual farmer can not obtaine by himself alone. Thus the corporation will give an ample stress on productivity while trying to minimize the cost to be involved.

In the concrete, the farmers' corporation will supply technical know-how regarding the rotation system of crop cultivation and systematic control of cultivation as well, together with a supply of input such as agricultural equipment, seed, fertilizer and insecticide.

2-1-2 Supply and Demand of Food

In Egypt, starting from the latter part of 1970, reliance on import of foodstuffs has increased. According to FAO's Food Balance Sheet (1990), it was revealed that during 1984 - 86, production of cereal (wheat, paddy, barley maize, millet inclusive) turned out yearly average, 8,369,000 tons and cereal imports was made. The figure above included feed and seed. Including domestic produce and imported. Foodstuffs amounted to 11,787,000 tons in total, making 247.7kg per head for the production. The per head amount of rice in terms of each paddy was accounted at 44kg.

As stated before, import of foodstuffs is now becoming more than one half of the nation demand. Particularly, the percentage

of staple food self-support, such as wheat, had decreased greatly from 69.8% (1960) to 24.8% (1980) and 22.0% (1984 - 86).

The reason of these transitions is mainly derived from the demand itself i.e., the population increase and increase of individual consumption of food but not the question of supply itself.

Average per capita consumption of wheat in the nation was 80kg in 1960 and then it increased to 142kg in 1973, 153kg in 1977, 180kg and recorded all-time-high and the world highest, followed by 144.8kg during 1984 - 86, while the production was marked at 56kg in 1960, 46kg in 1980 and 39kg during 1984 - 86, continuously being reduced.

On the contrary, the potential demand of rice has increased due to the income of the people, but actual per capita consumption of rice has remained unchanged because of the control of distribution on the consumption level.

2-1-3 Situation of Rice Production

(1) Cultivated area and production of rice

The principal agricultural products in Egypt are wheat, maize, rice and cotton. In general, cultivation of rice is common in the summer season, provided with irrigation. However, because of water consumption limit controls, no double crop is made at present.

The rice cultivation is mainly concentrated in the northern part of the delta area where the Nile flows to the Mediterranean. Five districts i.e., Dakahlia, Kafr El Sheikh, Beheira, Sharkia and Gharbia compose 95% of total rice cultivated area of the country. In terms of rice production in 1989/90, it accounted for 92% of total rice production,

In the past, per unit yield of rice was 2.398ton/feddan, as an average recorded during 14 years between 1976/77 and 1990/91.

In terms of ton basis, the above figure is converted into 5.7ton/ha, which amount is more than 5.1ton/ha (in Japan, 1990) and 5.5ton/ha (in U.S.A, artificially irrigated paddy field), and still more than the world average of 2.7ton/ha, i.e., the highest record in the World. The rice cultivated area is provided with ample fertile alluvial silt soil, less rainfall and blessed with days full of sunshine. In addition, generally farm management is comparatively small in scale and is most suitable for intensive cultivation of rice. Because of the desert, extension of rice cultivated are is limited and conversion of existing land into other purposes also under strict control by the relevant regulations. Ultimately the rice cultivated area as total will remain as it at a unit yield found to be attributable for total increase of rice production.

The following table shows the rice cultivating area, yield, production of paddy and district wise production of paddy.

Rice Cultivated Area, Yield and Production of Paddy

year (July-June next year)	Area (Feddan)	Yield (ton/Feddan)	Production of Paddy (ton)
1976/77	1,073,808	2.137	2,295,181
77/78	1,037,490	2.188	2,269,808
78/79	1,025,068	2.288	2,345,476
79/80	1,036,683	2.418	2,507,179
80/81	970,096	2.455	2,381,752
81/82	956,392	2.341	2,236,362
82/83	1,025,616	2.380	2,440,513
83/84	1,011,266	2.413	2,439,975
84/85	969,334	2.305	2,235,000
85/86	923,971	2.500	2,310,304
86/87	1,007,794	2.430	2,443,780
87/88	981,060	2.450	2,404,000
88/89	837,050	2.545	2,130,570
89/90	982,495	2.724	2,676,131
90/91	–	–	3,089,151
		Ave. 2.398	

Source : R T T C

Production of Paddy in each Governorate (ton)

Governorate	1985/86	1986/87	1987/88	1988/89	1989/90
Dakahlia	578,207	585,287	605,664	475,973	679,529
Kafr El Sheikh	506,524	479,185	517,888	534,736	574,060
Beheira	460,296	499,463	476,879	504,553	562,802
Sharkia	366,222	421,995	364,598	255,953	372,180
Gharbia	244,599	274,534	258,667	182,849	271,209
Sub total	2,155,848	2,260,464	2,223,696	1,954,064	2,459,780
(Prorportion to the total amount)	(93.3%)	(92.5%)	(92.5%)	(91.7%)	(91.9%)
Damietta	108,603	124,787	127,726	123,730	147,839
Fayaum	23,341	26,219	26,350	27,764	31,066
Others	22,512	32,310	26,228	25,012	37,446
Grand total	2,310,304	2,443,780	2,404,000	2,130,570	2,676,131

Source : R T T C

(2) Processing of harvested rice

In the Nile delta, rice is harvested earlier in the northern coastal areas than in the inland districts. As short grain rice grows more slowly than the long grain type, its reaping is delayed. In the delta, the harvesting season lasts from mid-September to the end of October.

After the rice plants are harvested at mid-stalk, using reaping hooks, the farmers' work has traditionally included drying the plants in the fields, binding stalks into large sheaves, transporting the bundles of rice on draft animals, tread-threshing the rice by means of draft animals or tractors, winnowing the chaff from the grain, and bagging (80 - 85kg paddy/bag). The problem arising from these processes is the deterioration of quality caused by mud balls (small lumps of earth) and white rubble getting mixed with the paddy during treading in the rice fields and winnowing. Another cause of deterioration in quality is undried paddy appearing on the market, though the amount is limited.

Farmers do not have warehouses; because, they deliver paddy for sale to the government without storing it at their end. The Rice Technology Training Center (RTTC) and FAO carried out a joint survey of losses resulting from the traditional processing of harvested rice by farmers. The survey shows that the losses total 11.4%: 1.59% falling off at reaping, 5.31% escaping from raking/stuck grain, 4.35% lost in transit, and 0.19% scattered during winnowing. There is no record of a loss in storage, because of the farmers' prompt dispatch of paddy for sale.

In recent years, harvesting has become increasingly mechanized. The lease system of farm machinery offered by the Mechanized Agricultural Company in the public sector has played the main role in this mechanization. The company has three farm machinery lending centers called the Mubarak Centers. Besides these, there are about 80 lending stations that form local hubs of the lease system. Tractors are used quite commonly and are main-

tained at an acceptable level. As for combines, smaller ones are favored since the Egyptian rice fields resemble Japanese ones in being narrowly sectioned, etc.

Approximately 2,000 combines of the Japanese type have been introduced and are in use. In some districts, the use of European combines is spreading through a sub-contract system. The use of combines makes raw threshing possible, but gives rise to the problem of threshed paddy remaining undried. Proper facilities to deal with undried paddy (such as dryers) are needed. On the other hand, the use of combines reduces the amount of dockage (mud balls and rubble) mixed in the paddy.

(3) Quality of paddy

As stated above, mud balls get mixed in the paddy and the water content of paddy varies widely. The distribution of moisture content in paddy procured by the Dakahlia Rice Mills Company is shown below.

Moisture Content and Proportion
of Paddy Procured at Dakahlia Rice Mill

Moisture Content	Procured
16% w.b.	24%
17 "	24%
18 "	16%
19 "	12%
20 "	8%
21 "	8%
22 "	8%

(w.b.:wet base)

The figures are not actual measurements but provide a guideline. Still, they represent the average state of paddy from the rice-growing districts in the delta.

The quality of paddy is inspected visually and by actual measuring, during transactions. Four percent dockage (96% purity) and 15% moisture content are the acceptable standards. The price is increased or decreased by 1% against a 1% difference from these figures. In addition to this, if defective grains such as empty grains, immature, red, yellow or chalky kernels are found, up to a maximum of 30%, the price is discounted by 20%. If the defective grains exceed 30%, the product cannot be accepted. Because of a shortage of efficient inspection equipment at each transaction site, however, these rules are hard to adhere to.

Although the Japonica type short grain rice is common in Egypt, the long grain type is also grown. Government-controlled rice is mostly of the long grain type, due to its higher productivity per acre; but farmers prefer the taste of short grain rice, which they grow for their own consumption. Thus far, there has been no difference in the price paid for long and short grain rice by the government. Nevertheless, a price disparity may arise when the rice market becomes more decontrolled.

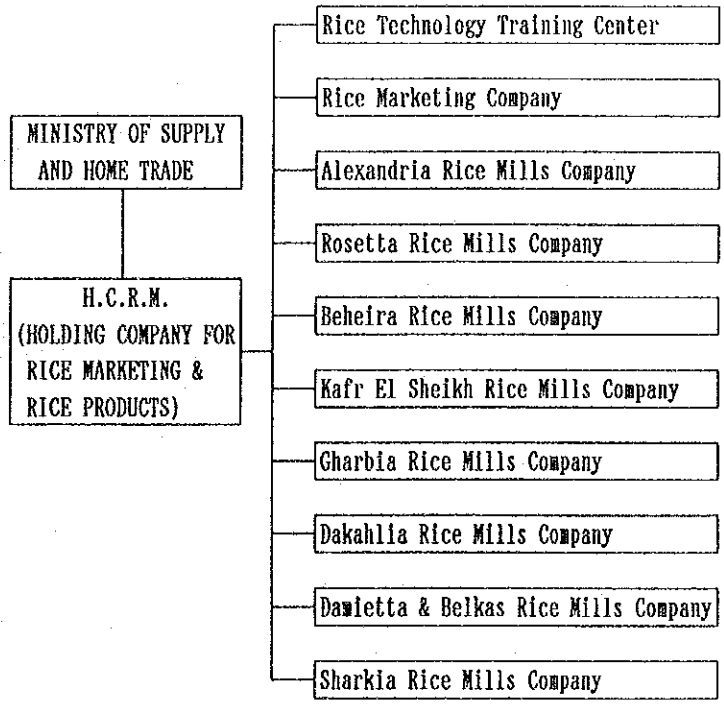
2-1-4 Distribution of Rice

(1) Rice distribution structure

In Egypt, the Ministry of Agriculture, the Ministry of Water Utilization and Irrigation are in charge of the production of rice. The Ministry of Supply is responsible for the distribution and consumption of rice. These ministries have a number of subordinate corporations, for the enforcement of their policies.

Public bodies involved in the distribution of rice include the Holding Company for Rice Marketing & Rice Products (HCRM), Rice Export Company, and Seed Company. The Holding Company for Rice Marketing & Rice Products, affiliated to the Ministry of Supply, was founded on the basis of the Republic Law 461/1983, and consists of the Rice Technology Training Center, a Rice Marketing Company, and eight Rice Mills Companies as shown in the following chart.

Holding Company for Rice Marketing & Rice Products
and Related Organization



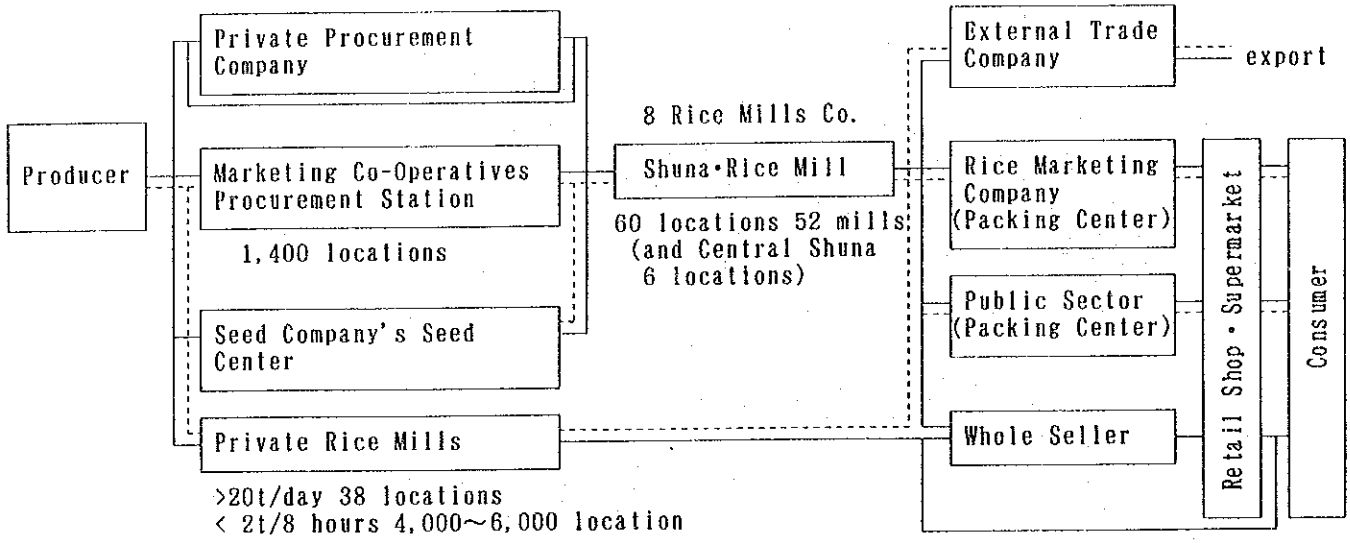
Source: RTTC

The Holding Company's main functions are to make operation plans for subordinate companies, to guide them in coordination, to control them, and to conduct research and development. In the private sector, rice collectors, rice mills, wholesalers, and retailers are involved in the distribution of rice.

(2) Rice distribution channels

Rice is distributed through two channels, one controlled by the government and the other operated privately. Formerly, rice growing farmers were required to sell 1.5 tons/feddan to the government. As a result of the country's policy towards a free economy, they were allowed to sell raw-stored paddy as they liked, starting from 1991's yields. The following chart shows the old and new distribution channels.

Commercial Flow of Paddy Rice



Source : HCRM

Before the liberalization, paddy meant for government-controlled channels was delivered to the marketing cooperative procurement stations in each locality. From there it was sent to the paddy storage facilities of the rice mills affiliated to the Rice Mills Company in charge. As the liberalization of distribution further progresses, it is expected that a fairly large percentage of the paddy handled by the Rice Mills Companies will be collected through cargo collectors (brokers) and the ratio of paddy handled by cooperatives will decrease in proportion.

The eight Rice Mills Companies are assigned to the various Governorates, as follows, and there is no rivalry among them at present. When distribution becomes fully decontrolled; however, they may compete with each other, for example, in the purchase of paddy as raw material.

Rice Mills Company and Related Governorate

Rice Mills Co.	Governorate
Alexandria	Kafr El Sheikh Sharkia
Beheira	Beheira
Rosseta	Beheira Damietta
Kafr El Sheikh	Kafr El Sheikh
Gharbia	Gharbia
Dakahlia	Dakahlia
Damietta & Belka	Damietta
Sharkia	Sharkia

(3) Amount of rice marketed

Each rice producer was liable to deliver 1.5 tons of paddy per feddan to the government till the current fiscal year, and the marketing was under the control of the government. There was also the possibility that some farmers' rice for self-supply was placed on the market within each Governorate through private rice millers. Due to strict restrictions on inter-Governorate movement, however, this amount was limited. Thus, the majority of rice marketed was government-controlled.

The following table shows the past records of rice procured by the Holding Company for Rice Marketing & Rice Products and the ratio of its purchases to yield. Both the procured volume and its ratio to yield have developed without fluctuation under the distribution system following the government's food control policy.

Paddy procured by the holding company on the basis of a new distribution system inaugurated this fiscal year amounted to 899,073 tons as of November 30, 1991, the time of the survey, and is estimated to reach last fiscal year's level by the end of Decem-

ber when the collection period terminates. Nevertheless, 571,648 tons (64%) of the above amount was collected through producers and cargo collectors. 319,345 tons (35%) through cooperatives, and 8,080 tons (1%) through the production company, contrasting remarkably with last year in which cooperatives were the primary collector.

Quantity of Paddy Rice bought by Rice Mills Co. in each Governorate

Governorate	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Dakahlia	296,863	298,915	307,387	216,459	302,755	277,363
Kafr El Sheikh	226,809	224,533	240,360	269,859	241,583	219,595
Beheira	206,711	206,083	224,675	222,946	219,345	171,371
Sharkia	160,509	173,974	171,751	190,311	154,692	137,792
Gharbia	110,686	131,646	139,423	88,893	118,672	90,312
Damietta	49,714	55,896	57,206	55,005	61,421	55,034
Others	31,771	32,753	34,277	28,138	13,694	25,667
Total	1,083,063	1,123,794	1,175,079	971,611	1,112,178	977,134
Production	2,310,304	2,443,780	2,404,000	2,130,570	2,676,131	3,069,151
Proportion to the production (%)	46.9	46.0	48.9	45.6	41.6	31.6

Source: HCRM

(4) Marketing period of rice

In the delta, rice is harvested from mid-September to the end of October. Rice growers sell their produce promptly, since paddy transactions are on a cash basis and the price of government-controlled rice is fixed. this shortens the actual marketing period of rice to 3 months, from October to December. Due to the free dealings allowed this fiscal year, however, some farmers would prefer to sell their produce at a different time and the marketing period is likely to be extended.

2-1-5 Rice Distribution Facilities

(1) Types of distribution facilities

As shown in the chart of rice distribution channels, each stage of distribution needs its own facilities. The major ones are cooperatives' procurement stations, Rice Mills Companies' outdoor storage (called Open Shuna) and rice warehouses, rice mills, privately-owned local rice mills, and the Rice Marketing Company's packing centers.

Cooperatives' procurement stations are built for regions with 500 feddan or larger rice acreages and set in 1,400 villages throughout the country. They are operated by representatives of cooperative members, public companies affiliated to the Ministry of Agricultural and rice mills companies to deal with not only purchase of agricultural products but also materials such as fertilizer.

(2) Rice storage facilities

Partly because of the climate and other natural factors in Egypt, paddy is traditionally stored outdoors. The rice mill has a storage area without walls, i.e., a shed, and one with walls, i.e., a warehouse. These facilities are annexed to the building for husking and milling. However, they are not for paddy but for the storage of rice and materials such as jute bags.

There is usually an outdoor storage area within the premises of the rice mill, which serves as a yard for raw materials. In the area, jute bags filled with paddy (80 ~ 85kg/bag) are heaped in 10 to 15 layers on wooden pallets spread on the ground, forming a semi-box shape pile with round top. The entire pile of bags is covered with sheets. (See the photograph on the opening page.)

The piles are small when there is sufficient ground space available. When the paddy has a high water content, smaller piles are preferable because of their higher air-permeability. Usually,

bags totaling 50 - 100 tons of paddy make up one pile. As the ground storage capacity is 1.0 - 1.5 tons/m^2, even an average-sized rice mill needs 20,000 - 30,000m^2 (2 - 3 ha) of land for paddy storage. When there is not enough space available, rice mills encroach on roads or cultivated land.

The table below shows the storage capacities of the facilities owned by the eight Rice Mills Companies under the control of the Holding Company for Rice Marketing & Rice Products. In this table, except the two silos capable of accommodating 10,000 tons built through the aid program by the government of Japan for the Alexandria and Damietta Rice Mills Companies, all are temporary storage bins (mill-day-bins) in the buildings for husking and milling. In other word, the available paddy silos have a total capacity of 20,000 tons (2%) as of December 1991, against about 1 million tons of government-controlled rice.

Capacities of Rice Storing Facilities of Rice Mills Co.

Unit : ton

Rice Mills Co.	Shed	Warehouse	Silo	Open Shuna	Total
Alexandria	2,000	2,400	12,250	138,450	155,100
Rosetta	12,000	-	-	139,000	151,000
Beheira	4,660	11,857	-	39,300	55,835
Kafr El Sheikh	13,500	-	-	82,000	95,500
Gharbia	5,000	10,000	2,140	67,000	84,140
Dakahlia	-	7,000	1,900	80,000	88,900
Damietta & Belkas	16,900	5,000	10,760	105,200	137,860
Sharkia	35,000	1,000	2,525	88,000	126,525
Total	89,060	37,257	29,575	738,950	894,860

Source: HCRM

Although an outdoor storage area is located within the premises of each rice mill, as mentioned above, two Rice Mills Companies, Alexandria and Rosetta, operate central outdoor storage areas (Central Shuna) independently built some distance form their mills. This is because their mills are not in rice-growing re-

gions and they have to bring raw material paddy from remote places. The central paddy storage areas function as paddy dumps. Location and capacity of the central paddy storage areas are as shown in the following table:

Central Shuna

Rice Mills Co. of Rice-cleaning	Location	Area	Storing Capacity (ton)
Alexandria	Abu Kabeer	Sharkia	)
"	Sidi Salem	Kafr El Sheikh	) 80,450
"	Disuq	"	)
Rosetta	Damankour	Beheira	)
"	Fuwa	"	) 72,250
"	Rosetta	"	)

Source: HCRM

Whereas outdoor paddy storage areas belonging to the Rice Mills Companies (excluding the two central Shunas) can accommodate 738,950 tons, the amounts of paddy actually purchased by the Companies are as shown in the table below. The figures show how tight the situation is as the capacity representing 68% of the total of their purchases (1989/90). It should be noted, however, that the outdoor storage area is simply a lot. Its capacity is flexible, depending on the number of bags piled up. The sufficiency rate differs considerably by the Company; the Beheira Rice Mills Company's paddy storage capacity amounts to only 28% of its purchases.

Purchase Records of Rice Mills Co.

Unit : ton

Rice Mills Co.	1985/86	1986/87	1987/88	1988/89	1989/90	Storing Rate of Outdoor Storing Lot 1989/99(%)
Alexandria	129,480	137,807	146,787	117,141	137,099	108
Rosetta	117,436	136,943	145,937	121,057	135,506	103
Beheira	113,821	142,644	147,949	116,122	138,622	28
Kafr El Sheikh	150,890	134,157	145,334	120,161	145,007	57
Gharbia	139,228	141,804	145,506	129,649	139,237	48
Dakahlia	160,112	138,806	144,961	116,156	139,548	57
Damietta & Belkas	142,254	149,035	153,793	136,160	140,103	82
Sharkia	129,842	142,598	144,812	117,165	138,056	64
Total	1,083,063	1,123,794	1,175,079	971,611	1,112,178	66

Source: HCRM

(3) Loss of paddy during storage

The Rice Technology Training Center investigated the loss of paddy in outdoor storage in 1984, in five storage areas scattered across the country. The result shows an average loss in quantity of 0.38%/month, or about 3% in an eight-month storage period. the reported causes were damage by birds (slightly below 1%) and rats (slightly above 2%).

No data are available about qualitative loss. However, degeneration of rice and other qualitative losses are assumed to have occurred since the Nile delta has had substantial rainfall in the paddy storage period in winter in recent years. In fact, during the study for this project, there was rain falling heavily on the paddy stored outdoors.

(4) Processing capacity of each Rice Mills Company

Each Governorate's rice yield, its Rice Mills Company's quota of paddy to be processed, and its rice cleaning capacity are shown in the following table.

The Rice Mills Companies have their demarcated Governorates where they procure raw material paddy. Thus, there is no question

of their fighting for paddy. Each Company's quota is set on the basis of its processing capacity.

The Alexandria and Rosetta Rice Mills Companies are not in rice-growing districts and have to purchase paddy from other Governorates. The locations were chosen because they are rice-consuming districts and close to loading ports for export.

Paddy Production in Governorate and Queta ・Rice Milling Capacity for each Rice Mills Co.

Governorate	Paddy Production (ton)		Rice Mills Co.	Queta (ton)		Rice Milling Capacity
	1989／90	1990／91		1989／90	1990／91	(White Rice;ton/day)
Kafr El Sheikh	583,060 (21.8%)	664,834 (21.5%)	Kafr El Sheikh	127,189 (12.4%)	115,443 (12.4%)	645 (11.9%)
			Alexandria	127,433 (12.5)	118,254 (12.7)	640 (11.8)
Beheira	572,802 (21.4)	567,356 (18.3)	Beheira	124,997 (12.2)	115,550 (12.4)	700 (13.0)
			Rosetta	128,636 (12.6)	116,450 (12.5)	593 (11.0)
Dakahlia	688,029 (25.7)	920,095 (29.8)	Dakalia	126,475 (12.4)	116,878 (12.5)	715 (13.2)
Gharbia	283,219 (10.6)	292,394 (9.5)	Gharbia	128,019 (12.5)	115,075 (12.4)	630 (11.6)
Sharkia	383,282 (14.3)	453,462 (14.7)	Sharkia	128,069 (12.5)	116,925 (12.6)	660 (12.2)
			Alexiandria	(127,433)(12.5)	(118,254)(12.7)	(640)(11.8)
Damietta	165,739 (6.2)	191,010 (6.2)	Damietta & Belkas	132,234 (12.9)	116,874 (12.5)	825 (15.3)
			Rosetta	(128,636)(12.6)	(116,450)(12.5)	(593)(11.0)
Total	2,676,131	3,089,151		1,023,052	931,449	5,408

Source : H C R M

2-1-6 Operation System for Processing and Distribution of Rice

(1) Organization, personnel and budget of holding company for rice marketing & rice products

In Egypt the rice distribution structure is composed simply of the Holding Company for Rice Marketing & Rice Products, which takes care of government-controlled rice, and its affiliated bodies. The former Public Sector Organization for Rice Mills & Marketing was renamed the Holding Company for Rice Marketing & Rice Products one month after the proclamation of the Presidential Decree. The system is now in the process of renewal.

The Holding Company has the following responsibilities:

* to make an integrated plan for the Rice Mills Companies and to set their respective goals

* to identify the causes of major problems encountered by the Rice Mills Companies

* to conduct technical and economical feasibility studies on each Rice Mills Company's activities, so that the above-stated integrated plan can be carried out and the respective goals can be attained

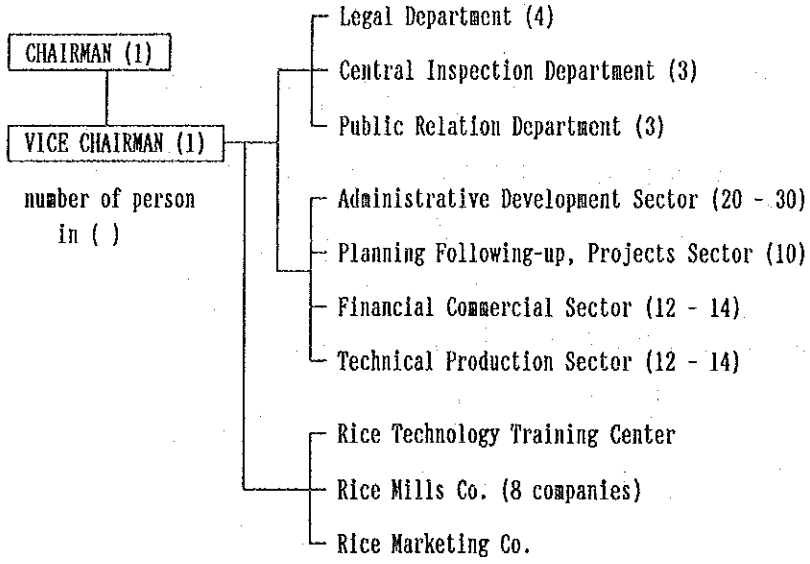
* to periodically follow up on each Rice Mills Company's activities, including its productivity, labor situation, and settlement of accounts

* to raise the training level of all the Rice Mills Companies, with particular emphasis on advanced, high-efficiency machines and apparatuses

* to extend financial assistance to the Rice Mills Companies for the achievement of their goals

Holding Company for Rice Marketing & Rice Products has its head office in Cairo. Following is its organization chart. It has 68 to 80 employees.

Organization Chart of Holding Company for Rice Marketing & Rice Products



Source: HCRM

New projects, including foreign-aided ones, are the responsibility of the Planning Follow-Up, Projects Sector. Its main job is to follow up on ongoing projects. A six member follow-up team is sent at regular intervals to each project site, to expedite the work and solve problems.

The Holding Company's budget is separate from those of the affiliated Rice Mills Companies. Investments budgeted for 1988/89 in Egypt's second Five-Year Plan for Socio-Economic Development (1987/88-1991/92), Plan for Year Two (1988/89) amounted to 27,334,000 LE.

(2) Rice mills companies' organization, capital, etc.

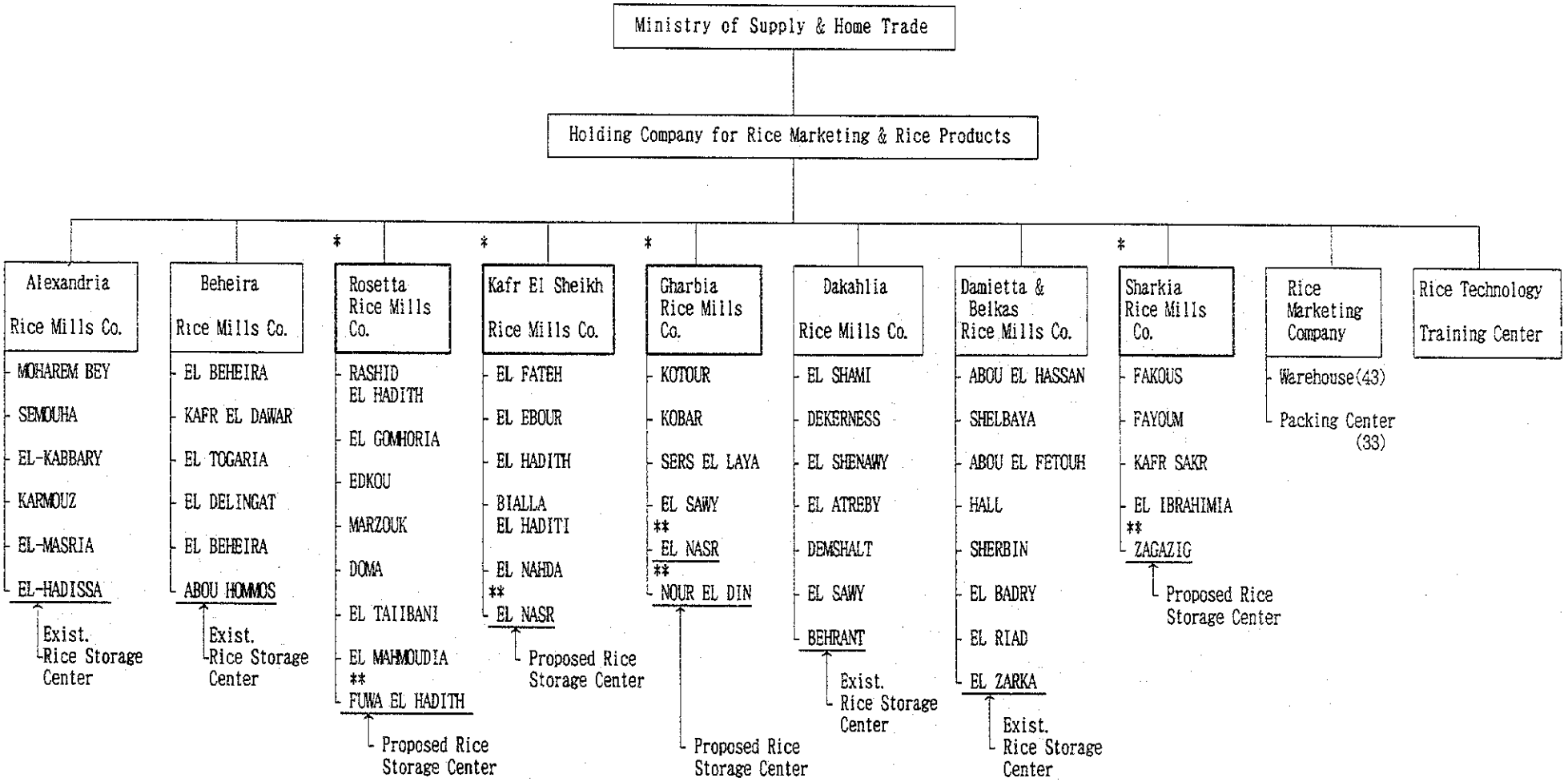
The Rice Mills Companies' main activities are purchasing paddy, processing it into polished rice, and selling it. Rela-

tions between the eight Rice Mills Companies subordinate to the Holding Company for Rice Marketing & Rice Products and 52 rice mills under their direct control are shown in the next chart.

Each Rice Mills Company is headquartered in a local city and operates several rice mills in its Governorate. To make use of the by-products of mills, some of the Companies have recently built feed plants, macaroni plants or ice plants, with the aim of diversifying their operations. Their capital and sales are as shown in the following table.

As the main offices are staffed with 30 - 40 persons, and 100 - 150 people work for each mill, as described later, each Rice Mills Company is estimated to have several hundred employees. The provisionally budgeted investments of the four Rice Mills Companies concerned with this project, in the third Five-Year Plan starting in 1992/93, are shown in the following table.

Rice Mills Co. and its Rice Mills



*:Rice Mills Co. for This Project

**:Rice Mills for This Project

Capital and Sales Amount for Rice Mills Co.

As of : Nov., 1991

Rise Mills Co.,	Capital(1,000LE)		Sales Amount(1,000LE)			Factories		Established in
	Paid	Authorized	1987/88	1988/89	1989/90	Nos. of R/M	Feed Mill	
Alexsandria	4,300	4,300	49,551	63,084	67,584	6 (640T/D)	—	24th Mar. 1967
Rosetta	5,820	5,820	54,364	91,755	102,638	8 (593T/D)	25t/hr	24th Mar. 1967
Beheira	6,000	6,000	59,561	84,945	98,915	6 (700T/D)	20t/hr	24th Mar. 1967
Kafr El Sheikh	3,265	3,265	44,306	60,472	67,972	6 (654T/D)	—	24th Mar. 1967
Gharbia	4,250	4,250	48,592	66,082	64,971	6 (630T/D)	—	24th Mar. 1967
Sharkia	3,200	3,200	67,977	85,853	89,287	5 (660T/D)	20t/hr	24th Mar. 1967
Dakahlia	3,250	3,250	44,066	56,625	57,975	7 (715T/D)	—	24th Mar. 1967
Damietta & Belkas	5,700	5,700	89,998	110,887	116,300	8 (825T/D)	25t/hr	24th Mar. 1967
Total	35,758	35,785	458,415	619,703	665,642	52 (5,408T/D)	90t/hr	

Source : HCRM

PROPOSED BUDGET OF FIVE YEAR PLAN FOR 1992-96 (Rosetta Rice Mills Co.)

unit : 1,000 LE

PROJECTS	MONETARY COMPONENTS				ASSETS						
	TOTAL	LOCAL CURRENCY	FOREIGN CURRENCY		LAND	BUILDING	EQUIP & MACHINES		TRANSPORTATION	FURNITURE	CUSTOM FEES
			CASH	FACILITIES			LOCAL CURRENCY	FOREIGN CURRENCY			
A. REPLACEMENT AND REHABILITATION											
RASHIDEL HADITH MILL	890	640	250			100	300	25	200		40
EDKOU MILL	1,540	1,290	250		500	300	300	200	150		40
DOMA MILL	760	710	50			50	600	50	50		10
EL MAHMOUDIA MILL	475	325	150			100	50	150	150		25
FOUN EL HADITH MILL	4,000	3,700	300			3,000	300	300	350		50
EL GOUM HOURIA MILL	730	530	200			250	100	200	150		30
DEVELOPMENT OF COMPANY UNITS	1,120	1,120				600	50	275	350	120	
FEED MILL	1,120	970	150				500	150	300	150	20
TOTAL	10,635	9,285	1,350		500	4,400	2,200	1,350	1,700	270	215
B. COMPLETION											
TOTAL											
C. EXTENSION AND NEW PROJECTS											
BISCUIT LINE	13,310	3,550	5,150	4,610		100	500	9,760	400	50	1,500
* SILOS	20,700	5,700		15,000		5,000	500	15,000		200	
TOTAL	34,010	9,250	5,150	19,610		5,100	1,000	24,760	400	250	1,500
D. NEW PROJECTS											
TOTAL											
GROUND TOTAL	44,645	18,535	6,500	19,610	500	9,500	3,200	26,110	2,100	520	1,715

Source : HCRM

PROPOSED BUDGET OF FIVE YEAR PLAN FOR 1992-96 (Gharbia Rice Mills Co.)

unit : 1,000 LE

PROJECTS	MONETARY COMPONENTS				ASSETS							
	TOTAL	LOCAL CURRENCY	FOREIGN CURRENCY		LAND	BUILDING	EQUIP & MACHINES		TRANSPORTATION	FURNITURE	CUSTOM FEES	
			CASH	FACILITIES			LOCAL CURRENCY	FOREIGN CURRENCY				
A. REPLACEMENT AND REHABILITATION												
KATOUR MILL	3,065	2,015	1,050			1,000	500	1,050	400	15	100	
EL NASR MILL	4,170	3,120	1,050			2,000	600	1,050	400	20	100	
KOBOUR MILL	7,075	6,025	1,050			5,000	500	1,050	400	25	100	
SERS EL LAYAN MILL	2,965	1,915	1,050			1,000	550	1,050	300	15	50	
ADMIN STRATION CENTER	1,125	1,125				300			500	325		
EL SAWY REHABILITATION	8,380	8,380			2,000	5,000	350		1,000	30		
NOUR ELDIN 〃	6,025	3,025	3,000			2,000	335	3,000	365	25	300	
FMAM 〃	2,980	2,980				2,000	550		400	30		
COMPANY WORKSHOP	4,030	4,030				2,000	2,005			25		
DEVELOPMENT OF COMPANY UNITS	1,000	500	500			250	250	500				
TOTAL	40,815	33,115	7,700		2,000	20,550	5,640	7,700	3,765	510	650	
B. COMPLETION												
SHABSHEER FEED MILL	9,705	9,705				8,000	600		800	205		100
EL MASR 〃 〃	4,225	4,225			1,800	1,820	600			5		
BORAI 〃 〃	7,310	7,310			1,000	3,000	3,000		300	10		
TOTAL	21,240	21,240			2,800	12,820	4,200		1,100	220		100
C. EXTENSION AND NEW UNITS												
SHABSHEER COMPLETE PLANT	100,000	6,000	24,000	70,000		5,000	1,000	94,000				
*SHABSHEER SILOS	19,000	4,000		15,000		3,500	300	15,000		200		
OIL EXTRACT	10,000	3,200	6,800			3,000		6,800			200	
TOTAL	129,000	13,200	30,800	85,000		11,500	1,300	115,800		200	200	
D. NEW PROJECTS												
TOTAL												
GROUND TOTAL	191,055	67,555	38,500	85,000	4,800	44,870	11,140	123,500	4,865	930	850	100

Source : HCRM

PROPOSED BUDGET OF FIVE YEAR PLAN FOR 1992-96 (Sharkia Rice Mills Co.)

unit : 1,000 LE

PROJECTS	MONETARY COMPONENTS				ASSETS						
	TOTAL	LOCAL CURRENCY	FOREIGN CURRENCY		LAND	BUILDING	EQUIP & MACHINES		TRANSPORTATION	FURNITURE	CUSTOM FEES
			CASH	FACILITIES			LOCAL CURRENCY	FOREIGN CURRENCY			
A. REPLACEMENT AND REHABILITATION											
MACARONI PLANT	815	515	300			250	100	300	100	20	45
EL FAYOUM RICE MILL	900	700	200			400	150	200	100	20	30
KAER SAKR RICE MILL	1,575	1,225	350			700	300	350	150	25	50
FAKOUS RICE MILL	1,475	1,175	300			600	400	300	100	30	45
EL ZAKAZIK RICE MILL	1,240	740	100			700	300	100	100	25	15
CENTRAL WORKSHOP	600	1,000				100	500				
REHABILITATION OF FEED MILL	9,830	4,830	1,000	4,000		3,000	1,000	5,000	200	30	600
REHABILITATION OF EBRAHMIYA	11,800	6,800	5,000			5,000	500	5,000	500	50	750
DEVELOPMENT OF COMPANY UNITS	1,000	500	500			250	250	500			
TOTAL	29,235	17,485	7,750	4,000		11,000	3,500	11,750	1,250	200	1,535	
B. COMPLETION											
TOTAL											
C. EXTENSION											
ROVGHNSS FEED MILLS	3,650	2,650	1,000			500	1,800	1,000	150	50	150	
BISCUIT LINE	13,310	3,310	2,000	8,000		100	500	10,000	200	10	1,500	1,000
RICE BRAN EXTRACTION UNIT	4,300	2,300	2,000			1,000	200	2,000	100	50	300	650
RICE BRAN TREATMENT	2,150	1,150	1,000			750	50	1,000	100	50	150	50
* SILO	19,000	4,000		15,000		3,500	300	15,000		200		
TOTAL	42,410	13,410	6,000	23,000		5,850	2,850	29,000	550	360	2,100	1,700
D. NEW PROJECTS											
TOTAL											
GROUND TOTAL	71,645	30,895	13,750	27,000		16,850	6,350	40,750	1,800	560	3,630	1,700

Source : HCRM

PROPOSED BUDGET OF FIVE YEAR PLAN FOR 1992-96 (Kafr El Sheikh Rice Mills Co.)

unit : 1,000 LE

PROJECTS	MONETARY COMPONENTS				ASSETS						
	TOTAL	LOCAL CURRENCY	FOREIGN CURRENCY		LAND	BUILDING	EQUIP & MACHINES		TRANSPORTATION	FURNITURE	CUSTOM FEES
			CASH	FACILITIES			LOCAL CURRENCY	FOREIGN CURRENCY			
A. REPLACEMENT AND REHABILITATION											
EL FATH MILL	2,500	1,500	1,000			725	500	1,000	100	25	150
EL NASR MILL	3,325	2,325	1,000			1,500	500	1,000	150	25	150
AUTOMATIC BAKARY	60	60				10	50				
EL EBOUR MILL	2,050	1,050	1,000		500	100	100	1,000	150	50	150
EL SALAM MILL	2,025	1,525	500			1,000	300	500	100	50	75
PARBOILED RICE MILL	1,250	250	1,000			100		1,000			150
EL HADITH REHABILITATION	11,470	6,470	5,000			5,000	500	5,000	200	20	750
EL NAHDA REHABILITATION	15,970	10,970	5,000		4,500	5,000	500	5,000	200	20	750
DEVELOPMENT OF COMPANY UNITS	1,000	500	500			250	250	500			
TOTAL	39,650	24,650	15,000		5,000	13,685	2,700	15,000	900	190	2,175
B. EXTENSION											
TOTAL											
C. NEW PROJECTS											
FEED MILL	27,000	14,000	13,000		1,000	5,680	6,000	13,000	500	20	300
BABY FOOD	2,425	925	1,500			450	250	1,500			225
PLASTIC PLANT	875	375	500			100	200	500			75
*SILOS	19,000	4,000		15,000		3,500	450	15,000		50	
TOTAL	49,300	19,300	15,000	15,000	1,000	9,730	6,900	30,000	500	70	600
GROUND TOTAL	88,950	43,950	15,000	30,000	6,000	23,415	9,600	45,000	1,400	260	2,775

Source : HCRM

2-1-7 The National Development Plan

The full-scale social economic development plan of Egypt was begun with the "Socio-Economic Development Plan" covering the 10 years of fiscal years 1961-70. This plan had been steadily carried out until the growth rate attained 6.5% for the target of 7.0% and the investment was recorded 96% of the target. After that, however, up to the middle of 1970s, the 3rd and the 4th Middle East Conflicts had resulted in the later half of 1970s, through an optimistic view of the Middle East peace settlement which changed the surroundings better, the plan has been re-activated to achieve a fair outcome.

The Five-Year Plan for fiscal years 1978-82 attained a growth rate of 5.5% for the average annual target of 10.9%, and the Five-Year Plan for fiscal years 1983-87 recorded a 6.8% growth rate for the target of 7.9%. The results are more or less acceptable. On the other hand, although the aforementioned Five-Year Plans have been constantly directing to industrialization, there are some strategical changes noted. Priority given at the early stage to industries to replace imports and heavy chemical industries has been changed in recent years to raise export-type industries and manufacture of the necessities of life.

The long-term target of the economic development of Egypt is set up in the long-term perspective program, covering the fiscal years 1983-2002, which includes:

* Establishment of self-support system in order to maintain development, utilizing the potential capacity of the Egyptian economy;

* Effective use of resources to improve investment capacity and economic efficiency, and improvement and consolidation of social economic infrastructure;

* Decentralization of population for the balanced population distribution and regionalization of economy.

The abovementioned items are main strategies for the long-term development. The Second Five-Year Plan of Socio-Economic Development (1988-92), in progress at present, works as a middle-term plan to accomplish the long-term target, following the preceding the First Five-Year Plan.

2-1-8 The Development Plan of Agriculture and Food Production

The Second Five-Year Plan (1988-92) of Egypt is to be finished in June, 1992. Figures planned for the next term have not been announced at the time of the field survey. Since the new agriculture crop and food production program is schemed under re-examination of the Second Plan, that of the Second Plan is mentioned below:

* To produce most of the food demand of the people

* To increase in and diversify major agricultural products for export

* To provide raw materials and middle products for those industries which supply fundamental materials needed for agriculture

* To make highly effective use of resources in employing various high-level agricultural technology to cope with shortage of water and land; in other words, to place vertical development of agriculture in the center

* To develop newly reclaimed land as well as reclaim wasteland; in other words, to strive for horizontal development of agriculture

* To develop and make rational use of water resources in existing and newly reclaimed farmland

* To select most suitable kinds of products to gain the best economic effect at a minimum possible production cost

* To promote livestock industry by forage production increase and breed improvement

* To introduce intensive and mechanized fish-breeding ponds in appropriate sites in order to ingest proteins

* To provide the Egyptian people with employment opportunities

On the other hand, the major projects related to the Ministry of Supply in the Second Five-Year Plan, which include construction of silos, are as follows;

* Flour mill project in northern Cairo

* Forage mill project belonged to Alexandria Rice Mills Company

* Macaroni mill project belonged to Sharkia Rice Mills Company

* Five metal silo projects for the Rice Mills Company in Alexandria, Rosetta, Beheira, Damietta and Kafr El Sheikh

* Cleaned rice packing center projects (City of Cairo, City of Alexandria)

2-1-9 The Present Circumstances of Agricultural Cooperation of Foreign Countries

(1) Importance and direction of agricultural cooperation

The population of farming villages occupies 56% of the total population of Egypt. Despite the fact, due to the increase in the population by 2.8% per annum as well as the increase in and also the diversification of food demand resulted from the improvement of income standard, Egypt, who used to export food, now lives on imported food exceeding 50% of the total demand. Under this

circumstance, a stable supply of food and improvement of self sufficiency are essential for social-economic development. Furthermore, ensuring employment opportunities in the agricultural sector to decentralize the population is the national task.

In view of the importance of agriculture as mentioned above, major developed countries, international organizations such as the World Bank, EC and the United Nation's organs centering on UNDP are working to cooperate in varied sectors of agriculture. The main countries cooperating in agriculture are the U.S.A., Germany and Japan respectively, and the international organizations are the World Bank and UNDP. The cooperation covers increase in agricultural production, irrigation, drainage, consolidation of agricultural cooperative systems, diffusion, investigation, research and reclamation of wasteland.

Each country and organization studies the fundamental policy of Egypt's agricultural development to select sectors for cooperation. Agricultural development strategies aiming at vertical development for production improvement in the existing farmland or horizontal development in accelerating reclamation of wasteland, efficient usage of resources such as water and land, and marketing problems are now under discussion.

Past agricultural cooperation shows that the U.S.A., Germany and the World Bank are inclined to vertical development. They consider that an urgent task for the economic development of Egypt is to reduce the imbalance of demand and supply of food in as short a term as possible. The UNDP is more or less vertical and Japan seems, through the allocation of the cooperative fund, to emphasize the horizontal development.

(2) The related general grant aid

The Japanese Government has in the past granted the government of Egypt the following cooperative gratuitous funds and KR2:

Fiscal Year	Nature of Co-operation	Name of Project	Present Condition
1984	General Grant Fund (¥1,557 million)	Construction of Rice Technology Training Center	In Operation
1986	KR2 (¥500 million)	Construction of El Zalka Rice Storage Center (Damietta Belkas Rice Mills Co.)	In Operation
1987	KR2 (¥500 million)	Construction of El Hadissa Rice Storage Center (Alexandria Rice Mills Co.)	In Operation
1988	KR2 (¥450 million)	Construction of Beheirant Rice Storage Center (Dakahlia Rice Mills Co.)	Expected Completion January, 1992
1990	General Grant Fund (Provision of Machinery and Equipment ¥624 million)	Construction of Abu Homos Rice Storage Center (Beheira Rice Mills Co.)	Expected Completion August, 1993

(3) The related technical cooperations by the government of Japan

The government of Japan sent a specialist to the Rice Technology Training Center for the period of 1988-90 and has now received a request for another. On the other hand, to accept trainees, the former body of JICA, Overseas Technical Cooperation Agency, opened a Group Training Course in Post-Harvest Rice Processing in 1973, including maintenance and control technology of rice, and has accepted about 15 trainees annually from developing rice-producing countries. Since 1974 the Course has also accepted about 20 trainees from the governmental rice distribution organizations of Egypt (Holding Company for Rice Marketing & Rice Products, Rice Mills Co. and Rice Technology Training Center).

(4) The related cooperation project

As to the related cooperation of foreign countries, the U.S.A., Germany and China have granted the Ministry of Agriculture following assistances and technical cooperations:

Tractor & Truck Mechanics Training Cetner	West Germany	Technical Cooperation
Sharkia Agricultural Cooperative Program	West Germanay	Technical Cooperation
National Agricultural Research Project	U.S.A.	Technical Cooperation
Agricultural Mechanization Project	U.S.A.	
Agricultural Mechanization Project	China	
Crop Seed Project (1982)	Japan	General Grant
Rice Mechanization center (1982)	Japan	General Grant
Rice Mechanization Program (1981 - 92)	Japan	Technical Cooperation
Farm Machinery Lending Center (1984 - 85)	Japan	General Grant
Agricultural Equipment Cooperation	Japan	KR2

On the other hand, following cooperations have been granted to the Ministry of Supply which controls rice distribuiton:

Construction of Rice Mill	Germany (East)	provision of equipment building
Dispatch of Specialist & Provision of Research Equipment	FAO	technical cooperation & provision of equipment
Facility Improvement (perboiled rice plant)	Germany (East), Italy	provision of equipment

2-1-10 Present Condition of the Related Project under the Japanese Cooperation

(1) Utilization

1) **El Zarka Rice Storage Center (1986 KR2)**

The operation started in May, 1989. It has been two years and 3 months at the time of our survey. Conditions of machineries and their maintenance were good. At the time of our survey on November 22, 1991 4,000 tons each of Japonica variety and Indica variety, total 8,000 tons were in the storage, occupying 80% of the total storage capacity of 10,000 ton in main silos. Considering the remaining 20%, that is 2 silo bins (1,000 tons x 2), would be used for paddy's rotation from one silo to another, maximum amount of paddy is stored at present condition.

2) **El Hadissa Rice Storage Center (1987 KR2)**

This center started operation in October, 1991. At the time of our survey, machinery and equipment were operating satisfactorily. Japonica variety paddy of 7,000 tons were stored and more paddy was being received. It is apparent that this center is utilized effectively.

3) **Behrant Rice Storage Center (1988 KR2)**

Facilities for this center were under construction to be completed by December, 1991. Nine of ten silos had already been completed. Installation of main machinery had also nearly been completed. Construction works were underway for starting operation in January, 1992.

4) **Abu Hommos Rice Storage Center (1990 Grant Aid)**

At the time of our survey on November 21, 1991, results of soil survey were being examined for the proposed site. Foundation works are scheduled to start in January, 1992.

5) **Rice Technology Training Center (1984 Grant Aid)**

Training for engineers and technicians are being conducted by the various training courses. Administrators and technicians from rice milling companies are participating in these training courses. This training center can be expected as an organization to conduct the technical training of the staff of Rice Storage Centers who will be in charge of operation and maintenance.

6) **Rice Mechanization Center (1982 technical cooperation)**

The study team interviewed experts of JICA technical cooperation, and were explained on the method of harvesting, rice varieties, characteristics of paddy, present situation of mechanization and quality of paddy received at each rice storage center.

As mentioned above, the results of our survey show that facilities built by the Japanese cooperation are fully utilized. In the construction of rice storage center, works allocated for Egyptian side, namely installation of machinery, civil works and building construction are generally carried out satisfactorily. It is assumed that there is no technical problem in the work divisions.

(2) Effects of rice storage centers cooperated

Two of the four facilities built under the cooperation project were operated. Their effects can be summarized as follows:

1) Reduction in storage losses

According to a report prepared by the RTTC, storage losses in open storage caused by scattering or damage by rodents and other small animals are approximately 3%. In the facilities, dockage is removed when paddy is brought, and moisture is removed before paddy is put in silos for storage. Furthermore, quality is controlled by grain temperature monitoring equipment and storage losses do not occur.

2) Quality control by separate storage

Paddy harvesting and collection are affected by season and paddy of different types and quality are delivered concentrically. In open storage, storage places must be decided each time. Paddy has to be moved again in some places. In the cooperated facilities, different types and quality are designated for individual silos. Paddy is sotred in designated silos in accordance with inspection results when it is delivered.

Good rice milling is possible, as paddy is stored by types and by quality, when shipping to rice mills. Paddy is sent to rice mills by special bulk grain trucks and it is not scattered during transportation.

3) Saving of land in rice mills

The land area needed to store 10,000 tons of paddy is approximately 1,700m^2 if stored in silos and approximately 10,000m^2 if stored outdoors. Therefore, approximately 8,000m^2 of land can be saved per site.

4) Pollution control of fumigant

Heaped paddy stored outdoors is covered by a tarpaulin sheet and is fumigated by methyl bromide (CH_3Br) or hydrogen phosphate (PH_3) for pest insect fumigation. Fumigation gases are strongly toxic. Even though many fumigating places are inside rice mills, some of these fumigating places face public roads outside of them. The use of a fumigant is dangerous to workers and residents living nearby. Compared with this situation, the cooperation facilities do not require fumigation, except in special cases. Possibilities of gas leak are low and residual toxic gases are exhausted mechanically to a safe place, even if fumigation is performed, for better pollution control.

(3) Remarks for future project

1) Pipes, blower bodies and other members were worn by paddy and dockage such as mud balls and small crushed stones. These damaged

places were temporarily repaired by jute bags or local welding. These places must be improved to a structure that resists wear or is easy to repair.

2) A large amount of dust was generated throughout the El Zarka Rice Storage Center (1986 KR2). Sufficient care must be exercised to remove causes of machine failures, to prevent dust explosions, to select dustproof equipment from the standpoint of improving the labor environment, and to calculating dust collector capacities.

3) Paddy is traded in accordance with grades established by quality inspection and by weighing, using truck scales. Sufficient quality inspection equipment is not installed at the facilities built under the cooperation project. In addition to being model facilities in terms of paddy storage and quality control, inspection equipment must also be selected in the quality inspection of paddy trading, also taking into consideration the characteristics of these facilities as a model.

4) The El Zarka and El Hadissa Rice Storage Centers started their operations in May, 1989 and October, 1991, respectively. Local rust could be found on the silo side panels, outdoor conveyors, piping, platforms and other places. Dust was attached to and accumulated on movable parts such as rotating shafts, even though no problems were caused at the moment. Equipment maintenance management such as cleaning, checking, replacing worn parts and repairs must be performed periodically and organizationally (budget and system).

5) In the past project, civil engineering work by Egyptian contractor took 14 - 18 months. And rice storage center started operation 26 - 38 months after the time of Exchange of Note being made. In order to start operation promptly, speedy process of Exchange of Note ratification, etc. are necessary for further project.

2-2 Outline of the Request

The population increase ratio of Egypt is high, approximately 2.8% per annum. Due to natural conditions, arable land accounts for only about 3.5% of the total land area of Egypt. Expansions in agri-

cultural production cannot catch up with the population increases. The self-support percentage of foodstuff has lowered to below 50% and the food problem has become increasingly serious. The proportion of foodstuff in total Egyptian imports increased to about 32% in 1990. This is one of the largest causes for the trade deficit.

In the Five-Year Plan (1988 to 1992), the government of Egypt has been placing an emphasis on increasing the food self-support percentage by increasing agricultural production, and is endeavoring to increase harvests by expanding farmland and by improving and expanding irrigation facilities.

The eight Rice Mills Companies under the Ministry of Supply & Home Trade are responsible for the distribution of rice. There are problems such as inappropriate post-harvest processing and lack of storage facilities, however, and rice losses in the distribution stage are estimated to surpass 10%. The government of Japan has cooperated in this sector by providing grant aids in machinery and equipment for building the Rice Technology Training Center in 1984 and four rice storage centers, one for each of four Rice Mills Companies, in 1986, 1987, 1988 and 1990. As a result, the Rice Mills Companies which received these grant aids have been able to greatly reduce losses in the rice distribution stage and increase supply quantities.

The government of Egypt noticed the effects and requested the government of Japan to provide grant aid to build 10,000 ton capacity silos as rice storage centers for the remaining four Rice Mills Companies.

The request under this project covers procurement of the following machinery and equipment to be supplied to the Gharbia, Kafr El Sheikh, Rosetta and Sharkia Rice Mills Companies.

Machinery and Equipment	Quantity
Paddy storage Silo 1,000mt/each	10 sets
Aeration fan	20 "
Intake Hopper 12mt/each	2 "
Paddy cleaner 12mt/hr/each	2 "
Destoner 4mt/hr/each	6 "
Dryer with 4 buffer tanks	1 "
Hopper scale 24mt/hr/eacht	2 "
Belt conveyors	1 lot
Chain conveyors	1 lot
Bucket Elevators	1 lot
Dust Suction Fan with dust collecting facilities	1 lot
Control Panel	1 lot
Ancillary Equipments	1 lot
Shipping Tank	1 lot
Grain Inspection Equipment	1 lot
Track Scale	1 set
Grain Bulk Truck 12.5mt/each	4 sets
Spare Parts	1 lot

2-3 Outline of the Project Area

2-3-1 Location of Project Area and Social Conditions

As shown in the location at the beginning of this report, all the project sites of this project are located in the delta regeon of the Nile River. This delta regeon is the center of Egypt's agricultural production. Rice, wheat, barley, corn and sorghum are mainly produced. As in the rice storage centers built under Japanese cooperation, the project sites are located adjacent to the rice mills owned by the Rice Mills Companies, which are scattered in this regeon. As one exception, Gharbia Rice Mills Company is building a new feed mill in Shabsheer, and the land needed for this project has been secured adjacent to the feed mill.

The project site of the Shabsheer Rice Storage Center of Gharbia Rice Mills Company is located near the center of a delta regeon, approximately 100km north of Cairo and about 80km inland from the coastline. The rice mill which is scheduled to receive paddy from this center is in the medium-sized city of Mahalla El Kubra, located approximately 24km northeast of the site. However, due to a land problem, the new facility is planned to be built in Shabsheer.

The project site of the El Nasr Rice Storage Center of the Kafr El Sheikh Rice Mills Company is located in the suburbs of Disuq, 80km east of Alexandria, and is about 3km distant from the urban district. The area around the project site is a mixture of farmland and residential area.

The project site of the Fuwa El Hadith Rice Storage Center of the Rosetta Rice Mills Company is located in Fuwa, approximately 70km east of Alexandria. The site is approximately 5km distant from the urban district. The area abounds with farmland.

The project site of the Zagazig Rice Storage Center of the Shar kia Rice Mills Company is in Zagazig, approximately 70km north-northeast of Cairo. This site is in the southeast part of the delta regeon and is approximately 120km inland. This site is the most inland one among all the project sites.

The project sites are located in rice producing areas. The farmland in the neighborhood is protected by laws, and cannot be converted to purposes other than agriculture. Reflecting the recent population increase trend, residential houses have started to be built near the project sites.

2-3-2 Natural Conditions

The natural conditions at the project sites differ in accordance with the distance from the coastline. The Fuwa El Hadith project site, located the northern-most among the four project sites, is located approximately 30km from the coastline and is much affected by the Mediterranean climate. The annual precipitation is approximately

150mm, as in Alexandria located along the coast. The southern-most Zagazig project site has an annual precipitation of 14mm. The maximum temperature in summer is 33° C, while the minimum temperature in winter is 8° C.

The humidity at all of the project sites in the delta zone is 50 to 60% throughout the year. All of the project sites are located in the delta regeon and the terrain at the sites is flat.

2-3-3 Rice Marketing Situation

As mentioned elsewhere in this report, construction of rice storage centers under this project is to supply material (paddy) to the six rice mills under four Rice Mills Companies.

Quota for each Rice Mills Company and further to each rice mill are as follows. The quota for each rice mill is decided considering the processing capacity of the rice mills.

Annual Quota for each Rice Mills Company and Rice Mill covered by this project

Rice Mills Company	Quota for Rice Mills Co. (Ton/Paddy)	Rice Mill	Rice Mill Quota (Ton/Paddy)	Rice Mill Processing capacity Ton/day Milled rice
Rosetta	128,636	El Gomhoria	15,000	50
		Fuwa El Hadith	20,000	75
Gharbia	128,019	El Nasr	30,000	150
		Nour El Din	30,000	100
Sharkia	128,069	Zagazig	25,000	100
Kafr El Sheikh	127,189	El Nasr	25,000	90
Others	511,139	-	967,178	4,843
Total of 8 Rice Mills Companies	1,023,052		1,112,178	5,408

Source: HCRM

2-3-4 Storage Facility Condition

Present Conditions of paddy storage facilities at each rice mill and each Rice Mills Company covered by this project are as follows: (These are all open yard storage)

Paddy storage Capacity of Rice Mills Co. & Rice Mill for the Project (1989/1990)

Rice Mills Company	Paddy Storage Capacity of Rice Mills Co. (Ton)	Rice Mill		
		Name of Mill	Paddy Storage Capacity (Ton)	Quota (Ton)
Rosetta	139,000 (75,250 Central Shuna)	El Gomhoria	14,000	15,000
		Fuwa El Hadith	22,000	30,000
Gharbia	67,000	El Nasr	20,000	30,000
		Nour El Din	15,000	30,000
Sharkia	88,000	Zagazig	25,000	25,000
Kafr El Sheikh	82,000	El Nasr	16,000	25,000
Total	758,950			

(additional 155,950 in Central Shuna)

Source: HCRM

CHAPTER 3

OUTLINE OF THE PROJECT

CHAPTER 3 OUTLINE OF THE PROJECT

3-1 Objective

The ultimate purpose of this project is to increase the food self-support capability to meet increases in the food demand caused by rapid increases in the population and to secure a stable supply of food. In this regard, the specific purposes can be listed as follow:

* To reduce quantitative and qualitative losses of paddy caused by the existing open storage practice.

* To rationalize loading, unloading and distribution by mechanized bulk handling.

* To reduce storage expenses of existing open storage facilities.

* To enhance the land utilization ratio of existing open storage facilities and to use surplus land for other purposes.

* To improve the living environment near the facilities by controlling dust and fumigation gases.

3-2 Study and Examination on the Request

3-2-1 Justification and Necessity of the Project

The justification and necessity of building the rice storage centers under this project are studied below.

* The food self-suppot capability of Egypt has been decreasing in recent years as food production cannot catch up to population increases. The government of Egypt has set improvement of the food self-support capability as an important task of national policies. This project aims at contributing to improvement of the self-support capability of food by reducing quantitative and qualitative losses in paddy storage and distribution to increase the supply of

rice. This project matches the upper projects.

* Presently, the paddy storage facilities at the project sites are only open storage facilities, and their storage capacities are absolutely short. This is generally because land cannot be secured easily. The land utilization ratio can be greatly increased by building silos, and surplus land saved by building silos can be used effectively.

* In Egypt, paddy is normally distributed and stored in bags. This makes rationalization of loading and unloading difficult and requires materials such as bags, tarpaulin sheets and pallets. According to trial calculations, the labor and material costs needed for open storage amount to roughly 20 LE per ton of paddy, or 5% of the paddy price. By building silos, these costs can be greatly lowered and inventory can be controlled accurately and easily.

* The rice storage center handles large quantity of paddy which include dockage and dust. So that dust tends to leak from the center and contaminate air quality in surrounding environment. Also, toxic gas is used for fumigation in the storage center with these situation, the storage center should be improved to secure safety and to maintain environmental quality.

* The construction of rice storage centers will greatly benefit farmers using the facilities and rice consumers. The population benefiting from these centers will be very large. The farmers can sell paddy, which is their product, to the rice storage centers directly or indirectly. Paddy of a high moisture content containing foreign materials can also be processed by machines and facilities of the rice storage centers to free the farmers from the trouble of drying or cleaning and grading when paddy is sold. Paddy harvested by such large machines as combined harvesters and threshers can be received in bulk. All the project sites of this project are basically in rice cropping areas and will affect a farming population of approximately four million people.

* Paddy processed by the rice storage centers will be milled and sold to many and unspecified consumers in the areas or in cities. The planned annual processing volume of paddy by the four rice storage centers in this project totals 80,000 tons, which corresponds to approximately 52,000 (Indica type) to 56,000 (Japonica type) tons of milled rice. This will be for 2.16 to 2.34 million people, calculated at 2kg per month per person (24kg per year per person), which is the standard rice rationing quantity of Egypt.

* The government of Egypt has formulated the project for the improvement of rice storage center, and has built silos for paddy equipped with cleaning, grading, drying and weighing functions, with four of the eight Rice Mills Companies throughout Egypt. The effects of these facilities have been verified to meet the intended objectives. As a result, this project has been regarded as a continuing project.

In view of these considerations, this project is determined to be justifiable and necessary as a project for grant aid.

3-2-2 Study of Execution and Operation Program

(1) Staff allocation plan

For operation of the each rice storage center, staff of 27 persons are planned as follows:

Operation Manager	1
Mechanical Engineer	6
Electrical Engineer	2
Inspector	4
Labor	6
Truck Driver	4
Assistant	4
Total	27

At present, the rice mills have more than enough personnel in addition to surplus labor force at the plants. This surplus labor

force enables easy recruiting of personnel by new sectors in the rice storage centers.

The mechanical and electrical engineers in the rice storage centers will be the same personnel as that from the rice mills, and will be used flexibly between the centers and plants. The technical level of these engineers is high, as they have been operating machinery and equipment at rice milling plants for a long time, and they will be able to operate the facilities at the rice storage centers without problems. The Rice Technology Training Center, which have continuously trained and guided engineers, and have been highly evaluated for the effects of their training, will be responsible for training.

The storage centers built under Japanese cooperation and the rice mills have been repairing machinery and equipment and have been replacing parts. They will be able to maintain the rice storage centers under this project without problems.

(2) Budget allocation plan

The construction cost to be defrayed by Egypt under this project will be approximately 4 million LE per site, based on examples of previous cooperation projects. As mentioned in the paragraph for the project implementation system related to rice distribution and processing, this amount has already been secured by the Rice Mills Companies in their draft budgets for the next Five-year Plan in 1992 to 1996. Problems are not expected in the execution of work to be undertaken by Egypt.

The annual cost to operate the rice storage centers under this project is calculated at 205,967 LE in maintenance and management, as mentioned later. This amount will be paid by the Rice Mills Companies.

The adjoining rice mills, which will comprehensively operate and manage the facilities, are purchasing more than 25,000 tons of paddy by cash every year. The amount will be approximately

10,000,000 LE. The maintenance and management cost of a rice storage center is 205,967 LE which is only 2% of that. Operation of the rice storage centers will not be a financial burden to the rice mills and budgets, including running expenses, will not present problems.

Management of the Rice Mills Companies controlling the rice mills and rice storage centers is stable at present. Impacts of privatizing the public corporations in the future are expected to only change part of the distribution of rice. Therefore, it can be concluded that the rice storage centers under this project can be operated and maintained smoothly, as in the existing rice storage centers.

3-2-3 Scale Setting of Project Facilities

As mentioned earlier, the scale of storage facilities requested by the government of Egypt is 10,000 tons per site, and four sites are involved. The scale of the storage facilities is studied below.

(1) Study based on food policies

In a broad sense, the paddy storage facilities under this project are based on the food policy of Egypt, to improve the self-support capability of food for Egypt. Nevertheless, the facilities are not intended for food stocking or storing for emergency purposes, but are temporary storage facilities of paddy as a raw materials for rice mills.

The government of Egypt has been controlling supply and demand of rice distribution and has been handling approximately 1.07 million tons (per year, paddy basis) which is about 43% of annual paddy production. This quantity regulates the necessary facility scale in the Rice Mills Companies. Distribution in the paddy collection stage has been liberalized beginning with rice harvested in 1991. However, the operating entities of storage facilities and rice mills requiring high facility costs have not

changed, and liberalization has not been a factor to greatly change the storage facility scale.

(2) Existing open storage facilities at project sites

The scales of existing open storage facilities relate to the scales of the rice mills to which paddy, as the raw material, will be supplied. The capacity of open storage facilities at the project sites, quotas (annual processing quotas) and milling capacities of the rice mills are as follows:

Project Site and Related Rice Mill (1989/90)

Project Site	Rice Mill	Ontdoor Storage Area(m^2)	Quota(ton)	Milling Capacity (ton/Day:milled rice)
Fuwa El Hadith	El Gomhoria	14,000	15,000	50
	Fuwa El Hadith	22,000	20,000	75
Shabsheer	El Nasr	20,000	30,000	150
	Nour El Din	15,000	30,000	100
Zagazig	Zagazig	25,000	25,000	100
El Nasr	El Nasr	16,000	25,000	90

Source: HCRM

As shown above, capacity of present open storage facility at each project site is ranging from 16,000 tons to 36,000 tons, and quota is ranging from 25,000 tons to 60,000 tons. The requested storage capacity of 10,000 tons is less than a half of the quantity which are handled by the rice mills at each project site.

(3) Maximum paddy stock at project sites in the past

Monthly calculations of the actual required scale based on the volume collected and supply quantity to the rice mills, that is, the paddy processing quantity, as storage facilities of paddy show that the maximum stock volume is approximately 20,000 tons, as indicated in the following table. This means that the volume

has been verified by the actual open paddy storage volume inside the rice milling plant premises during the field survey at the end of November (see photo at beginning of this report) which is the peak inventory level. According to monthly records of the Zagazig Rice Mill in the table, the maximum annual stock volume in 1989 was 21,000 tons in December and that in 1990 was 19,500, also in December, or roughly twice the scale of this project of 10,000 tons. This shows that, at present, the entire volumes are stored outdoors during the peak season.

Monthly Paddy Storage Inventory of Project Site

(Ton)

Year.Month	Fuwa El Hadith	Shabsheer El Nasr & Nour El Din	Zagazig	El Nasr
1989. 10	7,999	n.a.	8,000	5,190
11	13,545	n.a.	18,500	12,600
12	14,941	n.a.	21,000	18,000
1990. 1	12,641	n.a.	18,500	16,110
2	10,541	n.a.	16,000	13,660
3	8,490	n.a.	13,500	11,420
4	6,440	n.a.	11,000	9,320
5	3,900	n.a.	8,500	6,540
6	3,900	n.a.	6,500	4,020
7	3,057	n.a.	4,500	2,220
8	3,057	n.a.	2,500	1,270
9	3,057	n.a.	2,500	440
10	15,171	n.a.	6,500	6,240
11	17,161	n.a.	18,000	12,640
12	16,211	n.a.	19,500	18,630
1991. 1	14,111	n.a.	18,000	16,700
2	11,961	n.a.	15,500	14,140
3	9,520	n.a.	13,000	11,820
4	7,470	n.a.	10,500	10,100
5	5,970	n.a.	8,000	7,600
6	3,870	n.a.	6,000	4,950
7	3,870	n.a.	4,000	3,110
8	3,870	n.a.	2,000	1,220
9	7,928	n.a.	1,500	5,020
10	19,515	n.a.	6,500	11,260
11	20,940	n.a.	n.a.	17,040

Source: HCRM

(4) Storage center as model facility

The rice storage center in this project is considered to be a model facility for the Rice Mills Company functioning as a model station of efficient storage and modern quality control. Efficient storage centers are built as models at the Rice Mills Companies, which have traditionally been storing paddy outdoors, and to expand the efficiency of those storage center to other Rice Mills Companies or other rice mills. For the Shuna project, priority is given to build one silo each for all the eight Rice Mills Companies promptly, rather than enhancing the storage capacities of only some of the Rice Mills Companies. The storage capacity of 10,000 tons per site requested by Egypt has been applied in the past four cooperation project, and is appropriate for model storage centers.

(5) Operational forecast of planned facilities

As will be mentioned in detail in the section for the business plan, the storage facilities under this project will have two turns per year. One site will handle 20,000 tons per annum, or a total of 80,000 tons at four sites. This quantity of paddy equals approximately 55% of the quantity to be processed by the rice mills. It represents roughly 16% of the 511,913 tons annual processing quantity per year of the four Rice Mills Companies.

Possible changes in the distribution routes and in quality after the liberalization of rice distribution started this season could not be analyzed during the survey, as it was still in the midst of the season. As described elsewhere, there do not seem to be great changes in the distribution quantity. This can be taken to mean that the distribution routes are regulated from the standpoint of the rice milling capacity, as the large rice mills for the rice distributed are government rice mills.

It is expected that the volume to be handled by commercial brokers will increase in rice collection from the farmers, and that the volume to be handled by the cooperative associations

which have been collecting rice to be delivered to the government will decrease. Basically, the necessary scale of the rice mill storage facilities for paddy, as the raw material, is not expected to change.

Based on the study results of the facility scale setting mentioned above, the required scale of 10,000 tons per site is obviously smaller than the annual processing quantity at each project site, and the operating ratios of the facilities will increase. The facilities will not be large enough to store the entire quantities handled by the individual Rice Mills Companies. However, the model scale is appropriate, and the concept of building one facility at each rice mill is also appropriate.

3-2-4 Project Sites and Priority

This project calls for building one 10,000 ton silo for storing paddy at the following four Rice Mills Companies, excluding four rice mill companies which are building silos under similar projects, among the eight rice mill companies under the jurisdiction of the Holding Company for Rice Marketing & Rice Products.

Rice Mills Company	Project Site
Rosetta	Huwa El Hadith
Gharbia	Shabsheer
Sharkia	Zagazig (First Candidate)
	Fakous (Second Candidate)
Kafr El Sheikh	El Nasr

Each Rice Mills Company is operating several rice mills and has selected one of these plants to install the facility in it. The acceptability and priority would be decided for the five project sites (Fakous has been planned as a spare in case Zagazig is decided as not suitable) proposed by the Egyptian side. As mentioned separately, the field survey has found that all the four sites are suitable as candidate sites, based on the distribution

and infrastructure condition, in accordance with the field survey results. The priority among these four sites is studied below.

The criteria for the study are as follows:

(1) Degree of shortage of existing open storage places

The storage capacity of the open storage place and processing capacity of the rice mill at each project site are compared to calculate the sufficiency rate of the storage place for raw material paddy. The urgency is correspondingly higher the lower the sufficiency rate is.

(2) Quality of collected paddy

The level of moisture content and proportion of dockage mixed in paddy collected in various areas tend to differ due to the field and meteorological condition. The areas advanced in mechanized harvesting thresh without drying paddy so that paddy with greater moisture fluctuation is also collected, requiring early processing by the project facilities. This necessity is higher the greater the moisture content of paddy collected at the sites is.

(3) Annual handling volume

The volume of paddy as an object of loss reduction increases more the larger the annual handling volume of the project sites is. The effects of building silos will proportionally increase. The handling volume is calculated based on the planned allocation quantity to the quota and processing capacity of the rice mill to which the project silo will supply raw material paddy.

(4) Consideration to living environment

As a rule, the project sites are inside the rice mill premises. Formerly, rice mills were located far from residential houses. However, due to population increases in recent years,

some project sites are in densely populated areas. The necessity to improve the environment for residents living nearby will be given priority.

(5) Prominence of facility as model

Priority will be given to the governorate, which will have a specially high prominence as a model in various areas. To be more specific, area of rice cropping, number of farmhouses, distance from existing facilities and access network will be taken into consideration.

In this project, (1) is most important among the above criteria, followed by (2). The table shown below is a chart for assessment. As the overall evaluation results, it will be appropriate to put Shabsheer and El Nasr first and second in priority, in the order of small sufficiency ratios at the storage places. There is no significant difference in the sufficiency ratio of outdoor storage places between Zagazig and Fuwa El Hadith. Weighing paddy moisture fluctuations, the third and fourth places should appropriately be given to Fuwa El Hadith and Zagazig.

The Holding Company for Rice Marketing & Rice Products, which will be the organization responsible for implementing this project, has confirmed this priority as agreeable by the Egyptian side, as indicated in the letter on the priority in Appendix 5.

Priority Study Chart of 4 Proposed Project Site

Proposed Site	Primary Priority by HCRM	Cap. of Existing Shuna (A)	Cap. of Rice Mill (B)	Shuna Self-Sufficiency Rate (A)/(B)	Paddy Handling Volume	Environmental Conditions	Paddy Max MC Range
Fuwa El Hadith	1	14,000t El Gomhouria 22,000t Fuwa E.H.	17,857t/y 26,789t/y	81% -- 4	4	2	20-22% -- 1
Shabsheer	2	20,000t El Nasr 15,000t N.E.D.	53,571t/y 35,714t/y	39% -- 1	1	2	18% ----- 3
Zagazig	3	25,000t	35,714t/y	70% -- 3	2	1	17% ----- 4
El Nasr	4	16,000t	32,143t/y	50% -- 2	3	2	18-20% -- 2

Note: MC Moisture Content

3-2-5 Study of Requested Machinery and Equipment

(1) Machinery and equipment

After evaluation by the study team, machinery and equipment for the project are listed as follows:

List of Machinery and Equipment

Machinery and Equipment	Quantity
Paddy Storage Silo 1,000mt/each	10 sets
Aeration Fan	20 sets
Intake Hopper 12mt/hr/each	2 sets
Paddy Cleaner 12mt/hr/each	2 sets
Destoner 4mt/hr/each	6 sets
Dryer with 4 buffer tanks	1 set
Hopper Scale 24mt/hr/each	2 sets
Belt Conveyors	1 lot
Chain Conveyors	1 lot
Bucket Elevators	1 lot
Dust Suction Fan with dust collecting facilities	1 lot
Control Panel	1 lot
Ancillary Equipments	1 lot
Shipping Tank	1 set
Grain Inspection Equipment	1 lot
Truck Scale	1 set
Grain Bulk Truck 12.5mt/each	4 sets
Spare Parts	1 lot

1) Evaluation of rice storage centers as systems

The systems of the rice storage centers receive paddy mixed with a high moisture content (approx. 18% on an average), foreign materials (mud balls, small crushed stones, rachis-branches and

other materials) in bags. The systems' function include opening bags, cleaning, grading and drying (to below 14%) paddy which is bulk-stored in silos by type and quality. Paddy is shipped in bulk when necessary. These are modern systems as paddy distribution facilities. The characteristics of these systems are as follows:

(a) Paddy is dried and foreign materials contained in it are re moved before it is stored in silos so that quality deterioration and pest insects can be prevented during storage to reduce losses during storage.

(b) The storage capacity per unit area is approximately 1 ton/m^2 for open storage in bags, compared with 10 tons/m^2 for bulk storage in silos for effective utilization of land.

(c) The use period of bags is short, so that the number of bag reuse cycles can be increased to reduce the distribution cost.

(d) If the grain temperature increases or pest insects breed, quality can be controlled easily by rotation among the silos, by fumigation or by other means. Extra land, materials or labor will not be required.

(e) As a precaution, maintenance and management such as daily checks and repairs of facilities, machinery and equipment has to be performed periodically and organizationally for safe operation.

2) Study of principal machinery and equipment

(a) Paddy storage silo

Silos are built by the knock-down (assembled at site) method or by the site fabrication method (reinforced concrete silos, welded steel-sheet silos). The site fabrication method will not be appropriate in this project because of the difficulty in procuring construction equipment and materials in

Egypt, limitation on land for construction at the rice mills and construction cost. Therefore, as in the existing silos cooperated already by Japan, knock-down silos using galvanized steel sheet will be built. Steel-sheet silos are also recommended in this project as paddy, which is relatively high in heat insulation, will be stored.

The number of silos to be built should preferably be the necessary minimum, economically. The rice storage centers of this project grade paddy by types (short grain, long grain) and by quality. Therefore, about ten units will be appropriate, including rotation during storage.

(b) Paddy cleaner

The paddy cleaner has a function to remove foreign materials. Normally, the mixing proportions and sizes of foreign materials differ in accordance with the paddy harvesting method and production area. For this reason, the machines will have to be stopped temporarily for air volume adjustment and cleaning of clogged parts in the sieves. To meet this situation, the Egyptian side has requested to change the number of paddy cleaners from one at present (24 tons/h) with the existing facilities to two units each with a capacity of 12 tons/hr. This request is appropriate.

(c) Truck scale

The flow planning of trucks in premises is important to demonstrate the characteristics of the systems mentioned earlier to the maximum. Truck scales of appropriate capacities must be installed on the traffic flow. Based on the studies incorporating the various conditions of the project sites, relationship with existing facilities and capacities of trucks for loading and unloading, one 80-ton truck scale will be installed at the Shabsheer Rice Storage Center and one 30-ton truck scale, at the El Nasr Rice Storage Center. The Fuwa El Hadith and Zagazig Rice Storage Centers will be installed with 80- and 30-ton truck scales.

(d) Shipping

The rice storage centers, with the exception of the Shabsheer Rice Storage Center, will be installed inside premises of the existing rice mill, and paddy will mainly be supplied to the rice mills. During studies with the Egyptian side, the concept of carrying paddy directly to the rice mill by a conveyor was studied, using a hopper scale for loading to be installed within the system. However, for the following reasons, paddy will be shipped by grain bulk trucks after weighing by a truck scale, as in the facilities already cooperated by Japan:

* Paddy will sometimes be shipped while being received and an independent hopper scale exclusively for shipping will be required, to increase the cost by adding machinery and equipment and by expanding the building.

* Conveyor durability will be a problem.

* The conveyor position and length cannot be decided at present and the specification and cost of machinery and equipment cannot be finalized.

However, the paddy shipping position will be decided also taking into consideration conveyor transfer using a hopper scale exclusively for receiving.

(2) Grain inspection equipment

1) Necessity for grain inspection equipment

Paddy carried to the rice storage centers will be traded in accordance with weighing by a truck scale and by paddy quality inspection. As mentioned separately, the buy-and-sell price fluctuates by the moisture content and amount of foreign materials mixed with the paddy, as it affects paddy quality in trading. Empty grains, immature grains, red rice, colored kernels, chalky

kernels and cracked kernels are inspected. The price is reduced by 20% if a maximum of 30 grains are included in 100 grains. If more than 30 defective grains are included, paddy will be rejected. However, at present, grain inspection equipment is not available at trading sites and inspection is not performed fully.

The rice storage centers are regarded as models of storage and quality control bases at the Rice Mills Companies. By including grain inspection equipment in this project as future equipment to be installed for quality inspection of traded paddy, enhancement in the quality control technology in the future is called for. In the past, the Rice Technology Training Center has been guiding the rice mill companies on paddy quality control. It is expected that this guidance will actually function in the field by installing inspection equipment in the rice storage centers.

In planning the installation of inspection equipment that can be used daily in paddy trading, that have minimum failures and that have high accuracy reliability must be selected from the inspection equipment requested under the guidance of the Rice Technology Training Center.

2) Study and selection of grain inspection equipment

Grouped inspection equipments according to their function and inspection items are listed as follow:

Grouped Inspection Equipments

Group No.	Function	Inspection Equipment	Inspection Item
1	Sampling·Preparation	grain trier	Sampling
		hand-operated winnower	dockage
		divider	division of uniform quality
2	measurement of physical condition	moisture meter	physical condition including moisture content
		grain shape tester	
		weight per liter tester	
		rigidity tester	
		grain counter	
		grain crack inspector	
3	husking	paddy husker	immature
		balance	cracked kernel
		seive	
		(Automatic Paddy Inspector)	
4	milling	· milling machine	·empty grain·red rice
		· color sorter	·colored kernel·chalky kernel
		· rice grader	·cracked kernel
			·broken rice

(a) Sample collection and preprocessing

Samples are taken from received paddy for quality inspection. Dockage is removed and paddy is made uniform before moisture and property measurement. Therefore, grain triers, winnowers and sample dividers will be indispensable.

(b) Property measurement

* Moisture meter

Determination of moisture content is an important element in paddy trading and quality control. Three types of moisture meters have been requested, namely, infrared, portable and rod probe moisture meter. The infrared type requires a long time to measure, but has a wide measurement range. It has a high accuracy (0.1%) and high reliability. For these reasons, an infrared moisture meter is by all means necessary as a measurement standard in the field.

The portable type is easy to operate and has a relatively high accuracy (0.5%). It also does not fail easily and is suitable for use in the field. The rod probe type is convenient because moisture can be measured without sampling samples from bags. However, the accuracy is low (1%) and it is not suitable for this project. the infrared and portable types will be used in this project as moisture meters.

* Grain shape tester

The rice type (Japonica or Indica type) is decided in accordance with grain shape measurement to allow storage in silos by paddy type.

* Weight per liter tester

Weight per liter is a basic physical character of rice and is used as a reference for paddy quality.

* Grain counter

This counter is used to count numbers of grains to measure thousand-kernel paddy. Counters for 100 and 500

grains should always be kept in the field.

* Grain crack inspector

Both manual and electronic types have been requested. Cracked kernels are an item inspected during paddy trading, and inspectors are needed. However, the electronic grain crack inspector cannot be considered as a suitable model from the standpoint of daily use in the field. Therefore, only the manual type will be selected.

* Rigidity tester

This tester is used to mainly measure the physical strength of milled rice. This item does not affect trading of paddy and milled rice directly, and this tester is excluded from the list of planned machinery and equipment for this project.

(c) Voluntary paddy inspection

In the quality inspection of paddy trading, immature and cracked kernels are inspected using husked rice. For this reason, a husker, balance and sieve are needed. The automatic paddy inspection machine delivered to the existing sites in 1987 and 1990 is a fully automated machine with a printer, containing a husker, balance and rice grader. The Egyptian side is requesting both single equipment and an automatic paddy inspector. Because inspections are possible with single equipment and because single equipment is universal, single equipment will be procured. Single equipment will also be useful for field inspectors to learn basic technology and to improve their technology.

(d) Milled rice inspection equipment

This equipment is needed to inspect empty grains, red rice, colored kernels, chalky kernels and cracked kernels after brown rice is milled during paddy trading. The Egyptian side is requesting a rice milling machine, color sorter and milled rice grader as milled rice inspection equipment. A rice milling machine will naturally be needed for the quality inspection mentioned earlier.

A color sorter is originally used to sort milled rice and brown rice, and the facility will be used for paddy drying and storing. Rice milled by the test rice milling machine will only be sorted visually, and the color sorter will not be included as planned machinery and equipment. The milled rice grader is used to inspect the generation rate of broken rice. This rate will be inspected visually when necessary, and the grader will be omitted from the list of planned machinery and equipment.

3-2-6 Relationship with Similar Project

There are no other projects that are similar or that duplicate this project, including related aid projects by other countries. There are no projects on paddy storage except for the rice storage center improvement projects cooperated by Japan on the past four occasions.

3-2-7 Necessity of Technical Cooperation

The rice storage centers under this project are a continuation of many rice mills operated by the Rice Mills Companies and technical problems do not exist.

Indirectly, technical cooperation has already been provided to the Rice Technology Training Center (RTTC) by Japan. Requests to continuously send experts have been received. The RTTC is also responsible for training operators of the rice mills and rice storage centers. If this technical cooperation is implemented, synergism can be expected. However, the facilities built under Japanese cooperation are effectively utilized at present, and direct technical cooperation with the facilities under this project is considered not necessary.

3-2-8 Basic Policies for Cooperation

Based on the above studies, the effects, realizability and implementation ability of the recipient country have been verified. This project matches the system for Japan's Grant Aid. Therefore, it has been judged that this project is preferable as a Japan's Grant Aid project. Assuming grant aid by the Japanese Government as a precondition, the outline of the project is studied and a basic design is conducted below. As a basic policy, it has been recognized that this project is regarded as a continued project throughout the entire project.

3-3 Project Description

3-3-1 Excuting Agency and Operational Structure

Externally, the Holding Company for Rice Marketing & Rice Products under the jurisdiction of the Ministry of Supply & Home Trade is the implementation organization of this project. The silo construction project will actually be implemented and operated by the Rice Mills Companies under the ministry in the various Governorates. Within Holding Company for Rice Marketing & Rice Products, the project and project follow-up departments will be responsible for overall coordination of the project. The Rice Technology Training Center will be responsible for technical matters. The Holding Company for Rice Marketing & Rice Products

will act entirely as a contact for negotiations with Japan, including the survey stage and coordination inside the government of Egypt.

After the machinery and equipment arrives at the port of import, the Rice Mills Companies receiving the facilities will be responsible for inland transportation to the sites, assembly and installation, civil engineering, foundation work and other work, as well as project implementation including budgetary measures. The implementation structure of the Rice Mills Companies after the completion of the facilities is described in the section for operation and maintenance plan.

3-3-2 Plan of Operation

The paddy storage silos under this project are not pure commercial facilities to earn loading and unloading charges or storage charges as business earnings by silo companies handling and storing grains, as a precondition. Therefore, this project is not intended to directly increase earnings. This project is to build paddy silos with a storage capacity of 10,000 tons on the basis of paddy at one site of each of four Rice Mills Companies as pilots in the governorates.

As mentioned earlier, each Rice Mills Company handles 127,000 to 129,000 tons of paddy each year. The rice mills to receive paddy from the silos under this project are limited, and these mills handle 25,000 to 60,000 tons. At present, the entire quantities of them are stored in open space. Part of this paddy stored in open space will be stored in 10,000 ton silos under this project.

The silos under this project will be built in the rice harvesting areas and will receive paddy during the paddy distribution period after rice harvesting (about three months between October and December). The maximum receiving and drying capacity per day

will be 240 tons/day and 40 to 60 days are needed to fill a 10,000 ton silo, however an additional 10,000 tons can be received during the paddy collecting period. Needless to say, an additional 10,000 tons cannot be received unless the first 10,000 tons in the silo are shipped to rice mills. Shipping of paddy will be performed in parallel with paddy receiving.

Generally, rice mills are operated in three shifts per day during October to December when paddy is collected, two shifts in January to March and one shift in April to June. Operation will be stopped between July and September for checks and overhaul repairs. If the silo storage capacity is sufficient, paddy can be shipped from the silo matching the requirements of the rice mills. As mentioned earlier, the silos under this project cannot store all the necessary volumes. For this reason, the following operating method will be used to maximize the storage performance and handling performance, which are advantages of the silos.

* The first 10,000 tons will be collected in as short a period as possible from the end of September to October during the early period of collection.

* The second 10,000 tons will be collected during the second half of the collection period and will be stored for a long time till paddy stored in open space is used up.

* As mentioned before, the silos will be operated two turns a year and paddy is stored as long as possible. At other times, the silos can be operated more than two turns in rotation to place emphasis on handling convenience.

* The dryers installed in the silos can handle paddy containing a high moisture content. Paddy lots with a high moisture content are selected and are stored in the project silos and dry paddy is stored in open space as before. The dryers can be operated to a maximum.

* If operated in this style, the "product", as a storage efficiency to the silo storage capacity of 10,000 tons, will be approximately 50%. This efficiency is reasonable for silos in producing areas.

Thus viewed, the project silos will have two turns per year to handle 20,000 tons of paddy per site. This scale is a reasonable business scale for pilot facilities. Therefore, this project will receive, store and ship 80,000 tons of paddy per year at four silos. This quantity corresponds to 55% of raw material paddy needed by the rice mills at these sites.

3-3-3 Location and Condition of Project Site

(1) Location of project sites

The project sites are all located within the delta area which is described as major grain producing area including Cairo, Alexandria and Port Said. The location for each site is shown in the map at the beginning of this report.

(2) Condition of project sites

Condition of surrounding, infrastructure, area condition, size and shape of proposed site have been studied in the field by the study team for this project. Site condition, area and shape of the site and electric power supply have been evaluated and are suitable for this project. Details of the evaluation study for site condition are as follows:

1) Shabsheer Rice Storage Center

* Location : approximately 100km from Cairo, Alexandria, grain producing area situated in the middle of the Nile delta

* Distance to the Nearest City : approximately 20km to the city of Mahalla El Kubra where the rice mills are located

* Surroundings : in the area where feed mill is also scheduled to be built by the Rice Mills Company, area 50,000m² mostly farm land

* Approach road : private road of 80m long, 12m wide is situated from main street to the site, no obstruction to incoming trucks

* Site Condition : land is prepared and ready for construction

* Area : rectangular, 5,700m² (114m x 50m)

* Ground Condition: surface soil is soft, geological survey recommended; however, 50m high building is under construction so, it is judged that the ground is suitable for silo construction

* Electricity : transformer has been under construction which is scheduled to be used for silo

* Office, Depot & Storage : same facility obtained for feed mill construction can be utilized for the project

2) El Nasr Rice Storage Center

* Location : northwest of the Nile delta, grain producing area approximately 80km east of Alexandria

* Distance to the Nearest City : approximately 3km to the city of El Nasr

* Surroundings : the project site is located in the land of El Nasr rice mill, the rice mill is surrounded by farm land and houses

* Approach Road : paved road, width 6m, light traffic

* Site Condition : presently used as Shuna, land is prepared and leveling is unnecessary

* Area : rectangular, 13,000m^2 (60m x 220m)

* Ground Condition: in the area, rice mill has been newly built 2 - 3 years ago, there is no water seepage in the pit, suitable for constructing storage silo

* Electricity : transformer for the rice mill is scheduled to be reinforced and to be used for the storage center

* Office, Depot & Storage : facilities built for the rice mill will be sufficient

3) Fuwa El Hadith Rice Storage Center

* Location : northwest of the Nile delta, grain producing area, approximately 70km east of Alexandria

* Distance to the Nearest City : approximately 5km to the city of Fuwa

* Surroundings : the project site is located in the land of Fuwa El Hadith rice mill, the site is surrounded by farm land, approximately 200m from the nearest house

* Approach Road : approximately 20m from paved road, width 6m, the road crosses single rail road truck, however, traffic is minimal

* Site Condition : presently used as Shuna, trees and buildings (depot and warehouse) should be removed for functional layout of the storage center

* Area : rectangular, 11,200m^2 (70m x 160m)

* Ground Condition: bearing capacity 13ton/m^2, ground water level -1m, estimated length of bearing pile 15 - 20m

* Electricity : mostly supplied from the electricity station, however, the rice mill is equipped with generator and transformer

* Office, Depot & Storage : facilities built for the rice mill will be sufficient

4) Zagazig Rice Storage Center

* Location : southeast of the Nile delta, approximately 70km north-northeast of Cairo

* Distance to the the Nearest City : located in the city of Zagazig

* Surroundings : the project site is located in the land of Zagazig rice mill surrounded by houses, major road and a machinery repair shop

* Approach Road : major road (width 20m) with heavy traffic can be used, entrance to the site is wide and no obstruction

* Site Condition : presently used as Shuna and husk storage

* Area : approximately 14,000m^2 (166 - 65m x 90 - 35m)

* Ground Condition: ground level is 1m lower than the level of approach road, area has been used as paddy storage for many years, so, ground subsidence is not expected

* Electricity : transformer for the rice mill is scheduled to be reinforced and to be used for the rice storage center

* Office, Depot & Storage : facilities built for the rice mill will be sufficient

3-3-4 Outline of Machinery and Equipment

The machinery and equipment of this project are outlined below by function.

(1) Receiving and cleaning functions

Paddy in bulk or bags will be delivered to the sites by trucks and will be weighed by a truck scale. Paddy in bulk charged into the receiving hopper is transferred to the paddy cleaner to remove dockage larger than paddy (cords, straws, earth lumps, stones, etc.) and smaller than paddy (dust, sand, very small stones, etc.). Dockage similar to paddy in shape that is heavy in specific gravity such as stones, earth and metals will be removed by a destoner.

(2) Drying function

Cleaned paddy with a high moisture content (more than 14%) is dried to a moisture content of less than 14% by the dryer. Paddy is received during day time. Drying of paddy by using dryer takes time, so it will be performed during day and night. Under this condition, buffer tanks will be planed in the drying facility to store paddy temporally.

(3) Weighing and storage functions

Cleaned, dried and weighed paddy is stored in the silos. The maximum storage period is six months. If the grain temperature increases during storage by direct sunshine, ambient air temperature or paddy breathing, the normal grain temperature is regained by ventilation or by changing paddy between silos. If pest insects breed, they are exterminated by fumigation.

(4) Shipping function

Bulk paddy stored in the silos will be shipped to rice mills by bulk grain trucks.

(5) Dust collection function

A dust collection facility will be installed to prevent scattering of dust outside of the system for conservation of environmental and labor hygienic conditions and for protecting machines and equipment.

(6) Machine operation and monitoring function

The principal machines will be operated automatically and remotely. A minimum of automatic control will be incorporated to assure operation safety. A monitoring panel will be installed in the control room to always monitor the operating condition of all the facilities.

(7) Paddy inspection function

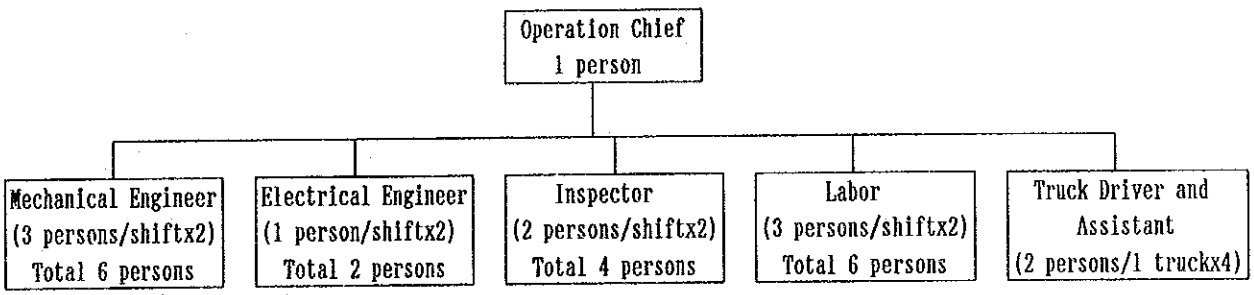
Inspection equipment needed for paddy acceptance inspection and quality control during storage will be provided as regular equipment.

3-3-5 Operation and Maintenance Plan

(1) Maintenance and management structure

The rice storage centers will be built adjacent to existing rice mills and will be operated as part of the rice mills. A total of 27 persons shown in the following chart, including an operation chief, mechanical engineers, electrical engineers, inspectors, labor, truck drivers and assistants, will be responsible for actual operation of a rice storage center.

Staff of Rice Storage Center



Personnel for paddy receiving, which requires the most labor, is supplied to rice storage centers by a specialized company as a separate organization, in accordance with the customary practice. Labor arranged by specialized companies unloads paddy from trucks, heaps up bags, opens bags and charges paddy into hoppers when paddy arrives.

Paddy arrivals are concentrated during a limited time of each year and it is not rational to hire full-time personnel. The necessity for labor changes by season and paddy receiving is

contracted to specialized companies. Labor to receive paddy at the rice storage centers is from specialized companies for receiving paddy for rice mills.

(2) Operation Cost

The operation cost of a rice storage center for one year is estimated as follows:

(a) Personnel expenses

The personnel expenses for operating the rice storage center with staff of 27 persons are estimated as follows:

Number of Staff:	Operation chief	1
	Mechanical Engineer	6
	Electrical Engineer	2
	Inspector	4
	Labor	6
	Truck Driver	4
Personal Expenses:		
	Assistant	4
	Total	27

staff	calculation	wage/year
Operation Chief	1,250LE/month x 12 months	15,000 LE
Mechanical Engineer	500LE/ -"- x 12 -"- x 6	30,000 LE
Electrical Engineer	500LE/ -"- x 12 -"- x 2	12,000 LE
Inspection	250LE/ -"- x 4 -"- x 4	12,000 LE
Labor	250LE/ -"- x 12 -"- x 6	18,000 LE
Truck Driver	250LE/ -"- x 12 -"- x 4	12,000 LE
Assistants	250LE/ -"- x 12 -"- x 4	12,000 LE
	Total	111,000 LE --- 1.

(base of calculation) Labor 10LE/day x 25 day/month = 250LE/month

Engineer = Labor x 2

Chief = Labor x 5

(b) Electricity Cost

category	change of installation	demand	actual change
receiving/shipping	220KW	80%	176KW
drying	80KW	75%	60KW
storage	160KW	60%	128KW
Outlet for light fixture	16KW	60%	9.6KW
		Total	373.6KW

usage :

category	calculation	usage
receiving/shipping	176KW x 830H/year	146,080KW
drying	60KW x 500H/year	30,000KW
storage	96KW x 300H/year	28,800KW
outlet for light firture	9.6KW x 8H/day x 22 day/month x 12 months	20,275KW
	Total	225,155KW

cost :

usage fee : 0.20LE x KWH

Note: basic fee is not considered due to an assumption of supply through adjacent rice mill.

225,155KWH/year x 0.20LE/KWH = 45,031 LE --- 2.

(c) fuel cost

usage : 70l/H x 500H/year = 35,000l/year

fee : 0.80LE/l

35,000l/year x 0.80l = 28,000 LE/year --- 3.

(d) repairing cost

Item	cost
Supply	13,000 LE
repair	5,280 LE
expense(20%)	3,656 LE
Total	21,936 LE --- 4.

Grand Total (1 + 2 + 3 + 4) = 205,967 LE

Based on the above calculation, the operation cost of 205,967 LE is estimated. The operation cost should be included in the budget for operating adjacent rice mill. Budget for operating storage center which were constructed in previous project have been included in budget of adjacent rice mills. The storage center is managed as a part of the rice mill and this management is suitable and fit with local customs.

CHAPTER 4

BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4-1 Design Policy

Based on the actual condition in Egypt and situation at the project sites, the following matters shall be taken into consideration when performing basic design of the facilities and selecting machinery and equipment:

(1) The facilities under this project are regarded as model facilities to store paddy, characterized as a pilot, in representative rice mills of the Holding Company for Rice Marketing & Rice Products. Therefore, machinery and equipment that are suitable for evolving paddy storage, safekeeping and handling technology shall be installed.

(2) To enable full maintenance and management of facility functions in the light of Egyptian economical and technical situation.

(3) Design shall be made so that no traffic line problems will occur in layout.

(4) Consideration will be given so that the facilities will match the natural conditions of Egypt.

4-2 Study and Examination on Design Criteria

4-2-1 Standard

For designing the storage center, following standard will be applied.

(1) International Organization for Standardization (ISO)
(2) International Electrotechnical Commission (IEC)
(3) Japanese Industrial Standard (JIS)
(4) The Standard of Japan Electrotechnical Comittee (JEC)

(5) The Standard of Japan Electorical Manufacturer Association (JEM)

4-2-2 Weather

(1)	temperature	: March Ave. 20° C, June Ave. 28° C, December Ave. 12° C
(2)	humidity	: Max. 94.7%, Min. 30%
(3)	rainfall	: Max. 4.7 mm/hour
(4)	wind velocity	: Max. 50 m/second
(5)	factor of earthquake	: 0.1

4-2-3 Type of Paddy

(1)	Type	: Japonica Type (short grain) & Indica type (long grain)
(2)	weight per volume	: Ave. 550 kg/m^3
(3)	moisture content	: Max. 22% w.b., Ave. 18% w.b.
(4)	dockage	: total 5% (weight proportion)
(5)	angle of repose	: 45°

4-2-4 Setting of Facility Scale

Based on the study results of the request, capacities related to the facility scale are decided as follows:

(1) The paddy storage capacity shall be 10,000 tons.

(2) The capacity of the receiving, cleaning and silo loading sections shall be 24 tons per hour and 240 tons per day. The operating hours per day shall be 10 hours.

(3) The capacity of the dryer section shall be 240 tons per day. The operating hours per day shall be 24 hours.

(4) The capacity of the shipping section shall be 24 tons per hour.

4-3 Basic Plan

4-3-1 Site and Layout Plan

(1) Facility layout plan

The following precautions will be given when planning the facility layout:

1) Plan truck traffic lines so that the trucks for paddy moving in and out will not cross each other and will be able to move without problems.

2) Arrange the facilities so that the land utilization efficiency will be enhanced.

3) Consideration will be given so that the new facilities under this project and the existing facilities of the rice mills will function organically.

(2) Machinery and equipment layout plan

The following precautions will be taken in planning the machinery and equipment layout.

1) The principal equipment, such as the paddy cleaner and hopper scale, will be installed indoors to maintain the performance of the equipment for a long time and to secure durability.

2) A work space for maintenance and checks will be provided for the equipment. The workability will be specially considered for sections of the paddy cleaner and lower part of the elevator where cleaning is required. Work safety during maintenance work and checks will be ensured by providing pit covers, safety handrails for elevated checking platforms and other safety devices.

3) The composite equipment of the dust collector will be put as much in one place as possible so that collected dust can be disposed easily and noise can be minimized.

(3) Function layout plan

The facilities at each project site shall be arranged in accordance with the following function layout diagram.

Trucks will be weighed by the truck scale to be installed near the entrance/exit and will arrive at the truck porch in the cargo arrival yard in accordance with the traffic line. The cargo arrival yard will have a roof and a floor pit will be installed. Paddy will be screened by the cleaner and destoner through the conveyor and bucket elevator installed inside the loading hopper in the basement.

Paddy of a high moisture content will be dried by the dryer. Cleaned and dried paddy will be weighed continuously by the hopper scale and will be stored and kept in the specified silos. Paddy will be discharged from the silos by the conveyors and will be unloaded on bulk trucks through the bucket elevator and shipping tank. The trucks will be weighed by the truck scale and will move in accordance with the traffic line.

Function Layout Chart