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**INTEGRATED AGRIBUSINESS
IN EGYPT**

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A GUIDE TO DOING BUSINESS IN EGYPT
follows page 115 of this report.

PREFACE

This report is one of a series published by the General Authority for Investment and Free Zones and designed specifically to promote the participation of U.S. companies in investment projects in Egypt.

Funded by the U.S. Agency for International Development (U.S. AID) and prepared by the Chase World Advisory Group of Chase Trade Information Corporation, these reports focus on sectors of the Egyptian economy which offer the foreign investor specific investment opportunities in significant areas of the Egyptian economy ranging from pharmaceuticals; the processing and distribution of food crops; and the production and processing of livestock, poultry, and fish products; to construction materials, components, and systems; and electrical and electronic machinery.

There are ten reports in all. This sixth report, on integrated agribusiness, is based in part on a report by the Hawaiian Agronomics Company (International), prepared for the Chase Trade Information Corporation.

INTRODUCTION

Large-scale private, integrated agribusiness is virtually unknown in Egypt today. Egyptian agriculture consists almost entirely of small farms producing crops and animal products for household, livestock, and village use, and to meet government established crop production quotas. Out of a total Egyptian land area of 238 million feddans,* only six million feddans are in agricultural use divided among 3.5 million farms.

Despite year-round intensive cultivation, this agricultural land base is unable to support the country's 43 million population (1981). As a result, Egypt imports nearly two-thirds of its food and animal feed requirements.

The country is engaged in major programs to increase the productivity of existing agricultural lands. However, even assuming major increases in yields, the existing cultivated land will be unable to satisfy the requirements of its rapidly growing population. New lands must be reclaimed from the vast barren deserts of the country and developed for cultivation.

* One feddan is equal to 1.033 acres.

The government is trying to encourage agricultural development on reclaimed land through a variety of private groups: settlers, homesteaders, agricultural students, Egyptian corporations, and large-scale ventures involving foreign participation. Particular emphasis is placed on large joint ventures. To that end, in August 1981 the late President Anwar Sadat signed Public Law 143 which, among other things, allows joint-venture companies to own up to 50,000 feddans of reclaimed land. The joint venture company may develop the land for its own use, or the developed land may be divided and sold or leased to farmers.

Scope of the Report on Integrated Agribusiness

This report on integrated agribusiness--the third in the series on Egyptian agriculture--examines potential opportunities for U.S. investors to participate in land development ventures in Egypt.

Following Chapter 1, an Executive Summary, Chapter 2 of this report discusses the general agricultural situation within Egypt and why land reclamation and development is being given such a high priority by the Egyptian government. Chapter 3 describes the government programs and policies regarding land reclamation and upgrading.

Although there has been insufficient experience on the part of private companies to determine conclusively how profitable large joint venture integrated agribusiness projects might be in Egypt, Chapter 4 reviews recent studies of the cost of upgrading and cultivating reclaimed land as well as the potential crop yields from the land. Chapter 5 examines potential Egyptian markets for crops and possible export opportunities, if applicable. Finally, Chapter 6 reviews opportunities for U.S. joint venture participation in several specific projects.

The second portion of this publication, A Guide to Doing Business in Egypt, provides pertinent information on the Egyptian business environment as a whole.

Other Reports on Egyptian Agriculture

The first report, The Processing and Distribution of Food Crops in Egypt, examines opportunities for joint venture investments in the packaging, processing, and distribution of food field crops, fruits, and vegetables.

The second report, The Production and Processing of Egyptian Livestock, Poultry, and Fish Products, examines opportunities for joint ventures related to the production, processing, and distribution of animal protein--that is, meat, fish, poultry, eggs, and dairy products.

A variety of short- and intermediate-term joint venture opportunities is described in those two reports. With a few exceptions, all of those opportunities must rely on the importation of agricultural products. There is simply not enough local produce to support additional food processing or animal production.

Crops in particularly short supply include:

- o wheat
- o oilseeds
- o corn
- o sugar
- o pulses
- o forage

In addition, current production and distribution of fruits and vegetables provide insufficient supplies for any substantial increase in processing or exporting.

The apparent conclusion is that virtually any crop, either for human or animal consumption, for which increased production is achieved will find ready markets within Egypt and in some cases is a candidate for export.

1. EXECUTIVE SUMMARY

The Need for More Farm Land

The demand for food products by the rapidly expanding and increasingly affluent Egyptian population far exceeds the country's ability to produce. Two-thirds of Egyptian food requirements were imported in 1981 at a foreign exchange cost of \$4.4 billion-- more than the country earned from oil exports and Suez Canal tolls and services combined. By the end of the century, food imports might exceed \$15 billion annually unless existing Egyptian farm land is used much more productively and large areas of new lands are brought under cultivation.

Currently, only 2 1/2 percent of Egypt's land is cultivated. These six million feddans are divided among 3 1/2 million farms, 95 percent of them less than 5 feddans in size. The farm land is worked intensively throughout the year providing food supplies for rural families, feed for farm animals, and a surplus which is sold through government and private distribution channels. The surplus, however, is insufficient to meet the needs of the urban population.

By the end of the century, the government intends to make an additional 2.8 million feddans of land

available for farm development through major land reclamation projects. It is hoped that much of this reclaimed land will be developed through private initiative, especially through large-scale joint ventures involving foreign participation.

Historical Background

Land reclamation is not new in Egypt. About 900,000 feddans of new land were reclaimed after 1952-- most of it prior to 1970. However, only about 60 percent of that land is now being farmed, and much of that is only marginally productive.

Much of the reclaimed land was farmed by public sector companies who had limited agricultural expertise. Many believe that inexperienced management of the land accounts for the lack of success. In recent years, there have been moves to make the reclaimed lands available for large-scale farming by the private sector. For example, in 1981, the Ministry of Housing and Land Reclamation offered to lease 13 lots totaling 220,000 feddans. The Ministry received only eight proposals, however, and all but three were turned down by the Ministry.

A few pioneering projects have been initiated by private groups in recent years, but there has been

insufficient time to determine their profitability. Within a few years, however, these projects will provide valuable information for planning and implementing new projects. Preliminary results vary substantially from project to project. Five projects of particular interest are as follows:

- o The Delta Sugar Company leases 50,000 feddjans of reclaimed land, principally in crops. The original land had a soil of high salinity. Land reclamation involved leveling the land and leaching it through flooding. The cost of reclamation was higher than anticipated. Furthermore, since the company is treated as a private Law 43 venture, it must pay "free market" prices for its inputs. Local farmers, who receive subsidized inputs, can produce crops--such as sugar beets--more economically.
- o The Nile Development Company leases 5,200 feddjans of originally virgin land. The project was conceived as a livestock project on which forage would be produced. Although the company has 1,000 head of dairy cattle and 1,000 head of sheep, because of water and electricity problems, there has been virtually

no forage production. Forage, principally hay, has been purchased, while green forage has not been available. Milk yields have been only about one-half of the projected amount. Despite this, the dairy and sheep-rearing operations are profitable, and given sufficient forage production in the future, the project should be successful.

- o The Arabian Agribusiness Company leases 10,000 feddans of previously reclaimed land from a public sector land company. Only 5,000 feddans have actually been transferred to the company however, as the other 5,000 feddans do not yet have adequate irrigation systems. The first crop was in 1979. Production was valued at 250,000 Egyptian pounds (L.E.) in 1979-1980, at L.E. 300,000 in 1980-1981, and is projected to reach L.E. 2,000,000 during the crop year 1981-1982. About 2,500 feddans will be planted, principally in field crops. Thus, yield is about L.E. 800 per feddan. Although the company is a private joint venture, it receives subsidized inputs of seed, fertilizer, and electricity.

- o The Ramses Agricultural Company consists of 15,000 feddans of which 12,000 will eventually be planted in orchards--principally oranges. Although the company was established in 1978, there have been substantial delays in initiating farming operations. During 1981, about 500 feddans were planted in oranges. An additional 3,000 feddans are to be planted, also in oranges, in 1982 and 1983. Yields of 23 to 26 metric tons (MT) per feddan are expected at full production. Expected total capital cost is L.E. 40 million. The company currently receives electricity at subsidized rates.
- o Pearl Farms was established recently as a pilot project using both pivot and drip irrigation on 224 feddans of newly reclaimed land. In April 1982, the second winter crop was harvested. It is expected that the farm will have a positive cash flow during the 1982 season. Farm inputs, including electricity, are subsidized.

In summary, experience on private large-scale farms has been mixed. Generally, management is optimistic as to profitability. It would appear, however, that profitability is dependent on subsidized inputs and favorable leasing arrangements.

Projected Costs and Profitability of Agribusiness Projects on Reclaimed Land

In January 1980, the Pacific Consultants published a report entitled New Lands Productivity in Egypt, Technical and Economic Feasibility. The study, financed by U.S. AID, concludes that with subsidized inputs, both center pivot and drip irrigation systems result in modest financial rates of return: from 12 to 17 percent per annum with center pivot, and 17 to 27.5 percent with drip irrigation depending on assumptions relative to crop yields.

The cost of irrigation systems vary widely depending on the systems used. For example, Pacific Consultants estimate that the investment cost to a private company for center pivot irrigation is about \$1,650 per feddan, while drip irrigation would require an investment of about \$900 per feddan. Annual operating costs were projected to be \$45 for center pivot systems versus about \$15 for drip irrigation.

Investment Opportunities

There are a large number of land parcels available for development in areas of newly reclaimed land. Some 150,000 additional feddans will be available annually through the year 2000 if the government land reclamation plans keep on schedule.

2. OVERVIEW OF EGYPTIAN AGRICULTURE

Availability of Land

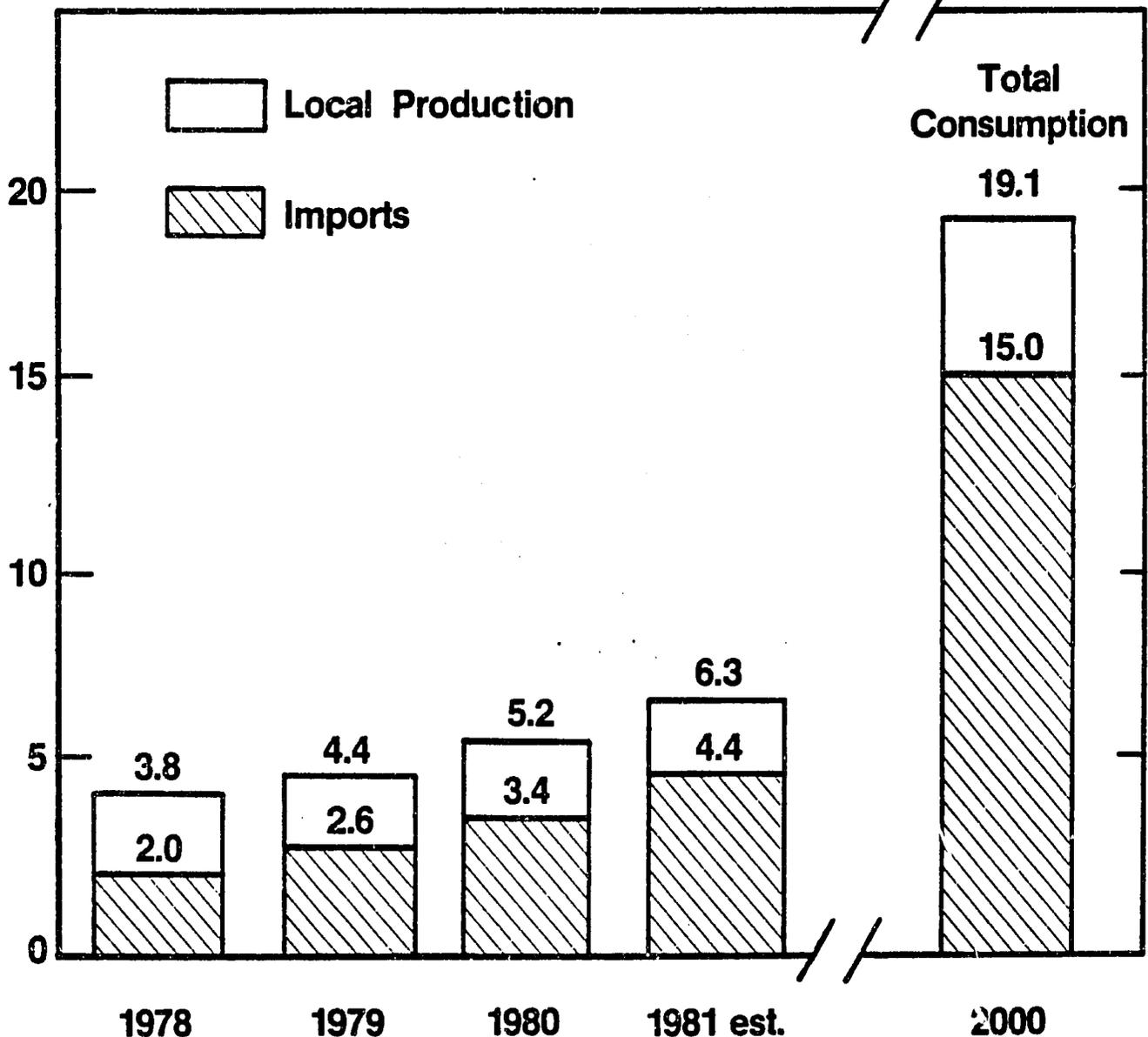
Egypt's existing agriculture has been unable to produce adequate supplies of food to meet demand. In value terms, close to two-thirds of the food consumed in Egypt in 1981 was imported. By the end of the century, Egypt could be importing as much as 80 percent of its food unless both the agricultural land base and the crop yields are dramatically increased. Figure 2-1 is an extrapolation of production, imports, and consumption through the years 2000 based on current trends.

During the years 1978-1980 farm output increased at an annual average rate of 4.2 percent. However, demand for agricultural products is increasing more rapidly. As a result, local production of all principal food crops (except vegetables, fruits, and rice) must be supplemented by imported foods. By the mid-1980s it is likely that rice imports will be required as well. There is no shortage of domestic market for agricultural products.

The government's goal is to reduce the reliance on imported food from the current two-thirds to 30 percent by the year 2000. For such a goal to be achieved,

FIGURE 2-1
Value of Production, Imports, and
Consumption of Food Products in Egypt,
1978-1981 and Projected for the Year 2000
(In Constant 1981 Dollar Prices)

Millions of U.S. Dollars



Sources: 1978- 1980, Agricultural Attache, U.S. Embassy, Cairo; 1981, CTIC Estimates; 2000, Projected on the Assumptions That the Value of Total Egyptian Food Consumption Increases at 6 Percent Annually, in Terms of Constant 1981 Dollars, and That the Value of Food Output in Egypt Continues to Increase at 4 Percent.

agricultural production would need to be increased sevenfold, or at an annual rate of about 11 percent.

At present, about 6 million feddans of Egyptian land are used for agriculture. This land is intensively cultivated throughout the year, thanks to the warm climate and the year-round availability of Nile irrigation water. Two croppings per year for basic field crops are usual, and three or more croppings are possible for some vegetables. In recent years, the equivalent of about 11 million feddans are harvested annually.

Some of the land has been under cultivation for at least 6,000 years, and virtually all of it is under surface irrigation. About 60 percent of the land is in the Nile Delta; most of the balance is in the Nile Valley north of Aswan and south of the Delta. The soils are generally level, deep, medium- to heavy-textured and potentially highly fertile.

In recent years, changes in agricultural cropping methods, increasing mechanization, increasing cash cropping, and above all the loss of the annual silt-bearing floods following the completion of the Aswan High Dam, have resulted in a deterioration of soil structure and a build-up of salinity. The development

of effective countermeasures for this situation is an urgent priority.

Over 900,000 feddans of land have been reclaimed since the revolution of 1952--principally during the decade of the 1960s. Much of the reclaimed land is in state company farms whose management has lacked large-scale agribusiness experience. The Ministry of Housing and Land Reclamation has now decided to make available areas of this land for foreign companies interested in the development of agro-industrial projects.

The government plans to increase cultivated land area by the reclamation of some 2.8 million feddans by the year 2000. Against this, some 750,000 feddans of top-quality land stand to be lost to cultivation if the present trend of urbanization continues and land continues to be lost at a rate of about 40,000 feddans annually. The government of Egypt is trying to counterbalance this loss through their New Urban Communities and Satellite Cities program.

From the point of view of national food security, there are strong incentives for the government of Egypt to encourage both land reclamation and the more effective use of existing and reclaimed lands.

Land Ownership

Traditionally, most Egyptian farms have been small. Even before the initiation of land reform in 1952, over 34 percent of the farm holdings were less than five feddans in size. Since 1952, farms have been divided into even smaller holdings. Over 80 percent of the farms amount to less than three feddans, and almost 40 percent are less than one feddan.

To sustain a profitable agricultural sector with such land fragmentation, the government of Egypt has introduced an extensive system of production and price controls. Inputs are provided at subsidized prices, and produce is often bought at a set price for a number of strategic crops. There may also be crop production quotas. The official buying price has frequently been below world price and below delivered prices at Egyptian ports for many crops.

Cropping Patterns

The climate of Egypt varies from a typical Mediterranean climate in the north and in Sinai to a hot desert climate in the south, where the country extends into the tropics. The abundance of sun and the water available from the Nile make cultivation of a wide range of crops possible. Generally, these crops

are classified according to the season of planting. Those planted in October through December are termed winter crops; those in March through June are the summer crops. A former additional planting season was July and August, the Nili season, which was associated with the annual flooding of the Nile prior to the completion of the Aswan High Dam.

In the winter season about five million feddans are cultivated. Fifty-five percent of this is berseem clover grown as animal fodder, primarily for draft animals. The government is encouraging the widespread use of tractors, pumps, and other farm machinery to replace draft animals, so that land now devoted to animal crops can be made available for food crops.

Wheat production utilizes 27 percent of the winter farmland area, and the remainder is devoted to vegetables and to pulses (fava beans, fenugreek, lentil, lupin, and chickpeas). With the exception of vegetables, the main winter crops are consumed locally or sold to the government at fixed prices.

About five million feddans are also devoted to summer crops. Land utilization is about 28 percent maize, 24 percent cotton, 21 percent rice, and 10 percent vegetables. Another 5 percent of the area

is devoted to sugar cane, a perennial crop which occupies land in the winter as well. Fruit orchards occupy the balance of about 350,000 feddans.

Nili season crops occupy about 800,000 feddans, mostly maize (60 percent) and vegetables (32 percent).

Figure 2-2 depicts the approximate percentages of land devoted to various crops throughout the year.

The Agricultural Infrastructure

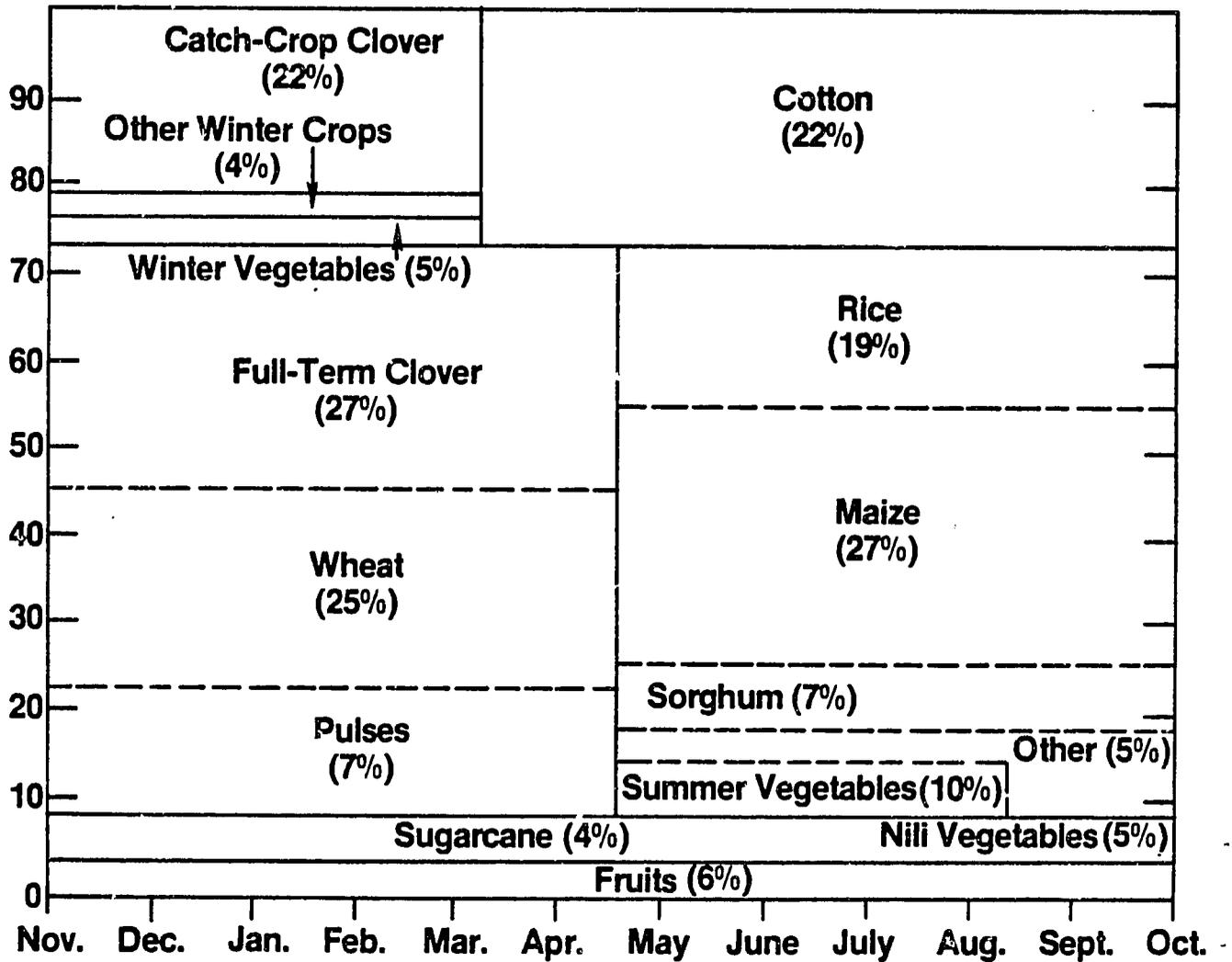
Equipment and Inputs

Because Egypt has a long history of agriculture and because most of its agriculture is concentrated in one part of the country, there is generally a functional agricultural infrastructure.

In most towns in the farming areas it is possible to find most requirements for fertilizers, pesticides, seeds, and other basic materials. There are some shortages of spare parts for machinery largely because mechanization is not well developed as a consequence of the land tenure systems, but machinery pools do exist, and most towns have mechanics who are skilled in making machines work. Shortages of inputs are not usually quoted by farmers as being a serious production problem.

FIGURE 2-2
Egyptian Cropping Patterns, 1981
Area Devoted to Specified Crops

% of Land



Source: Egyptian Ministry of Agriculture

Manpower

It has been estimated that there are about 150,000 agricultural graduates in Egypt, and almost any village will have sent some young persons to study agriculture at university or technical college. There are 12 universities in Egypt, with an enrollment of about 27,000 male and 9,000 female students of agriculture, of whom 6,300 graduated during the 1979-1980 school year. There are also many facilities for vocational training in agricultural and mechanical engineering; such schools produce about 25,000 graduates yearly. In addition, quite a number of Egyptians receive university or vocational education outside the country.

Many of these graduates work in agriculture either on their own account, in government projects, or in service companies. A wide range of agricultural extension literature is available, and there are frequent television broadcasts for farmers. Thus, there are many opportunities for exchange of ideas between agriculturalists. All this means that there is a good manpower basis upon which an investor can build. Most agriculturalists, including graduates, have been trained in Arabic, their native language, and thus may

lack familiarity with the applied use of English.

Management

Very marked differences of opinion are expressed concerning the relative effectiveness of foreign and Egyptian management of agricultural projects.

In the final analysis, the effectiveness of management must be judged by its ability to get the best possible results in a given situation. In this instance the given situation is the land of Egypt with its existing infrastructure, its system of government, its financing institution, and the social norms which exist in the rural community where, generally, Islam is the directing influence.

In some cases, the application of foreign management to Egyptian agro-industry has not proved an outstanding success. One joint venture has withdrawn American management in favor of Egyptian; some others have decided from the start that foreign management could not operate effectively in prevailing conditions, and others are using foreign management but with Egyptian assistance to facilitate all contacts with government and labor.

The majority of agro-industry has been developed under Egyptian managers who are generally fully aware

of the principles of cost-effectiveness and of the use of modern technology but who are also aware of the problems of applying such concepts to the local environment. Generally they have developed their projects well, taking into account the prevailing conditions.

Government Organizations

One of the difficulties which is peculiar to an investor in agro-industry is the large number of government departments and ministries involved directly or indirectly in a project. This makes for very time-consuming situations, sometimes complicated by conflict of interests between different departments. These are inherent problems in a country seeking to rebuild itself after the revolution of 1952 and long years of war. They are well recognized by the leaders of the country, who are seeking ways to smooth the path for an investor. An investor must be prepared to recognize these problems, and a way to do this is to work with an experienced Egyptian partner.

Generally the ministries and departments most closely involved will be: the Ministry of Agriculture, which controls agricultural production on the old lands and supplies research and support services;

universities where selected members may prove of great assistance on specialized topics; and the Ministry of Housing and Land Reclamation, which controls recently reclaimed land and is responsible for further land reclamation. It operates in this area through the General Authority for Urban Projects and Agricultural Development.

The supply of water to a project is the responsibility of the Ministry of Irrigation, which usually undertakes the construction of the main canals. The approval of the Ministry of Industry, acting through the General Organization for Industrialization (GOFI), is needed in respect of the industrial aspects of any agro-industrial project. The pricing structure of essential foodstuffs and imports is the responsibility of the Ministry of Supply.

Another aspect of government control is in the choice of inputs. The seed, fertilizer, and other basic agricultural inputs available on a subsidized basis are decided according to recommendations by the Ministry of Agriculture. The Ministry of Agriculture also approves the introduction of new types of agricultural machinery on the basis of tests made at their testing center near Alexandria.

3. GOVERNMENT ACTIVITIES RELATED TO UPGRADING AND RECLAMATION OF AGRICULTURAL LAND

Background

The government of Egypt plays a major role in virtually all aspects of agribusiness.

- o Most basic agricultural inputs--fertilizers, pesticides, seeds, poultry and animal feeds, veterinary supplies, as well as water, electricity, and fuel--are distributed by government organizations, often at subsidized prices.
- o Government organizations purchase substantial quantities of agricultural outputs at prices below the free market price. It then regulates distribution and pricing to food processors, wholesalers, and retailers.
- o Basic food commodities are subsidized and several are rationed.
- o Most of the food processing is done in government-owned plants.
- o Government companies handle most of the food imports and exports.
- o The government owns the largest retail food chains in Egypt.

- o Most desert lands are owned by the government, which controls their use.
- o The government is responsible for land reclamation and the provision of supporting infrastructure.
- o Much of the reclaimed land is owned and operated by government companies.

Anyone contemplating investment in an integrated agribusiness project in Egypt should carefully investigate the impact of the government's programs and policies on the project. A joint venture involving foreign financial participation is subject to the terms of Public Law 43, "Concerning the Investment of Arab and Foreign Capital and the Free Zones." This law is included and discussed in Part 2 of this report, A Guide to Doing Business in Egypt.

In general, a Public Law 43 company is considered a private company (even if the joint venture includes majority participation by a government organization), and both inputs and outputs are free of government controls and ineligible for subsidies. Exceptions are made in special cases, however, especially for high-priority agricultural projects.

This chapter reviews government activities,

programs, and policies relative to land reclamation and upgrading. This is followed by a review of government distribution and pricing practices to the extent that they might impact on the profitability of an integrated agribusiness project.

Many individuals, including senior government officials, are highly critical of the government's involvement in the distribution and pricing of production inputs and outputs. It is argued that artificial prices and subsidies have caused serious dislocations throughout the Egyptian economy and that the cost to the nation is exorbitant. The 1982 government budget allocated \$2.9 billion for food subsidies, which represents 11 percent of the country's projected gross domestic product.

President Mubarak has appointed a team of high-level officials to review the entire program and to make recommendations for changes. It is widely believed that major changes will be implemented and that those changes will most likely have considerable impact on agribusiness projects.

Upgrading of Old Lands

For purposes of this report, arable land is

divided into three categories:

- o Old lands
- o Recently reclaimed lands (i.e., reclaimed since the revolution of 1952)
- o New (reclaimable) lands.

Land available for upgrading would come either from old lands or from lands reclaimed since 1952. Generally the opportunities for upgrading by private investors are very remote in the case of old lands but are slightly more encouraging on the recently reclaimed lands, although even there the infrastructure is fairly rigidly imposed. By contrast, the development of new land offers greater opportunity. Nevertheless, for the sake of completeness, the upgrading of existing agricultural land is discussed at this stage.

Most of the 6 million feddans of old land are located along the banks of the Nile, in its Delta, and in old-established irrigated areas such as El Fayoum. Generally, these lands have been in cultivation for many thousands of years, and the farmers have developed techniques of production which are compatible with their social and ecological conditions and have led to a labor-intensive situation which, nevertheless, gives rise to extremely high yields.

Two events of great agricultural significance have taken place in recent years, the revolution of 1952 and the completion of the Aswan High Dam in 1965.

The revolution of 1952 resulted in re-allocation to the landless peasants of the lands previously held by large land owners and also gave the impetus to urbanization and industrialization. The re-allocation of land made available some of the best farmland in Egypt, on the basis of 2 1/2 to 5 feddans per family. This land has proved to be highly productive, and many peasant farms enjoy relatively high incomes. The original land allocation is, however, insufficient to support the needs of an expanding family. This forces many persons into urban areas and, as a consequence, removes them from active participation in the agricultural sector. Nevertheless, such land now commands a very high value, with good land being worth in excess of \$20,000 per feddan.

During the new allocation of land, the Egyptian government set up cooperatives under the Agrarian Reform Organization. These cooperatives are provided with basic services such as fertilizers, insecticides, and seeds. Some have grown to be efficient units of production, have amassed considerable funds over the

years, and have used these for investment in agro-industry such as egg and broiler production.

The re-allocation of land after the revolution of 1952 has resulted in the fact that there are no large areas under single ownership in the older lands. Consequently, opportunities do not exist for the acquisition of such areas either by purchase or rental. Thus opportunities for large-scale mechanized production in these old lands do not exist.

On the other hand, the cooperatives may control quite sizable areas (some 2,000 feddans or more) of contiguous land. This gives rise to the possibility of a coordinated operation. The Egyptian government, through the Agrarian Reform Organization and its cooperatives, has recognized the possibility of these cooperatives forming joint ventures with foreign companies for the purpose of establishing agro-industrial complexes for fruit and vegetable packaging, processing, and distribution for the local market or for export. There have been preliminary discussions, inter alia, with some U.S. companies. Such ventures, if successful, would give access to the produce of some extremely fertile land with farmers who benefit from millenia of experience in how to use it,

and also enable this experience to be enhanced by imported technology through extension services attached to the agro-industrial venture.

The construction of the Aswan High Dam in 1965 has had a profound effect on the whole agriculture of the Nile Valley. Until that time, the annual flooding of the Valley with the silty, mineral-enriched waters of the swollen river had resulted in an annual deposit of a highly fertile alluvium together with a flushing of excess salts and a replenishment of water reserves in the soil. In the past, it was possible to grow excellent crops in the new alluvium left by the receding floods with very little recourse to fertilizers or irrigation. These techniques are still practiced to a limited extent in parts of the Sudan above the Aswan High Dam.

Since the completion of the dam, the whole pattern of agriculture has changed. It is now necessary to use artificial fertilizers to replace lost fertility. The use of these fertilizers along with the lack of an annual flood has meant that there has not been an annual flushing of excess salts; salinity of soils has built up in some regions to the extent of limiting crop yields. There has generally been considerable effect

on the water table, and irrigation requirements have changed to the point where older networks are no longer adequate.

The government recognizes the fact that the yields of these older lands are falling off, or static, rather than increasing. It recognizes also that yields could increase considerably with the introduction of such changes as modern technology can provide. Therefore, it is embarking upon programs to improve the irrigation and drainage systems of these old lands. Opportunities exist for specialist consultancy and irrigation engineering companies to participate in such programs.

In conclusion, it may be mentioned that there is considerable controversy in certain policy-influencing circles on the relative financial and economic costs of the reclamation of new lands versus the upgrading of the old. A report by Pacific Consultants is often quoted in these controversies.* Unfortunately the discussions have sometimes given the impression of polarizing into opposing camps, and the general lack of reliable data has encouraged opinions rather than

* New Lands Productivity in Egypt, Technical and Economic Feasibility, Pacific Consultants, Washington, D.C., January 1980. (Prepared under AID Contract/NE-C-1645. Project No. 263-0042).

conclusions. In practice both approaches must be adopted since there is clearly a ceiling beyond which old land productivity cannot be increased. Further, the old lands are being appropriated for urban development which is often more attractive around existing infrastructure.

Although considerable public investment will go into the upgrading of old lands, opportunities for private joint ventures in the old lands are generally limited to those such as have been cited above. However, there are exceptions. One of these is the Fayoum Irrigation Project in the Fayoum Governorate, which is discussed in Chapter 6 of this report.

Upgrading of Recently Reclaimed Lands

About 98 percent of the land reclaimed since 1952 was reclaimed prior to 1970. Thus, a sufficient period of time has elapsed to examine the success of these early efforts at land reclamation. Unfortunately the results have been far short of those projected. Only about 60 percent of the reclaimed land is currently being farmed, and 40 percent of the land being farmed is not producing an income sufficient to cover

out-of-pocket costs.*

Since a substantial amount of the previously reclaimed land is being offered for private joint venture agribusiness projects, it is important to understand why results to date have been less than satisfactory.

The dominant mode of implementing land reclamation has been through eight state company farms under the general direction of the Ministry of Housing and Land Reclamation rather than the Ministry of Agriculture. A consequence of this has been the absence of direct contact with experience gained elsewhere in the world concerning the cultivation and utilization of reclaimed desert.

The original intention of the government was to implement land reclamation through small private farms. Thus, the system and infrastructure were designed accordingly. This put some constraints on the state farms and required system modifications. After the state farms had made the necessary modifications in order to adjust to large-scale farming, small areas

* New Lands Productivity in Egypt, Technical and Economic Feasibility, Pacific Consultants, Washington, D.C., January 1980. (Prepared under AID Contract/NE-C-1645. Project No. 263-0042).

were turned over to settlers and agricultural graduates.

When the reclamation projects were planned, designed, and implemented, no experimental base existed. As a result, much of the land was farmed with systems and technology appropriate for the old lands but not necessarily appropriate for the sandy soils of the reclaimed land. Furthermore, there were shortages of labor and such production inputs as fertilizers; extension services were not available; and water and electric power supplies failed at critical periods, especially for sprinkler irrigation.

In recent years, there has been a move to make some of the reclaimed land available for large-scale farming by the private sector. It is fair to say that companies which have taken up options either under Public Law 43 or independently from it have encountered a number of administrative constraints.

Control of the amount of water available through the allowed irrigation works has influenced cropping patterns. Control by the leasing public sector company or ministry has also made flexibility of cropping programs difficult. Companies which have sought funding under Law 43 have found that deviations from

the originally agreed cropping program, possibly for quite valid agricultural or managerial reasons, have been construed as a breach of contract; such companies risk being denied benefits which they might previously have been accorded.

More recently, the Ministry of Housing and Land Reclamation has offered for lease considerable areas of reclaimed land complete with infrastructure and in some instances planted with fruit. The response from foreign companies has been very disappointing despite all the incentives offered.

These lands are controlled by the Ministry of Housing and Land Reclamation through the General Authority for Urban Projects and Rural Development. Some 220,000 feddans in 13 parcels were offered in 1981 from lands being worked by six public sector companies. The Ministry received eight proposals, five of which were turned down as unacceptable due to improper feasibility studies or requirements for subsidized ("soft") loans. Three proposals were accepted in principle, subject to negotiation of lease contracts. Since the land is currently owned by public sector land reclamation companies, the foreign companies must negotiate with these companies directly.

The successful proposals were as follows:

- o Winsome Industries from Seattle, Washington, to take over 6,000 feddans, of which 3,000 are currently planted to citrus and 3,000 to field crops.
- o Ramses Agricultural Company, to take over 6,000 feddans currently planted to citrus.
- o Middle East Land Reclamation Company, to take over 6,000 feddans in North Tahrir, of which 3,000 are planted to citrus and 3,000 to forage crops.

Annual lease values per feddan on these lands have been established as follows:

- o Currently uncultivated land with access to irrigation water L.E. 50
- o Land planted with field crops and having either surface or sprinkler irrigation L.E. 100
- o Land planted with vineyards and having either surface or sprinkler irrigation L.E. 155
- o Land planted with citrus and having either surface or sprinkler irrigation L.E. 250

Lease values are adjusted based on the actual cropping patterns. For example, the annual L.E. 50-per-feddan price continues until the land is reclaimed. When actual cultivation begins, the lease terms are increased to the categories listed above, depending on cropping patterns.

Land not currently owned by the Land Reclamation Companies is under the jurisdiction of either the General Authority for Rehabilitation Projects and Agricultural Development, the individual governorates, or the Ministry of Development and New Communities. Potential investors who are interested in land under these jurisdictions are to negotiate directly with the party concerned.

Another concept of land upgrading and reclamation has been to develop on a cooperative basis. A number of private sector Egyptian businessmen with close government connections have been active, especially in the Ismailia area. In these companies the employees are investors and shareholders; popular development committees are being set up in each governorate and a Ministry of Popular Development has been set up to foster this type of private sector development. In some cases, participation by foreign firms would be

welcome.

The Pacific Consultant team analyzed the feasibility of various-size projects on reclaimed land in the South Tahrir and Tahaddi areas, located halfway between Cairo and Alexandria, including several 6,000-feddan joint-venture-type projects. The results of these analyses are discussed in the next chapter. In general, the studies indicate that properly managed joint ventures would be financially viable from a private investor's viewpoint if water is free and energy provided at subsidized prices. However, the economic cost to the country for basic infrastructure would be high in relation to national benefits.

Government Activities Relating to New Land Reclamation

Despite the cost of land reclamation, including the provision of water and associated infrastructural development, the present policy of the Egyptian government is to develop more new land and to increase food production so as to reduce dependence upon foreign imports for food supply. Accordingly, the Ministry of Land Reclamation has allocated priorities for the reclamation of about 2.86 million feddans of new land between now and the year 2000.

Two areas of special interest are Sinai and New

Valley, a long crescent-shaped chain of oases near the High Dam and extending westward before curving east again toward El Fayoum and Cairo. Other areas include various sandy regions surrounding the Delta.

New Lands Scheduled for Reclamation

The location and priorities for the reclamation of the 2.86 million feddans are summarized in Table 3-1.

Table 3-1
EGYPTIAN LAND SCHEDULED FOR DEVELOPMENT UP TO THE YEAR 2000
(Listed by Governorates)

	First Priority	Second Priority	Other	Total
North Sinai	30,000	-	650,000	680,000
South Sinai	-	-	55,000	55,000
Port Said	20,000	-	90,000	110,000
Ismailia	10,000	-	-	10,000
Suez	-	-	40,000	40,000
Sharkiya	325,000	-	267,000	592,000
Damietta	43,500	15,000	-	58,500
El Dakahlia	26,000	-	-	26,000
Kafr El Shiekh	69,400	73,000	-	142,400
Bahira	86,000	-	-	86,000

Table 3-1 (cont'd)

	First Priority	Second Priority	Other	Total
Alexandria	-	-	10,000	10,000
Marsa Matruh	296,000	-	-	296,000
Gezira	91,000	-	-	91,000
Beni Suef	5,000	9,000	-	14,000
El Fayoum	25,000	50,000	-	75,000
El Minia	-	-	16,700	16,700
Asyut	5,000	-	-	5,000
Sohag	10,000	-	13,000	23,000
Kana	43,500	-	-	43,500
Aswan	102,000	-	-	102,000
New Valley	-	-	385,000	385,000
GRAND TOTAL	1,187,400	147,000	1,526,700	2,861,100

Source: Ministry of Housing and Land Reclamation, 1981.

The planned reclamation activity, by major regions within Egypt, is given in Table 3-2 for the period through fiscal year 1985. A detailed listing of lands scheduled for reclamation is given in Table 3-3 by location, size, types of soil, and irrigation.

Table 3-2

PLANNED EGYPTIAN LAND RECLAMATION FOR FISCAL YEARS 1981-1985

(By Fiscal Year)

Region	Total Area (Feddans)	Distribution According to Plan				
		1981	1982	1983	1984	1985
East Delta and Sinai	323,200	31,500	44,750	61,500	81,300	104,200
Middle Delta	44,900	13,000	8,000	4,400	9,500	10,000
West Delta	223,500	38,200	65,900	26,400	42,500	51,500
Middle Egypt	90,500	2,000	9,000	19,500	27,500	32,500
Upper Egypt	84,000	4,200	13,000	31,300	22,500	13,000
New Valley	60,300	4,500	6,800	8,250	17,500	23,250
Total	826,400	93,400	147,450	151,350	200,800	234,450

Source: Ministry of Housing and Land Reclamation, 1981.

Table 3-3

EGYPTIAN LANDS SCHEDULED FOR RECLAMATION THROUGH THE YEAR 2000, BY PRIORITY

Location	Area (Feddans)	Soil Type*	Irrigation Type**	Remarks
<u>First Priority</u>				
North Sinai (East Lake Morrah)	30,000	CS	P	Water from Ismailia Canal by siphon under Suez Canal
Port Said (Between Damiyat and Port Said)	20,000	CS/S	P	Water from Damiyat Nile
Ismailia (Extension Pepsi-Cola Project)	10,000	CS/S	P	Water from Ismailia Canal
Damiyat				
El Borg Farm	27,000	CS/S	P	Water from Damiyat Nile
Faraskor	5,500	SC1	F	Water from El-Sharkiya Canal
Omm Dungal	10,000	S	P	Water from Drain No. 1
El Dakhaliya El Matariya Extension	29,000	SC1	F	Water from El Banr el Saker
Kafr-Es-Shaikh				
Hafeir Shehab el-Din	10,000	SC1/C1	F	
El Borolos	8,400	SC1	F	
West El-Borolos	16,500	C1/SdC1	F	
El Qom el-Akhdar	24,500	SC1	F	
El Zawya	3,000	SC1	F	

Table 3-3 (cont'd)

Location	Area (Feddans)	Soil Type*	Irrigation Type**	Remarks
El Behiyra				
El Bomilin	16,000	SD	P	
Barsyek	20,000	SC1	F	
El Entelak	7,000	SD	P	
West Nobiriyah	20,000	SD	P	
Marsa-Matruh				
N.W. Coast	5,000	CS	R	
Giza				
Kamaza	15,000	SD	P	
El Wyesmi	3,000	SD	P	
Atfieh	8,000	SD	P	
Beni Suef				
Abou-Myer	5,000	SD	P	
El Fayoum				
Bahr el Karak and Bahr Wahby	25,000	C1/ SdC1	F	
Assyut				
East Assyut	5,000	SD	P	
Sohaq				
Awlad Tuk Shark	10,000	SD	P	
Kena				
El Kalassy	4,000	SD	P	
El Mokhadma	3,000	SD	P	
Koft	3,000	SD	P	
Nassiem Valley	2,000	SdC1	P	

Table 3-3 (cont'd)

Location	Area (Feddans)	Soil Type*	Irrigation Type**	Remarks
			<u>Second Priority</u>	
El Sharkiya North Es Salhiya	70,000	SdCl	F	
Damiyat El-Bananh	15,000	Sd	P	
Kafr-Es-Sheikh Dried Edges Lake Borollos	73,000	SCl	F	
El Behiyra El Hagar	13,000	SCl	F	
Marsa-Matruh West Nobiriyah	269,000	214,000 CSdCl	P	
		55,000 CSd	P	
Siwa Oasis	23,000	SCl/Sd	F	
Giza El Bahraya Oasis	45,000	Cl/SdCl	F	
Beni Suef Khafog Beni Suef	9,000	Cl/SdCl	F	
El Fayoum El Ryan Valley	50,000	Cl/SdCl	F	
Kena West Extension	22,400	Sd	P	
Aswan Kharbet Valley and Allah Valley	77,000	40,000 Sd	P	
		37,000 ScDl	P	

Table 3-3 (cont'd)

Location	Area (Feddans)	Soil Type*	Irrigation Type**	Remarks
<u>Later Priority</u>				
North Sinai				
El Tina Plain	135,000	SC1	F	
North Coast between El Tina and El Arish	265,000	SdCl	F	
Region between Contour 5 and Contour 60	250,000	CSd/Sd	P	
South Sinai				
East of Suez Canal	55,000	CSd	P	
Port Said				
South Port Said	50,000	SC1	P	
Plain to south of Port Said	40,000	SC1	P	
Suez				
West Suez Canal up to Contour 20	40,000	CSd	P	
<u>Other</u>				
New Valley				
El Farafra	140,000	Cl	F	The 375,000 feddans for New Valley are variously allocated to different priorities.
El Dakhala	60,000	Cl	F	
El Kharja	40,000	Cl	F	
South Valley	135,000	Cl	F	

* Soil Types: Cl = Clay, CS = Calcareous Sand, SC1 = Saline clay, SD = Sand, SdCl = Sandy Clay
 ** Irrigation Types: F = Surface Irrigation, P = Sprinkler Irrigation, R = Rainfed

Source: Ministry of Housing and Land Reclamation, 1981.

Government Role in Reclamation Projects

The government of Egypt recognizes its obligation to provide infrastructural facilities for larger land developments. Such facilities include electricity, irrigation, potable water, roads, education, health, security, and postal services. The cost of these services is considered as part of the cost of land development, but in recent months the government is recognizing that such costs must be seen as social costs to be borne entirely by the project.

The government is well aware of the conclusion of the various reports which show very low or negative benefit-cost relationships for many reclamation projects. However, it sees no viable option but to reclaim more land.

The execution of land reclamation works and the provision of the necessary infrastructure are usually done in Egypt by public sector companies. These companies are well experienced in such work, and they enjoy considerable price subsidies.

The fact that land reclamation may be expensive from the national point of view should not deter a private investor as long as basic infrastructural costs are met by the government and the investor is able to

have use of the developed land at a financially attractive purchase price or rental.

The approval of any land development rests upon feasibility studies covering both technical and economic aspects which must be approved by the General Authority for Urban Projects and Rural Development.

The feasibility study and the related proposal for land development provides an opportunity for potential investors to explain the conditions under which the project might operate profitably and in the national interest. For example, policy makers are now much more aware of relating charges for the purchase or rental of newly reclaimed land to the financial viability of projects aimed at increasing national food security.

Potential investors who have spelled out the conditions needed can then negotiate with the government from that standpoint rather than seeking to find profitable investment opportunities within the existing administrative and pricing framework.

Ownership and Use of Desert Land

Generally speaking, any unfarmed land with a potential for reclamation is classified as desert land and its ownership is vested initially with the government, which can control its development under

Law 143 of 1981. This law is a key to understanding governmental policy toward land development, and any potential investor is advised to study it thoroughly.

Both ownership and use of desert land are controlled under Law 143, which replaces an earlier law (No. 100 of 1964). The following paragraphs emphasize the policy toward desert land use.

The defense requirements of the Arab Republic of Egypt take priority in the allocation of such land. The plans for land reclamation are under the responsibility of the Ministry of Housing and Land Reclamation, operating through the General Authority for Urban Projects and Agricultural Development. This authority is responsible for the design and execution of the necessary infrastructure and is assisted in this by a committee drawn from other ministries involved in such development.

Law 143 provides for the Authority to assist the financing of cooperatives, companies, and private individuals who may be allocated the reclaimed land. It also recognizes the validity of Law 59 of 1979, which provides financial incentives for community development projects. There is a limitation on the possession of land according to the schedule in Table 3-4.

Table 3-4

LIMITATIONS TO THE SIZE OF LAND HOLDINGS
UNDER PUBLIC LAW 143 OF 1981

(In Feddans)

	Per Person	Per Family	Per Cooperative	Per Private Companies	Per Share Companies
Land irrigated by modern irrigation systems; e.g., sprinkler, drip, or pressurized systems	200	300	10,000 (30 feddans per member)	10,000 (150 feddans per member)	50,000
Land irrigated by surface irrigation	100	150	5,000 (15 feddans per member)	5,000 (75 feddans per member)	25,000

Notes:

- o Egyptian participation in a company must be not less than 51 percent.
- o No one person may possess more than 5 percent share in Share Companies.
- o There are no such limitations for public sector possession of the land.

Source: Public Law 143 of 1981, as translated by Hawaiian Agronomics Company (International), 1981.

The Authority is empowered to fix rental charges under the provisions of the law and to lay down conditions for the use of the land. It also can repossess the land if it is not utilized within three years of a rental contract being made.

The leasing of the land is not necessarily by tender, and certain categories of persons are afforded priorities in their own governorates; for example, families of soldiers who have been killed or wounded in military service, small farmers, college graduates, and retired public sector workers.

The reclamation of land is the responsibility of those who rent it, and it must not be used for purposes other than those agreed.

The law provides for conferring the rights of ownership to desert lands to persons who have already had interest in the land, to public sector companies, to the classes of persons listed above, to agricultural and reclamation cooperatives, to purchasers by tender, and to joint-venture projects under Law 43. The President has the right to bestow other classes of ownership to reclaimed lands in Sinai, New Valley, the Red Sea, the Western Desert, or areas irrigated by rain or existing wells and springs. Egyptians who rent land

for more than 50 years have ownership rights.

The law provides for the ownership of land by joint-venture companies of particular composition and also recognizes the possibility of a company developing land and selling it with the necessary facilities for production. Such facilities could include the provision of the necessary irrigation equipment, windbreaks, and the provision of farm buildings. The law would also seem to allow the provision of farmsteads for subletting. However, the General Authority for Urban Projects and Agricultural Development is likely to give most favorable consideration to any project which would involve development and subsequent use of the land by one company.

Government Programs Influencing Price and Availability of Agricultural Inputs

Government agricultural programs greatly influence the prices and availabilities of agricultural inputs and outputs, both directly and indirectly, through government competition in the market place. This discussion relates only to agricultural inputs such as water, land, capital, equipment, construction materials, fertilizers, seeds, pesticides, and labor. The government role in the distribution and pricing of

farm outputs is discussed in Chapter 5 on the market for agricultural products.

Because of the complex pricing structure which prevails in the Egyptian mixed economy, many essential agricultural inputs are available both at subsidized prices and at free market prices. Furthermore, the availability of inputs may depend upon government policy concerning importation or upon government approval for the use of certain types of machinery, chemicals, and seeds. Table 3-5 summarizes the prices of basic farm inputs, subsidized and free market.

The pricing policies on inputs are often flexible and prices can be negotiated, especially if the project is considered to be of high priority by the Ministry of Agriculture and the Investment Authority.

Land

The selling prices for newly reclaimed land established by the General Authority for Urban Projects and Agricultural Development tend to be high due to the government policy of pricing land according to all development costs. Prices in late 1981 were about \$5,000-\$6,000 per feddan, inclusive of infrastructure, center pivots, and water piping. Prices are negotiable, and there is an increasing recognition

within the government that some of the cost of infrastructure must be absorbed by the state as a necessary social cost. Land prices are generally high in Egypt, with good agricultural land selling for up to four times this range on old lands.

Land rentals are also negotiable, especially on land being leased from the Authority. Generally, rates vary from as low as \$60 per feddan per year for arable land, through \$120 or more for vegetables, and up to \$250 for orchards. There is considerable variability, however. For example, some rentals have been on the order of \$300 for arable land with infrastructure.

Since most banks, including the agricultural banks, only lend against the security of the land, there are difficulties raising loans unless land is purchased.

Capital

Subsidized interest-rate loans are available for Egyptians wishing to buy land through the Agricultural Development Bank. However, land ownership is mandatory since all loans must be secured by real property. The interest rate for land purchases was 3 percent in late 1981. Joint venture companies with foreign participants would have to pay prevailing free market interest rates, which were 15 percent in late 1981.

Table 3-5
COSTS OF FARM INPUTS IN EGYPT, 1981

Item	Unit	Price in U.S. \$	
		Free Market	Subsidized
Diesel fuel	liter	0.17	0.03
Electricity	kwh	0.06	0.018
Water	m ³	0.005**	Free
Urea	MT	240	145
Ammonium Sulphate	MT	134	66
Ammonium Nitrate	MT	183	104
Triple Superphosphate	MT	235	106
Potassium Sulphate	MT	228	70
Wheat seed, local	per feddan	N.A.	7.63
Maize seed, local	kg	0.24	0.18
Maize seed, hybrid	kg	1.50	1.46
Land rental (orchard)	feddan/year	250-300	-
Land rental (vegetable)	feddan/year	120	-
Land rental (arable)	feddan/year	60	-
Land purchase with infrastructure	feddan	5,500	-
Bank interest	percent	15+	3-6
Unskilled labor	per month	80-200	-
Engineers	per month	200-450	-
Senior management	per month	500-750	-
<u>Duties in Imports</u>			
Farm tractors & parts			
(a) 45-70 hp	ad valorem	15%*	-
(b) Other	ad valorem	2%	-
Agricultural machinery for ploughing, tilling, cultivating, fertilizer spreading, harvesting, and threshing	-	Exempt	-

Table 3-5 (cont'd)

Item	Unit	Price in U.S. \$	
		Free Market	Subsidized
Pumps			
(a) Petrol (gasoline)	ad valorem	15%	-
(b) Hand	ad valorem	10%	-
(c) Pumps with diesel engines	ad valorem	5%	-
(d) Other	ad valorem	Exempt	-

* Currently exempt from duties.

** This is the "economic price" of water used in the Pacific Consultants' Report.

N.A.: Not Applicable.

Source: Hawaiian Agronomics Company (International).

Assuming a selling price of L.E. 4,500 per feddan, a 25 percent down payment (L.E. 1,125), and a ten-year repayment period, the Egyptian farmer would have a cash outflow of L.E. 395 per year in order to amortize the L.E. 3,375 debt.

The joint venture company, with foreign participation, with the same down payment, would have to pay about L.E. 672 annually, however, to amortize the debt over ten years--or 70 percent more than the wholly Egyptian-owned company, a distinct competitive disadvantage.

The fully secured Egyptian borrower can also obtain subsidized, six-percent working capital loans through the Agricultural Development Bank, while the mixed-venture company would have to pay the prevailing commercial rate.

Water

Water is available free of cost to all agricultural projects through the Ministry of Irrigation (MOI). For new lands reclamation, the MOI diverts water from a main feeder canal through a project main canal to branch canals with predetermined rates of water based on the project size and topography. Since the new lands are generally higher in elevation than the main feeder canal, the MOI establishes pumping stations at appropriate locations along the main project canal. The MOI is also responsible for the construction of main and trunk drains from a project.

Secondary canals or pipe systems, supplied with water from the branch canals, distribute water within the project. The amount of water going to secondaries is controlled by the MOI at the turnout from the branch canal. Each farm receives water for a precalculated time period based on the size of the farm, the type of

irrigation system used (surface, sprinkler, drip), soil characteristics, cropping patterns, and other factors. These secondary systems and further on-farm water distribution and drainage systems would normally be developed by the large integrated joint-venture projects (in excess of about 6,000 feddans) on new lands. However, in the case of recently reclaimed land projects, the on-farm distribution and drainage systems may already be in place.

Construction Materials

Although public companies receive certain construction materials (such as cement and steel products) at subsidized prices, it is unlikely that a Law 43 company would be eligible for these subsidies. There might be exceptions in special cases, especially if the Law 43 joint venture involved the participation of a public company.

Fuel and Power

There is a considerable difference between the free market and government-subsidized prices for fuel and power. Although the water itself is free at the farm, diesel fuel for pumping is 3 cents (U.S.) per liter at subsidized rates, versus 17 cents per liter at free market rates. Similarly, the subsidized price of

electricity is 1.8 cents per kilowatt hour, versus 6 cents at the free market rate.

A Public Law 43 joint venture is eligible for only a portion of subsidy during its initial five years of operation. In the first year, the company pays the subsidized rate plus 20 percent of the difference between the subsidized prices and the world prices. In subsequent years, an additional 20 percent is added so that the world price is paid after five years. There have been exceptions to this pricing policy, however, in the case of high-priority agricultural projects. Since power and fuel can be important cost factors in a reclamation project, especially where sprinkler or drip irrigation systems are utilized, an investor should be prepared to justify obtaining the subsidized rate.

Fertilizers

Farmers providing produce to the government are eligible to receive fertilizer at subsidized rates through the farm cooperatives. The amount received is based on the production of government-purchased crops. However, farmers often utilize the fertilizers for crops not controlled by the government, or they sell the fertilizer at prices above the subsidized levels.

Normally, a Public Law 43 joint venture would not be eligible for these subsidies.

Prices of some basic fertilizers are as follows in U.S. dollars (1981) per metric ton:

Item	Free Market Price	Subsidized Price
Ammonium Sulphate	\$134	\$ 66
Ammonium Nitrate	183	104
Triple Superphosphate	235	106
Potassium Sulphate	228	70

Adequate supplies of fertilizers are generally available in the Egyptian free market.

Machinery

Any machine destined for use in Egyptian agriculture must be approved by the Ministry of Agriculture, usually as a result of tests carried out on its testing site near Alexandria.

Because of its fragmented nature, Egyptian agriculture has not mechanized rapidly; therefore the number of tractors in use is relatively small. A wide range of makes has been imported, but to date preference has been for cheaper eastern-bloc machines rather than the more expensive and complex western machines. Consequently, the dealer and spares network for western machines is not well developed.

Since the government is encouraging agro-mechanization, the import of tractors and agricultural machineries currently enjoys customs exemptions.

The fourth report in this series, The Non-Electrical Machinery Industry in Egypt, discusses the market for several types of agricultural equipment and suggests several potential joint-venture opportunities, especially for the production of tractors and pumps.

Seeds

The Egyptian government has also held seed prices artificially low, directly through subsidies on seeds and indirectly through the low prices paid for locally produced crops.

About 90 percent of the commercial seed sold in Egypt is supplied by Ministry of Agriculture agencies including the Seed Propagation Administration (SPA), the Egyptian Agricultural Organization (EAO), and the Nuba Seed Company. Private seed companies provide the balance through the importation of seeds, principally vegetable seeds and hybrid corn. The private seed sector is expected to expand in the future.

The SPA must approve any seeds imported to Egypt. Seed certification and seed import standards are

established, and all seeds offered for sale must meet these certification requirements. All plant varieties and hybrids used in Egypt must be tested and placed on a national list of approved varieties.

Pesticides

The government generally undertakes pest control in strategic crops grown by small farmers. Public Law 43 investors would have to negotiate their own arrangements. Most pesticides are available, and aerial spraying contractors may be found.

Labor and Services

The government has little influence on the cost of farm labor except to the extent that subsidies have influenced migration from the farms to the cities, as previously discussed.

With its long history of agriculture, there is little problem in finding Egyptian agricultural graduates and skilled labor in general. There is some difficulty in finding persons who are willing to forego the relatively congenial and semi-urban life of the old lands and live in newly reclaimed areas. Large-scale projects have run into serious difficulties, especially when there is a need for quantities of seasonal labor. There are also problems in finding persons conversant

with the concepts of large-scale agriculture, and potentially good staff often lack appreciation of the goals of a project. Hence the need for familiarization visits outside Egypt.

Wages and terms of service vary considerably within Egypt and between public and private sectors. Egyptians are generally motivated by opportunity for higher earnings, and this has the result of payments being competitive.

The rates of pay for a progressive private sector company, as shown in Table 3-6, may be used as a guideline. The figures quoted are base rates to which social insurance (20 percent of base), medical fees, transport to and from work, etc., must be added. Bonuses may be anything from 35-50 percent of the base depending on whether or not overtime is paid. Senior employees may also receive a car allowance. When making comparisons with the public sector, it must be realized that apparently low public sector pay is often supplemented by considerable benefits including housing or housing allowances. It should also be realized that competent persons view salaries competitively with what they might earn in the Arabian Gulf or Saudi Arabia.

Table 3-6
MONTHLY BASE SALARY LEVELS IN EGYPT:
SELECTED POSITIONS, 1981

Job Description	Salary (\$ per month)	Qualifications
Manager	500-750	Some years experience. Department Head
Assistant Manager/ Executive Secretary	300-500	Able to become Manager after 2-3 years
Secretary/ Accountant, etc.	150-400	Younger graduate
Senior Engineer	400-650	Graduate with some years of experience
Engineer	200-450	Younger graduate
Technician/ Mechanic, etc.	150-350	Qualified in trade
Laborer	80-200	Unskilled

Source: Hawaiian Agronomics Company (International), 1981.

4. PROFITABILITY OF AGRIBUSINESS PROJECTS ON RECLAIMED LAND

Private Projects in Egypt

There has been insufficient experience with private, large-scale agribusiness projects in Egypt to determine how profitable such ventures might be. There are numerous uncertainties relating to potential profitability. These include crop yields, investment and operating costs, and government policies with regard to subsidies on inputs and price regulations on outputs. These considerations are discussed in this chapter. There are several Egyptian agribusiness projects utilizing reclaimed land. Most are still in the early stages of development. Within a few years these avant-garde enterprises will provide valuable information for planning and implementing agribusiness complexes of the future. Seven Egyptian agribusiness projects of particular interest should be watched.

The Delta Sugar Company has a site which comprises nearly 50,000 feddans in northern Egypt close to Lake Borollos. The land is leased from the Egyptian Company for Distillation and Sugar for 50 years, with an initial ten-year payment of L.E. 16 per feddan per year. Subsequent payment levels will depend on changes in the

price of main crops. The company is owned 50 percent by the Egyptian Company for Distillation and Sugar and 2 percent by Kyle Babcock of France. The International Finance Corporation also has a small equity position. The balance is owned by other Egyptian groups. It is under Egyptian management.

The land had not been previously utilized and had soil of high salinity. The company first leveled the land and then leached it. The leaching process which was utilized covered the land with 15 centimeters of water for 40 days, let it dry, plowed, and then repeated the cycle. Depending on the salinity of different areas, between three and eight cycles were required.

The project includes a beet sugar factory which is already operational in the pilot stage and expects to be in large-scale production during the 1982-1983 season. A three-year crop rotation schedule is planned on the heavy saline clay to include sugar beets, wheat, alfalfa, flax, sorghum, soybeans, and rice. In addition, a 6,000-feddan fish farm is planned on hard pan soils.

When fully operational, annual production is expected to be as follows:

Beet-Sugar Products:

- o 100,000 MT sugar
- o 32,000 MT molasses
- o 250,000 MT beet tops
- o 38,000 MT pulp

Other Products:

- o 20,000 MT flax
- o 5,000 MT linseed
- o 15,500 MT wheat
- o 36,000 MT sorghum
- o 12,000 MT soybeans
- o 34,000 MT rice
- o 190,000 MT alfalfa
- o 53,000 MT straw and hay
- o 6,000 MT fish

The company's 1981 beet production averaged only about 6 MT per feddan, about one-third of production on old lands. The company believes that it will take another three years before reasonable yields can be expected.

The company estimates that it will contract for sugar beets with 35,000 farmers owning 36,000 feddans of old land. Yields are expected to average 20 MT per feddan. The contractual terms are L.E. 15 per MT of

beets, calculated on a sugar content of 16 percent. During the 1981 growing season, the average yield was 13 MT per feddan, and prices averaged L.E. 17 per MT due to a higher than 16 percent sugar content.

Were it to start again, the company said, with the experience it has gained, it would not reclaim the land. It has proved to be more expensive to leach than the company originally thought. Furthermore, the company's own farm inputs are not subsidized, while those of the contract farmers are. Thus, it would have been more economical to contract for the entire supply of beets.

The Nile Agricultural Development Company (NADCO) in North Tahrir is also under Egyptian management. The company leases 5,200 feddans from the General Authority for Urban Projects and Rural Development. The lease terms are as follows: 50 years, with annual lease payments of \$50. The land is located in West Nubariya adjacent to the El Nasr Canal. When acquired, the land was virgin but had a service road and main electricity.

The project was originally conceived as a livestock operation: NADCO currently has about 1,000 head of dairy cattle and 1,000 head of sheep. The forage production, which will be used internally, will be mainly alfalfa, sorghum, and berseem clover.

There have been substantial problems with water supply and equipment. To date, there has been no appreciable forage production, and forage, principally hay, has been purchased from outside sources. The yields on the dairy operation have been impaired from the lack of green forage. The target yield remains in excess of 15 kilos per day of fresh milk, but production so far, due to dry forage, has been only half this amount.

NADCO sells its milk production to Misr Milk, a government-owned company, or to Egyptian Agricultural Industries, a private sector processor, at 25-30 piasters per kilo. The milking is mechanized with refrigerator holding tanks installed.

The company will use seven center pivots to irrigate 900 feddans, with the rest of the land covered by sideroll sprinkler irrigation. A small amount of citrus and table grapes will be irrigated with a drip system.

Approximately L.E. 8 million has been spent to date and, given sufficient forage production, the project should be successful. The dairy and sheep-rearing operation is currently profitable. All loan funds have been received from commercial sources at market rates of interest.

NADCO is a partner in the Egyptian American Company for Agriculture, which is developing 2,000 feddans of

tomatoes for export to Europe. The latter employs American management.

The Arabian Agribusiness Company is owned 25 percent by the South Tahrir Company for Land Reclamation, a public sector company, and 75 percent by First Arabian Investment Company, a predominately foreign-owned company. First Arabian Agribusiness leases 10,000 feddans from South Tahrir. The land was originally reclaimed by South Tahrir in the 1960s, but production was marginal. The joint venture was established in order to improve production on the land.

The capital of the company is \$3.3 million, and South Tahrir transferred the existing sprinkler irrigation system to the joint venture as its equity contribution. Lease terms are for 25 years, with lease payments set at L.E. 27.80 per feddan for the first ten years . To date only 5,000 feddans have actually been transferred to the joint venture; the other 5,000 feddans do not yet have adequate irrigation systems.

The first commercial crop was produced in the winter of 1979. Total revenue from farm production was L.E. 250,000 in 1979, L.E. 800,000 in 1980, and projected to close to L.E. 2,000,000 for 1981. The increase results from both better crop yields and

increases in actual acreage planted. In 1982, about 2,500 feddans are being planted. During the winter season, the main crops are wheat, barley, alfalfa, beans, peas, tomatoes, broad beans, and berseem clover. During the summer, the company plants alfalfa, peanuts, soybeans, and tomatoes. The company also has 5,000 head of native cattle which it is inseminating artificially with imported Friesian stock.

Barley, alfalfa, and berseem are sold into the "free" market, while the rest of the production is sold at government-controlled prices. The company receives subsidized inputs of seed, fertilizer, and electricity.

The pumps for the irrigation system are operated electrically, and the operating cost is about L.E. 5,000 per month. If the company were paying non-subsidized electricity prices, the figure would rise to about L.E. 20,000 per month. However, even at current levels, electricity represents more than 15 percent of operating costs.

Sales of most of the produce are made through private wholesalers who pay the government-controlled price. The actual prices were said to be "not unattractive" and each crop was reported as profitable at current levels. Most of the wheat is sold to the

Ministry of Supply for seed, at a price 33 percent higher than wheat used for flour. Peanuts are sold for L.E. 30 for a 75-kilo bushel, unshelled and ungraded.

The major problems are twofold: First, finance is very difficult to obtain. The Agricultural Credit Bank lends term money only against a mortgage of the land. Since the land is leased, access to this source of funds is closed. There are no other banks that have particular expertise in agricultural lending, and lack of funds has been the main reason for the slow development of all 5,000 feddans.

The second main constraint is the difficulty of exporting produce. Although in theory the company can export any of its production (if it agrees to purchase inputs at world prices), the actual procedures for exporting were described as "difficult and hazardous." For that reason the company has chosen subsidized inputs and government-controlled selling prices.

Apparently the company must in practice choose whether to operate either 100 percent in the free market or 100 percent in the "controlled" market. Given the difficulty in exporting, the former is impractical. If accounting procedures agreed with those of government authorities, so that there were acceptable standards for

allocating inputs to either controlled crops or exports, additional opportunities would open up.

The company is currently growing 40 feddans of tomatoes as experimental production for a major U.S. food processor who plans to put up a joint-venture canning factory. If the project goes ahead, First Arabian could plant up to 700-800 feddans for this production out of a total factory requirement of about 3,500-4,000 feddans. The security of a long-term contract is attractive to the company, and since the U.S. company has people on site, they are gaining valuable production experience at the same time. The company has Egyptian management.

The Ramses Agricultural Company is currently owned 50 percent by five public sector companies and 50 percent by Coca-Cola. However, the public sector companies have expressed a desire to increase ownership to 75 percent.

The project was started in 1978 and has suffered substantial delays. During 1981, 600 feddans were planted to orange trees, with another 1,000 feddans projected for 1982 and 2,000 feddans for 1983. The company has developed its own nursery so that plants are no longer a problem. The land totals 15,000 feddans, of

which 12,000 will eventually be planted. Oranges (baladi, valencia, and navel) will be planted on 75 percent of the area, with 25 percent devoted to grapefruit, tangerines, and table grapes. The yield is projected to be 23 MT per feddan for oranges and 26 MT per feddan for grapefruit.

It is estimated that 75 percent of the output will be exported to the European market. The company will be installing a grading/packing plant and cold-storage facilities. Given the location on the Cairo-Ismailia road, the exports will go by ship through Port Said. The remaining 25 percent of the output will be available either for the local fresh market or as raw material to a canned and frozen juice facility.

The land is entirely virgin and has been leased from the Egyptian Agricultural Company, one of the five public sector shareholders. Ramses was responsible for all site infrastructure. The government has provided main electricity as far as the farm and has constructed an access road to the farm boundary. All other costs have been the responsibility of the project.

The land is located 4 kilometers from the main Ismailia Canal. Water is initially pumped from the canal to a 40,000-cubic-meter ground reservoir, a lift

of 29 meters, at the corner of the land. This serves approximately 8,000 feddans. A portion is then pumped to a second ground reservoir, a further lift of 15 meters, which supplies 7,000 feddans furthest from the canal. Because of the high cost of infrastructure required, the lease terms were favorable: a five-year grace period during the reclamation and planting phase and L.E. 5 per feddan per year for the next ten years. The lease is structured for 50 years, with a ceiling of L.E. 10 per feddan during that time.

The capital of the company will be \$10 million, of which 50 percent has now been paid in. The total capital cost is forecast to be L.E. 40 million. Ramses has applied to the Agricultural Credit Bank for loan funds; however, to date, Law 43 companies have not been eligible for funding from this source, and the lack of land title prevents the bank from perfecting a mortgage lien on the land.

The company will use electric pumps due to their lower cost. The electricity cost is currently calculated at 0.78 piasters per kilowatt hour. An increase to "international-priced" electricity would have a major impact by raising the power cost by about 500 percent. The company estimates a power usage of

25 million kilowatt hours per annum for stage one (8,000 feddans), so each one-piaster increase is an additional L.E. 250,000 in annual operating cost. This estimate is based on pumping 4,200 cubic meters per feddan per annum.

The company has Egyptian management which replaced earlier American management.

Pearl Farms, using both pivot and drip irrigation, was recently established on a 224-feddan plot in Nubariya, about 150 kilometers from Cairo on the Cairo-Alexandria desert road. The owner, Mr. Kamal Korra, and his son have been working closely with Ball Agricultural Systems Division to develop the land for cultivation. Initial results have been encouraging.

In April 1982, the farm harvested its second winter crop. During the past year, the land has improved markedly in productivity. The Ph of the soil has been reduced from 9.5 to 8.0, resulting in substantially higher yields.

One half of the center pivot has been planted to barley; the 1982 yield is expected to be about 1.4 MT per feddan, with potential for about 2.0 MT in 1983. One quarter has been planted to onions, with an expected annual yield of 8-10 MT. The final quarter has been

planted to alfalfa, which will be plowed under to increase the organic material in the soil.

The farm employs 11 full-time workers, with additional casual labor as required. There is a high degree of mechanization, and the average workforce is estimated at twenty.

The farm is currently being operated on a cash expenditure outlay of less than L.E. 60,000 per annum. This figure, of course, excludes depreciation, investment return, and interest but includes all direct operating costs such as seed, fertilizer, insecticides, electricity, maintenance, diesel fuel, and all personal expenses. The farm should have a positive cash flow for the 1982 season.

The barley is not price-controlled and is sold either to the brewery or as fodder, particularly for sheep. The price of barley is estimated at L.E. 128 per MT. Last year, the value of the straw was almost as high as the value of the grain itself.

The farm has two electric pumps and one diesel stand-by, in case the electricity fails. The cost of electricity is currently paid at the subsidized rate. The canal is 1.2 kilometers from the farm gate, with a minimum of height deviation. The total cost of water

provision, including maintenance of the pumps and depreciation over 5 years, is estimated to be L.E. 80 per feddan per annum. Any change in the price of electricity would substantially increase this cost. These estimates are based on pumping 3,000 cubic meters per feddan per annum.

Mr. Korra is in the process of purchasing the land, which is currently leased. He estimates that the final purchase price will be agreed upon at approximately L.E. 800 per feddan. He was responsible for the installation of the main pumping station as well as for a 1.2-kilometer pipeline to the farm gate, one center pivot system covering 150 feddans, and spoke pipelines to three corners to supply drip irrigation for fruit trees. All necessary farm equipment has been purchased with the exception of a combine which is rented during the harvesting season. All plowing, seeding, and spraying are mechanized. The capital cost will end up at about L.E. 600,000 (L.E. 3,000 per feddan). This figure is substantially less than for some other more publicized projects of land reclamation in Egypt and should provide a competitive advantage to this operation.

The Arab Contractors have a project in Salheya, which is a 50,000-feddan integrated desert reclamation project about 40 kilometers from Ismailia near the Cairo-Ismailia Desert Road. The project is already producing a variety of crops, including vegetables, fruits, fodder, and cereal grains. However, the land has been under cultivation less than two years, so ultimate yields when full production is reached are not yet known. The complex also includes poultry and cattle operations. This project envisages the reclamation of an additional 100,000 feddans in 1982 and a further 150,000 feddans in later years.

Nimos Farms is a 200-feddan private venture which has been operating for several years. The project, which was developed by Mr. Niazi Mustafa, former Co-Chairman of the Egypt-U.S. Business Council, and his family, is located 40 kilometers from Cairo. It provides an excellent example of how drip irrigation can be used to reclaim desert land for the cultivation of a variety of fruit trees and vegetable crops. The project also includes a controlled-environment greenhouse.

Crop Yields

Among the uncertainties regarding the development of new lands, a major one is how much the desert land

will yield in crop output, especially on the deep, sandy soils that make up much of the desert regions.

Experiences on previously reclaimed land do not provide a reliable guide, and the various agribusiness projects discussed above have not developed sufficiently to provide more than clues.

Crop yields in the Tahaddi reclamation area by settlers and agricultural graduates have been substantially below yields on old lands, according to the Pacific Consultants' survey. On the other hand, projections by Arab Contractors, Delta Suga. Company, the First Arabian Corporation, and especially, the Egyptian American Company for Agriculture have been quite optimistic, with projected crop yields substantially above the average yields on old lands.

Considerable additional information will be forthcoming within the next year or so as the various private agribusiness projects continue to develop. Pacific Consultants has developed data on yields from several sources, and based on these data and other information, they have made their own projections or "target yields."

Table 4-1 summarizes crop yields (current and projected) from a variety of sources as an indication of what might be anticipated on reclaimed land. The most optimistic projection relating to tomato yields is by the Egyptian American Company for Agriculture, based on its experience with intensive vegetable cultivation methods used in the United States.

Pacific Consultants believes that if the target yield projections are achievable for sprinkler or surface irrigation on new lands, then drip irrigation systems most probably would result in yields at least 25 percent higher, as in the last column of Table 4-1.

Investment and Operating Costs on Reclaimed Land

Pacific Consultants has made a detailed analysis of the investment required for the irrigation and cultivation of reclaimed land in the Tahaddi-South Tahrir area adjacent to the existing Nubariya Canal. These estimates include several hypothetical 6,000-feddan joint-venture projects utilizing a variety of irrigation systems.

Irrigation System Costs

Investment costs for irrigating were estimated separately for the additional Ministry of Irrigation work needed to deliver water, power, and access roads to

Table 4-1

INDICATIVE CROP YIELDS - ACTUAL AND PROJECTED IN EGYPT

(Metric Tons per Feddan)

Crop	USA	Average National Yields		1979 Tahaddi Yields		Agro-Industrial Companies		Pacific Consultants Target Yields for Joint Ventures	
		1980/81(a)	1985-90	Settlers	Graduates	Initial	Ultimate	Surface and Sprinkler Irrigation	Drip Irrigation
Barley	N.A.	1.1	1.23	0.42	0.43	0.90	2.20	1.80	2.25
Maize	2.37	1.75(b)	2.50(b)	0.45	0.50	1.80	3.00	2.40	3.00
Peanuts	0.68	1.00	0.93(a)	0.53	0.51	1.00	1.40	1.12	1.40
Potatoes	N.A.	7.27	N.A.	1.20	1.00	12.00	12.00	9.60	12.00
Tomatoes	N.A.	7.43	N.A.	N.A.	N.A.	11.00	60.00(c)	9.60	12.00
Wheat	2.12	1.40(b)	2.00(b)	0.68	0.45	0.90	2.00	1.60	2.00

Sources: Pacific Consultants, unless otherwise specified as follows:

(a) Hawaiian Agronomics Company (International).

(b) CTIC (Sectoral Survey 1, The Processing and Distribution of Food Crops, 1982).

(c) Egyptian American Company for Agriculture.

N.A.: Not available.

the farm gate and for the one-farm irrigation systems. The total investment costs in irrigation systems range from \$672 per feddan for surface irrigation, using private tubewells (where possible), to \$994 per feddan for drip irrigation, to \$1,780 per feddan utilizing center pivot irrigation. Table 4-2 details these costs.

The report also developed annual "financial" costs for each type of irrigation system, assuming that water is free and that electricity is provided at the subsidized rate of 1.5 P.T. per kilowatt hour. These annual "financial" costs are also shown in Table 4-2. To the joint venture, surface irrigation is the least expensive by a considerable margin. Drip irrigation is the second least expensive, and drip systems would most likely result in substantially higher crop yields.

The final column of Table 4-2 is Pacific Consultants' estimate of annual "economic" costs for the irrigation, assuming that all inputs including water are priced at their true economic cost.

Other Estimates of Irrigation System Costs

Both the investment costs and operating costs of irrigation systems developed by Pacific Consultants appear to be in line with other estimates. For example,

Table 4-2

INVESTMENT, FINANCIAL, AND ECONOMIC ANNUAL IRRIGATION COSTS FOR VARIOUS SYSTEMS

Irrigation System	Investment Costs (U.S. \$ per Feddan)			Annual Financial Costs (U.S. \$ per Feddan per Year)			Annual Economic Costs (U.S. \$ per Feddan per Year)
	Total	MOI*	Joint Venture	Total	MOI*	Joint Venture	
Sprinkler manifold	1,400	202	1,198	69.17	15.46	53.71	273
Sprinkler, farmer pumps	1,032	133	899	52.61	15.32	37.29	243
Center pivots	1,780	133	1,647	60.33	15.46	44.87	236
Surface irrigation, private tubewells	672	0	672	30.49	0	30.49	196
Drip irrigation	994	87	907	27.59	12.75	14.84	169
Surface irrigation, from canals	1,320	173	1,147	23.31	20.34	2.97	159

* MOI: Ministry of Irrigation investment and operating costs (including maintenance).

Financial costs are actual cash outlay, assuming subsidized electricity (1.5 P.T. per kwh) and free water. Economic costs are based on true cost of electricity (5 P.T. per kwh) and water.

Source: Pacific Consultants.

the Eisenberg Group of companies and the Tahal Consulting Engineers submitted a proposal to the Egyptian Prime Minister in April 1980 entitled "Plan of Operations for Developing of New Lands East of the Delta." The plan calls for the development of 475,000 feddans gross, resulting in a net of 356,000 feddans of cultivable land in the El Salehiya, El Shabab, and El Salaam desert regions.

The estimated investment cost of agricultural development was \$664 million, or about \$1,860 per feddan. Crop irrigation would be based on sprinkler, trickle, and mini-sprinkler techniques. These costs are for on-farm agricultural development only. The cost of the main water-conveyance and drainage systems would be an additional \$463 million, or about \$1,300 per feddan.

In Tahrir Province, there is a joint venture involving the French which is rehabilitating land originally reclaimed in the 1960s. Also, in nearby West Nubariya the British consulting group, ULG, has recommended work on 65,000 feddans. Estimated cost of the two projects is about \$440 million to rehabilitate 400,000 feddans, an average of \$1,100 per feddan.

Other Investment and Operating Costs

The above costs relate only to the irrigation system itself and do not include investments in on-farm roads and project-related buildings. These, of course, would vary depending on the nature of the agribusiness to be developed. The Pacific Consultants' report estimated that for the 6,000-feddan joint venture such costs would total \$2,710 million, or about \$452 per feddan.

The report also estimated that production inputs and labor would total \$694 per feddan annually for full production, based on the particular farm plan chosen for analysis. The farm plan consists of double-cropping cultivation of the full 6,000 feddans plus a year-round cattle-fattening operation. According to the plan, 4,000 feddans would be divided among peanuts, maize, and fodder in the summer, and between berseem clover and barley (or sunflower) in the winter. In addition, 2,000 feddans would be cultivated with onions and potatoes (900 feddans each) and tomatoes (200 feddans) during both the winter and summer seasons.

Profitability Estimates

Table 4-3 indicates the "financial" (actual) and "economic" (shadow) prices of crops used in the Pacific

Table 4-3

FINANCIAL AND ECONOMIC PRICES USED IN
 PACIFIC CONSULTANTS' ESTIMATE OF PROFITABILITY OF
 6,000-FEDDAN JOINT-VENTURE PROJECTS

(U.S. Dollars per Metric Ton)

Item	Financial Price per MT	Economic Price per MT
Barley	93	179
Berseem	14*	14*
Fodder	10*	10*
Maize	117	189
Onions	86	86
Peanuts	382	553
Potatoes	86	86
Tomatoes	84	84

* These prices were not used in the calculations.

Source: New Lands Productivity in Egypt,
Technical and Economic Feasibility,
 Pacific Consultants, Washington, D.C.,
 January 1980.

Consultants' study. Based on the "financial" prices, the report concluded that "Joint ventures show with center-pivot irrigation moderate financial rates of return (12 to 20 percent), which may not be commensurate with the risks involved, and better potential rates of return (17 to 27.5 percent) with drip irrigation."

The report concludes that, at target yields, the economic IRR* is negative with center pivot irrigation and 5 percent with drip irrigation. If 125 percent of target yields is achieved, however, the economic IRR of center pivot irrigation is 9.6 percent and is 16.3 percent for drip irrigation. The likelihood of achieving yields of 25 percent above target is quite high, especially for drip irrigation systems.

It is, of course, the "financial" or actual profitability with which investors are primarily concerned in the analysis of an agribusiness project, assuming subsidized electricity and free water are provided.

The Pacific Consultants also reported the projected financial IRRs of three other land reclamation projects:

* Internal Rate of Return.

Project	Estimated IRR
Ramses Agricultural Company	16.3 percent
Wadi Al Natrun	11.5 percent
First Arabian Company (Al Fath)	32.6 percent*

A report prepared by sponsors of the Egyptian American Agricultural Company's tomato venture forecasts extremely high profitability "due to Egypt's low labor cost, the twelvefold increase in yields made possible through the transfer of U.S. technology, and the high demand for imported produce in Europe when local production is not available." Net profits are projected to be \$19.7 million on 2,000 feddans annually after two years of operation.

* The Pacific Consultants' footnote was as follows: "IRR = 32.6% for the planned investments (disregarding sunk costs), imputing no economic cost or pumping charges to the water delivered at the farm gate, not considering the true cost of electricity, and imputing the entire value added of vegetable exports (less freight charges) to farm operation. Imputing the current land value of 1,000 L.E./feddan to the existing infrastructure would reduce the IRR to 22.6 percent; including realistic water and energy costs would reduce it considerably further."

A 1981 preliminary study of the proposed Fayoum irrigation project indicates that the internal rates of return would vary between 12.1 percent and 20.6 percent, depending on the type of irrigation systems utilized and the selected cropping pattern.*

* Reconnaissance Report on the Fayoum Irrigation Project in Fayoum Governorate, Egypt, Agricultural Development Consultants Association, Nippon Koei Co., Ltd., July 1981.

5. THE MARKET FOR AGRICULTURAL PRODUCTS IN EGYPT

The demand for food products in Egypt greatly exceeds the local production, as has been explained in detail in the first two reports in the series on Egyptian agriculture.* Consequently, imports of virtually all foods have increased rapidly in recent years.

Table 5-1 lists the principal field crops and indicates estimated 1981 and projected 1986 production and import statistics. Cotton and rice, which are traditional export products, are two major crops which are not included in the table. Cotton production is controlled by the government, and there are plans to decrease the area devoted to cotton. Rice, also largely controlled by the government, is unlikely to be capable of being grown by large-scale mechanized methods because of land-tenure problems where the appropriate clay soils are available. Water requirements for growing rice on the sandy desert soils would most likely be uneconomically high. Data on

* Sector Survey 1, The Processing and Distribution of Egyptian Food Crops, and Sector Survey 2, The Production and Processing of Livestock, Poultry, and Fish.

Table 5-1
 PRODUCTION AND IMPORTATION OF PRINCIPAL FIELD CROPS
 IN EGYPT, 1981 AND 1986
 (Thousands of Metric Tons)

Crop	1981 Estimate		1986 Projected	
	Production	Imports	Production	Imports
Wheat	1,940	6,200*	2,900	8,300*
Corn	2,720	1,200	4,900	2,100
Oilseeds ¹	780	1,600**	1,140	2,090*
Pulses ²	244	180	250	317
Sugar	658	695	1,000	1,200
Barley	107	0	127	16
Sorghum	636	0	755	96

¹ Oilseeds used for edible oil were soybeans and cottonseed in 1981.

² Pulses include fava beans, lentils, chick peas, lupines, and fenugreek.

* Imports of wheat and wheat equivalent of flour.

** Imports of oilseeds and oilseed equivalent of oil.

Sources: 1981 - Egypt: Annual Grain and Feed Report, U.S. Embassy, Cairo, September 1, 1981.
 1986 - CTIC estimates. For further details on wheat, corn, oilseeds, and sugar, see Sector Survey 1, The Processing and Distribution of Egyptian Food Crops.

fruits and vegetables are given in a separate section of this chapter, as are animal products and several specialty products.

The sections which follow discuss various agricultural crops produced in Egypt in terms of overall markets, prices, and the government's involvement.

Cereal Crops

Wheat

Wheat is a major winter crop for peasant farmers on the old lands, and it is now grown under large-scale mechanized conditions by some private companies operating on recently reclaimed lands.

Despite excellent growth conditions in Egypt, yields remain much lower (1.36 MT per feddan) than yields in similar climatic conditions in the U.S.A. (2.12 MT per feddan). Recent government attempts to increase yields by offering higher prices for modern high-yielding dwarf varieties (HYV) have proved unsuccessful because the straw of traditional varieties brings in about \$180 per feddan for forage, which is scarce during the summer. This is even more than the value of the harvested grain.

Prior to the 1980 season, the government established production quotas for wheat, which they purchased at prices below the free market price. However, quotas have been removed and the farm gate price in 1980 rose to \$126 per MT versus \$92 in 1979.

Wheat production has remained relatively constant over the last eight years while demand has continued to increase. In 1981, imports exceeded 6 million MT, and they are expected to continue to grow at a rate of 8 to 10 percent annually.

In late 1981, the price of U.S. hard winter wheat was about \$193 per MT c.i.f. Alexandria. The marked gap between the Egyptian farm gate price and the c.i.f. price might make it possible for an investor with experience of large-scale wheat production to negotiate a position mutually attractive to himself and to the government.

Corn (Maize)

Corn has become one of the principal summer crops in Egypt. It is also an attractive summer crop for large-scale agribusiness. Locally-produced white corn is now used for human consumption in rural areas, principally in corn bread, whereas imported yellow corn is used principally for animal feed. It is also used

in the production of starch and glucose. Several projects are planned to increase starch and glucose production, and high-fructose corn syrup production is anticipated.

The present corn import level of approximately 1.2 million MT is expected to increase to about 2.1 million MT in 1986. Local production is expected to increase from 2.7 million to 4.9 million MT over the same period.

Yields are expected to increase from the present level of 1.75 MT per feddan to 2.5 MT per feddan. The demand for corn as animal feed is increasing owing to the shortage of pasture land and increased demand for poultry and eggs.

At present, there is little government involvement in the marketing of corn. The small amount not consumed locally is sold on the free market. The farm gate price in 1980 averaged about \$176 per MT, which is substantially above the U.S. farm gate price of \$92 per MT. The average 1980 c.i.f. price for imported corn was \$204 per MT. The imported corn is sold by the government to poultry feed producers at subsidized prices. The 1981 price was L.E. 60 (equivalent to \$85.50 prior to the 1981 devaluation).

Hybrid seed is becoming more usual in Egypt, and preliminary 1981 data shows yields of 2.8 MT or more per feddan, giving potential income of \$493 or more per feddan. A U.S./Egyptian joint-venture company is planning to produce hybrid seed in Egypt.

Sorghum (Millet)

The 1981 area devoted to sorghum was about 400,000 feddans, about 8 percent of the cultivated land devoted to summer crops. Production was 636,000 MT, at an average yield of 1.6 MT per feddan. That yield is much lower than the average of about 2.5 MT per feddan achieved in the Imperial Valley of California. The government is not involved in the marketing of sorghum; therefore the prices are determined by supply and demand. The free market price of sorghum in 1980 was about \$145 per MT. About two-thirds of the crop is used for animal feeds and is consumed locally. The balance is used for making bread.

Barley

Barley is grown as a winter crop, especially on soils less suited for wheat. It is used for feed and for brewing. The 1981 area is estimated as 94,000 feddans which, at 1.09 MT per feddan, yielded 102,000 MT. The average farm gate price was

\$122 per MT in 1980. The government is not involved in the marketing of barley, so prices are established in a free market.

Pulses

The pulse crops which are used for human consumption are fava beans (horse beans, broad beans, ful masri) and lentils. Both are major items of diet and are sold at subsidized prices through government food stores for about \$0.15 per kilogram (or \$150 per MT).

In 1981, an estimated 240,000 feddans of fava beans were planted and 12,000 feddans of lentils (only one-third of the 1978 area). Both fava beans and lentils are subject to government marketing quotas at set prices. Prices for farmers were fixed at about \$323 and \$536, respectively, in 1981. Yields were on the order of 0.85 and 0.47 MT per feddan, respectively. Egyptian prices are low compared with U.S.A. farm gate prices of \$360 and \$750. Imports of fava beans were estimated at about 80,000 MT in 1981 and of lentils about 100,000 MT.

If suitable price arrangements could be negotiated, production of pulses could be useful in the crop rotations of agro-industrial complexes.

Oilseeds

Although the climate of Egypt is excellent for the production of many oilseed crops, the amount produced is grossly below requirements. Currently, government oilseed mills rely heavily upon imported unrefined oil. In the future, seeds for crushing will be imported. The major locally produced oilseed is cottonseed, but recently there has been an interest in soybean production as an alternative crop, and high yields have been achieved. Sunflower and safflower production is also being investigated.

Because of the increasing dependence upon imported edible oils and oilseeds, there is a strong interest in encouraging the cultivation of oilseeds and producing oil in integrated agribusiness complexes. By 1986, Egypt will require estimated imports of 365,000 MT of edible oils.

The present production of oilseeds includes cottonseed (744,000 MT), soybeans (110,000 MT), peanuts (46,000 MT), sunflower (14,000 MT), and sesame (16,000 MT). However, only cottonseed and soybeans are used in producing edible oil in Egypt. All cotton is sold to the government, and when the cotton is ginned the cottonseed is sold at subsidized rates to the

government edible oil producers. Soybeans and peanuts are also sold to the government. The 1930 fixed price per MT was \$286 for soybeans and \$305 for peanuts.

There are plans for a number of joint venture companies to establish mills for the crushing of imported oilseeds. Presumably these companies would be interested in using locally produced seed of comparable quality. Some agro-industrial complexes established under Law 43 are currently producing peanuts and soybeans, and another project is under negotiation which aims at producing sunflower seeds in association with an extraction plant.

Sugar Cane and Sugar Beets

Egypt has a well established sugar cane industry which is one of the three largest in Africa. The factories, which utilize cane bought from peasant producers, are well run under Egyptian management. The sugar cane industry is situated in Upper Egypt, and recently, sugar beet production has also been started in northern Egypt.

At one time the sugar cane industry satisfied Egypt's needs for sugar; however, a growing population and a deterioration of soils are making it impossible for production to keep pace with demand. Further, only old varieties are grown.

At present, about 185,500 feddans of sugar cane are cultivated for centrifical sugar which, in 1981, produced about 6.4 million MT of cane with an average sugar content of 9.65 percent. This cane was sold to the Egyptian Sugar Company at a fixed price of \$22.59 per MT at 10.3 percent sugar. Thus, on an average yield of nearly 37 MT per feddan, the income was on the order of \$700 per feddan, which is quite attractive to a farmer who works his farms almost entirely by hand. Some farms achieve much higher yields of as much as 70 MT per feddan.

Despite the national demand for sugar, it is doubtful if the present land-tenure system or availability of land in the Nile Valley would allow for the development of plantation-type production. There are, however, plans to build additional sugar cane factories in Upper Egypt and to encourage local production. There have also been suggestions by the Agrarian Reform Organization that a joint-venture company should consider building small factories in some good cane-growing areas and offer agricultural services to the peasant producers.

Although the climate of Upper Egypt is excellent for sugar cane, the problems of land tenure and the

general problems of soil deterioration have directed attention toward sugar beet production. The first commercial production of sugar beets was started in 1980 by the Delta Sugar Company, a joint-venture concern with a French group established under Public Law 43. This project was described in Chapter 4.

As a joint-venture company, its sugar is sold on the free market, but the company forfeits the right to subsidized inputs. In the 1980-1981 season, the company paid sugar beet growers \$25.31 per MT for tubers containing 12 percent sugar.

Additional sugar beet projects are planned. Sixty-eight thousand feddans are being developed in West Nubariya with the help of a loan from the British government.

With an estimated 1986 production of 850,000 MT of sugar cane and 150,000 MT of sugar beets, versus estimated consumption of 2,200,000 MT, total Egyptian 1986 import requirements will be on the order of 1,200,000 MT. Thus there is a substantial requirement for more locally produced sugar. There is also the possibility of increasing corn and cassava production as the raw materials used in producing high-fructose syrups as sugar substitutes, especially in soft drinks and a variety of processed foods.

Vegetables

The climate of Egypt is admirably suited to the production of a wide range of horticultural crops. There are excellent possibilities for the export of produce to northwest Europe in the winter and to Saudi Arabia and the Gulf States in the summer.

Egypt has been famous for vegetable production since the earliest days of recorded history, and its excellent produce today reflects considerable skill and experience. Table 5-2 shows the quantities and range of products, some farm gate prices, and indications of quantities exported.

Conceptually, there is good potential for export of vegetables, but a word of caution must be issued to those who are not familiar with markets in the region. The northwest European market is very demanding as to quality and presentation of produce, and so high standards are needed. Many projects have been started in North and Central Africa to supply this market, but there have been problems in maintaining supply and the projects have been short-lived. High prices in the seasonal importing markets are due to scarcity; therefore any large influx into the market could completely unbalance the situation and cause prices to

Table 5-2

EGYPTIAN VEGETABLE PRODUCTION AND EXPORTS (1980)
WITH INDICATIONS OF SOME FARM GATE PRICES (1979)

Crop	Area of Production (Feddans)	Average Yield (MT/F)	Production	Average Farm Gate Price (\$/MT - 1979)	Volume of Exports (MT)
Tomatoes	332,000	7.43	2,468,000	87.32	4,172*
Zucchini	56,000	7.84	439,000	48.65	na
Haricot (green)	30,000	3.63	109,000	81.87	3,756*
Haricot (dry)	12,000	0.83	10,000	451.40	21*
Kidney Bean (green)	4,000	3.25	13,000	95.72	na
Kidney Bean (dry)	6,000	0.83	5,000	455.06	na
Pea (green)	14,000	3.50	49,000	110.56	na
Pea (dry)	8,000	0.75	6,000	427.00	na
Broad Bean	1,000	--	2,000	na	na
Cabbage	36,000	9.80	353,000	42.28	na
Cauliflower	10,000	9.70	97,000	44.10	na
Eggplant	32,000	8.88	284,000	33.47	na
Green Pepper	24,000	6.88	165,000	na	186*
Okra	11,000	6.00	66,000	na	na
Jew's Mallow	13,000	7.15	93,000	na	na
Spinach, etc.	8,000	6.88	58,000	49.48	na
Sweet Potato	8,000	10.75	86,000	na	1,351
Artichoke	4,000	7.25	29,000	na	664*
Taro	7,000	13.43	94,000	136.64	na
Radish	6,000	5.50	33,000	na	na
Turnip	7,000	8.29	58,000	28.19	na
Lettuce	13,000	8.31	108,000	na	na

Table 5-2 (cont'd)

Crop	Area of Production (Feddans)	Average Yield (MT/F)	Production	Average Farm Gate Price (\$/MT - 1979)	Volume of Exports (MT)
Carrot	13,000	9.38	122,000	37.28	967 (1977)
Parsley	2,000	14.50	29,000	na	na
Rocket	5,000	10.60	53,000	na	na
Egyptian Leek	3,000	12.00	36,000	na	na
Water Melon	119,000	9.72	1,157,000	na	10,459*
Sweet Melon	19,000	9.74	185,000	na	na
Cucumber	44,000	6.68	294,000	120.33	na
Other Cucurbits	22,000	7.95	175,000	na	na
Potato	167,000	7.27	1,214,000	100.65	143,900
Garlic (fresh)	16,000	5.88	94,000	100.16	8,400
Garlic (dry)	-	-	-	-	2,000 (F)
Other	4,000	16.75	67,000	-	na
Total	1,056,000	7.73	8,051,000	-	-
Onion (fresh)	34,000	6.79	231,000	54.36	42,000
Onion (dry)	-	-	-	-	47,000 (F)

NB: Onions are separated from the table because of the wide divergence between Egyptian and U.S. figures. Only "solid" areas have been included in production estimates.

*1979

F=Fresh Weight

Source: Hawaiian Agronomics Company (International) estimates derived from CAPMAS, Ministry of Agriculture (Cairo), USDA and U.S. Embassy (Cairo).

fall. A number of earlier Egyptian studies for large-scale farms have relied heavily upon luxury crops to generate cash flow, but in practice these projects have drifted away from the concepts described in the studies on the grounds that the risks outweighed the benefits.

The most successful attempts to grow for these markets have been by companies who themselves have business connections in the markets. Kenya has been a favored location.

However, attempts continue to challenge the glasshouse industry of northwest Europe, which is struggling with high production costs, and the challenge is met principally with tomatoes, green peppers, and lettuce. For example, the Egyptian American Company for Agriculture aims at growing 2,000 feddans of outdoor tomatoes to enable them to export 60,000 MT annually to Europe during all but four months of the year.

Any company considering such ventures should first undertake very thorough marketing studies, not least of which involves the study of the likely effect of the accession of Greece to the European Economic Community and the proposed accession of Spain and Portugal.

If such exports do develop, there could also be a demand for locally produced packaging materials.

Although excellent vegetables are grown on the old lands, the unavailability of large areas for joint-venture companies prevents any large-scale integrated vegetable-export enterprise from being developed there unless the project is in conjunction with cooperatives which control a sizable area of contiguous land. Some companies are exploring such possibilities with cooperatives under the Agrarian Reform organization, where the intention would be to form joint-venture grading, packing, and export units centered in such an area. Some companies, notably the public sector Nile Export Company, have established markets in northwest Europe and are seeking more produce.

Companies involved in land reclamation projects on light, sandy soil might concentrate on such vegetable root crops as peanuts, potatoes, onions, garlic, carrots, and sweet potatoes for the export market. These crops are now exported. The crops are suitable for mechanization and would be suitable for large-scale production. Peanuts, which have a particularly high yield on sandy soils, are ideally suited to Egypt.

They are also easily harvested and have not yet been infected seriously by nemotodes.

Fruits

Fruit production is at an advantage over vegetable production in that there is not the same competition with local products in the markets of northwest Europe, Saudi Arabia, or the Gulf. However, the effect of the possible entry of Spain and Portugal into the European Community should not be overlooked. Table 5-3 provides information on Egyptian fruit production, prices, and exports.

Citrus

The production of oranges constituted 25 percent of the fruit area of Egypt in 1952 but is now about 50 percent of the area. The present area of 160,000 feddans is increasing. The quality of product is generally good. Yields average 7 1/2 MT per feddan with a planting density of 160 trees. Yields are likely to increase as recent plantings mature and come closer to the 15-18 MT per feddan achieved by top-quality mature orchards.

Orange exports in 1980-1981 were reported by the El Wadi Company for Agricultural Exports (the main exporter) as being 137,636 MT out of a total production

Table 5-3

EGYPTIAN FRUIT PRODUCTION AND EXPORTS WITH INDICATIONS OF SOME FARM GATE PRICES, 1980

Crop	Area of Production (Fed ² ans)	Average Yield (MT/F)	Production (MT)	Average Farm Gate Price (\$/MT)	Volume of Exports (MT)
Oranges	127,091 (bearing)	7.25	829,881	107	137,636
	35,018 (other)	-	-	-	-
Tangerines	12,139 (bearing)	5.78	70,194	243	NIL
	4,456 (other)	-	-	-	-
Lemons	191 (bearing)	5.24	1,000	222	NIL
	256 (other)	-	-	-	-
Grapefruit	214 (bearing)	7.31	1,565	222	500
	436 (other)	-	-	-	-
Limes	9,305 (bearing)	7.75	72,110	229	500
	8,049 (other)	-	-	-	-
Other Citrus	275 (bearing)	5.66	1,557	222	NIL
	138 (other)	-	-	-	-
Grapes	57,000	5.26	300,000	-	30*
Figs	7,000	2.28	16,000	-	-
Guavas	16,000	6.69	107,000	-	-
Olives	4,000	1.50	6,000	-	-
Mangoes	28,000	3.50	98,000	1,000	103*
Pomegranates	4,000	3.25	13,000	-	-
Apricots	5,000	3.00	15,000	-	-
Plums	3,000	1.67	5,000	-	-
Bananas	15,000	8.87	133,000	-	-
Dates	-	-	406,000	-	-
Peaches	2,000	5.00	10,000	-	-
Pears	9,000	5.56	50,000	-	-
Apples	5,000	3.60	18,000	-	-
Other	5,000	6.40	32,000	-	-

* 1978.

Sources: Egyptian Ministry of Agriculture, Central Agency for Public Mobilization and Statistics (CAPMAS), and U.S. Embassy - Cairo.

of 920,881 MT. About 45 percent of the exports went to the U.S.S.R. and a further 35 percent was shared between Saudi Arabia and North Yemen. Although the government-owned El Wadi Company handles exports at present, at least one joint-venture company plans to undertake its own export program.

Wholesale prices of citrus are fixed by the Ministry of Supply and Home Trade and, apart from very early production, are firm for the season. In 1980-1981 they varied between U.S. \$125 and \$185 per MT, depending on quality and type. A common procedure in Egypt is to sell a standing crop to a wholesaler who becomes responsible for harvesting and marketing.

Areas devoted to other citrus crops are relatively small. Locally produced tangerines are of excellent quality and wholesale between \$160 and \$170 per MT. Although untested on a commercial scale, the hot climate of Upper Egypt would seem to be very favorable for limes and grapefruit. Although the export of limes is difficult, there is a ready market for them in Saudi Arabia and the gulf.

At present about 7,500 MT of citrus are used in processing, which is done by the government-owned Edfina and Kaha canning companies. A one-pound can of

jam is sold at L.E. 0.23 (U.S. \$0.28) and a four-ounce can of single juice at L.E. 0.11 (U.S. \$0.13). These government-controlled prices are low, and the companies export quantities of processed product to the Gulf States and Saudi Arabia, where Egypt controls a sizable proportion of the market. Local sales are protected by import tariffs which, at present, are 150 percent ad valorem on fruit juices and 50 percent on fresh fruit.

Although world demand for oranges is growing rapidly, production is projected to grow more rapidly, according to a 1979 FAO report. That report projects a worldwide surplus of 1.2 to 1.5 million MT by 1985, principally as a result of a major expansion in Cuban production. The Cuban production is likely to compete directly with Egypt for the market in the U.S.S.R.

In the Middle East, Egypt is likely to face increased competition from Morocco and Cyprus during the 1980s, while Portugal, Spain, and Greece will become increasingly competitive in the EEC countries.

Grapes

There is a good demand in Europe for cheap table grapes, and Egyptian grapes are also of excellent quality. The grape area remains at about 15 percent of the total fruit area, and yields at present are about .

4 1/2 MT per feddan, although higher yields were recorded in the past. A considerable amount of wine is produced in Egypt, and there is a growing demand for grape juice in Europe and the Middle East.

Guavas

Guavas account for about 5 percent of the area and generally are of excellent quality and free from insect damage. Conceptually, the demand for guava juice in Europe and the Middle East is a reason to take advantage of the climate of Egypt for growing this fruit.

Mangoes

Excellent mangoes are grown in Egypt. Mature orchards of grafted trees may be found, and younger trees have been planted in suitable areas. They account for about 5 percent of the fruit production of the country. There is a growing demand for mango juice, puree, and the fruit itself in both the European and Middle Eastern markets. Mangoes take a longer time to come into bearing than other fruit trees, but the investor is able to negotiate appropriate concessions.

Strawberries

Strawberry production is not included in official statistics, but considerable quantities are grown in

rotation with vegetables where the soil is suitable. They fruit early in the year and retail at high prices in the larger cities of Egypt. There is some export to Europe.

Various proposed agro-industrial complexes have included strawberries in their feasibility studies, influenced by high out-of-season prices in Europe and relatively cheap labor in Egypt. Unfortunately the northwest European market prefers varieties grown in cooler North European conditions. Also, export procedures have proved difficult and, above all, seasonal labor is hard to obtain.

Other

Figs and pomegranates of very good quality may be found. Bananas are also grown, but government pricing policy has not encouraged local production.

Non-Edible Crops

Flowers and Ornamentals

A number of growers are producing roses, gladioli, strelitzia, and other flowers for export to Europe during the winter months. Some use protected cropping systems. For specialist producers interested in the European market, Egypt offers a long tradition of established skills and a good horticultural infrastructure.

Nursery Stock

Some growers have developed a substantial trade in producing trees, shrubs, and ground-cover plants for the massive urban development programs in the Kingdom of Saudi Arabia and in the Gulf. The freight charges to the Kingdom are relatively low, especially in comparison with the west coast of the U.S.A., which is also growing materials for these projects.

The Egyptian nurseries have not, in general, learned the mass-production and quality-control skills known to the U.S. industry.

It is possible that American nurserymen who have export contracts for the Middle East could consider partnerships with Egyptian producers.

Opportunities for Seed Production

There is a large market for agricultural and horticultural seeds in Egypt, and opportunities exist for investment in either seed importation and distribution or in production. In the latter, the possibility of producing seeds in Egypt for export elsewhere should not be overlooked.

Considerable work is being done by the government on plant research, varietal testing, seed production, and distribution. In addition, U.S. AID, FAO, and

other international groups are contributing their efforts in this field.

An increasing amount of seed is being imported. The use of hybrid seed corn, which was introduced into Egypt in 1978, is growing rapidly. By 1985, about one-third of the corn planted is expected to be hybrid. A U.S. company, Pioneer Hybrid, has formed a joint-venture company under Public Law 43 to import, produce, and distribute hybrid corn. Other U.S. companies have been investigating opportunities for taking a more active role in seed production and distribution.

An Egyptian private company, CENTECH, is involved in a variety of agricultural projects and holds agency agreements for a number of agricultural inputs. It has undertaken large-scale trials with grain sorghum as a replacement for berseem clover forage and is also developing berseem seeds for export to Europe. In addition, it has been experimenting with other seeds and plans to introduce tissue-culture techniques.

Animal Products

Egyptians consumed over 4 million MT of meat and dairy products in 1980. About one-third of this was imported. By the year 2000, as both population and

per capita consumption expand, close to 7.5 million MT will be consumed.

To virtually eliminate imports and still increase per capita animal protein intake by 50 percent, the government is encouraging and assisting private business to expand production threefold by the end of the century. Table 5-4 indicates the 1980 Egyptian production, imports, and consumption of meat and dairy products. It also shows projections for the year 2000. The data in the table is adapted from Sector Survey 2: Production and Processing of Egyptian Livestock, Poultry, and Fish. That survey discusses markets and opportunities in considerable detail not to be repeated in this report.

Table 5-4

CONSUMPTION OF MEAT AND DAIRY PRODUCTS IN EGYPT, 1980 AND PROJECTED 2000

Item	Year 1980			Projected Year 2000		
	Egyptian Production (000 MT)	Imports (000 MT)	Consumption	Per Capita Consumption	Total Egyptian Consumption	Per Capita Consumption
Red Meat						
Beef & Buffalo	272	80	352	8.4	588	8.4
Sheep & Mutton	63	13	76	1.8	126	1.8
Poultry Meat	128	76	204	4.9	700	10.0
Fish	168	130	298	7.1	700	10.0
Total Meat	631	299	930	22.2	2,114	30.2
Eggs	79	2	81	1.9	310	4.4
Milk	1,860	1,140	3,000	71.8	5,040	72.0
TOTAL	2,570	1,441	4,011	95.9	7,464	106.6

Source: Chase Trade Information Corporation.

6. SOME PROPOSED INTEGRATED AGRIBUSINESS PROJECTS

Specific opportunities exist in regions of the country for integrated agribusiness projects on newly reclaimed land or on previously reclaimed land now operated by state companies. Several such opportunities are briefly described in this chapter. These are examples of projects for which foreign management, technology, and equity are desired. In most cases, the potential government partner has made some preliminary appraisals of how the land might be utilized and how much it would cost for development. Also, most proposed projects suggest schemes for food processing and distribution. All such suggestions are preliminary and subject to the results of feasibility analysis.

South New Valley

Size: 1.3 million feddans

Location: South of New Valley between Lake Nasser
and Sudan border

Egyptian Interest: Ministry of Housing and Land
Reclamation

Estimated Total Cost: \$3.5 billion

The Ministry would like to establish several joint ventures to develop this vast area in upper Egypt,

initially through three pilot projects. As indicated previously, the Ministry's goal is to develop about 60,000 feddans by 1985 (Table 3-2, page 36) and another 325,000 by the year 2000.

A prefeasibility study for developing this region was prepared by an international mission. This was followed by a more detailed study by Hawaiian Agronomics Company (International), which decided not to pursue the project itself.

East of the Nile Delta

Size: 600,000 feddans

Location: Between the Suez Canal and the Nile Delta

Egyptian Interest: Ministry of Housing and Land
Reclamation

Estimated Total Cost: L.E. 2.1 billion

This project is under construction. Technical feasibility work has been done for the Ministry, but no economic feasibility studies have been completed.

Farafra

Size: 50,000 feddans

Location: 500 kilometers south of Cairo in the New
Valley

Egyptian Interest: Ministry of Housing and Land
Reclamation

Estimated Total Cost: L.E. 90 million

This project is aimed at producing fruits, vegetables, and fodder, with associated fruit drying, vegetable canning, and dairy facilities. A prefeasibility study has been conducted.

West Nubariya:

Size: 10,000 feddans

Location: 75 kilometers southwest of Alexandria

Egyptian Interest: Ministry of Housing and Land
Reclamation

Estimated Total Cost: L.E. 26 million

This is one of several projects the Ministry is encouraging for growing alfalfa on new lands for the extraction of green protein. The proposed output would be 300,000 MT per year of alfalfa, from which the facilities would produce 10,000 MT per year of protein and 80,000 MT per year of alfalfa meat or pellets.

Fayoum

Size: 6,000 feddans

Location: Fayoum Governorate

Egyptian Interest: Fayoum Governorate

Estimated Total Cost: L.E. 31.5 million

This is a venture for the integrated production and processing of 25,000 MT per year of frozen and canned fruits and vegetables.

In a July 1981 report by the Agricultural Development Consultants Association, Nippon Koei Co., Ltd., a more comprehensive plan to rehabilitate old land and reclaim new land was proposed. This would involve:

- o Supplementing irrigation water to 23,000 feddans lying along the downstream reach of the Tushka Canal in the New South Valley
- o Developing about 9,000 feddans of desert by using the increased flow of the Tushka
- o Cutting down the inflow to Lake Qarun and restoring the inundated areas on its beach

El Tal Il Kebeer

Size: 5,000 feddans

Location: El Tal Il Kebeer in Ismailia and Sharkia Governorates

Egyptian Interest: General Authority for Endowment

Estimated Total Cost: L.E. 12.6 million

This proposed project involves vertically and horizontally integrated production and processing facilities for fruits and vegetables and dairy products. A poultry operation might be added for an additional L.E. 9.9 million for the annual production of 60 million eggs and 1.2 million broilers.

The projects are high-priority items for the General Authority. However, no feasibility studies have been initiated.

Ismailia

Size: 3,000 feddans

Location: Ismailia

Egyptian Interest: Ismailia Governorate and Edfina Co., a government food-processing company

Estimated Total Cost: L.E. 17.9 million

This project proposes to grow and process fruits and vegetables. It includes the establishment of processing facilities with the capacity to produce up to 11,000 MT per year of canned and frozen foods.