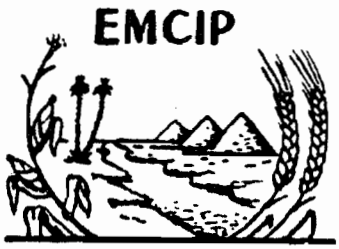

Ministry of Agriculture
Government of Egypt
Cairo, Egypt

Consortium for International Development
5151 E. Broadway, Suite 1500
Tucson, Arizona 85711 U.S.A.

New Mexico State University
Las Cruces, New Mexico 88003 U.S.A.

United States Agency for International Development
U.S. Embassy, Cairo, Egypt

Research Report

WHEAT ECONOMICS IN EGYPT

by

Dr. ABDEL-MAWLA M. BASHEER
PROGRAM LEADER
ECONOMICS & STATISTICS

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ABREVIATIONS

f	Feddans
mf	Million feddans
t	Tons (metric)
mt	Million tons
t/f	Tons per feddan

CONVERSION FACTORS

1 Feddan = 1.04 acres = 0.42 ha

To convert yields to tons / ha, multiply by 2.38

WHEAT ECONOMICS IN EGYPT

By
Dr. A.M. Basheer
Agricultural Economist

I. Potential Wheat Production and Consumption in Egypt in 2000

Bread has an important place in the Egyptian diet. Wheat is the major cereal used in making bread by the urban population but the rural people mix wheat with maize and other cereals to make flour for their bread. High bread consumption results in one of the highest caloric intakes for any country in the world, an average per capita exceeding 3,500 calories per day, and one of the highest vegetable protein intakes, an average per capita exceeding 85 grams per day. Wheat provides about one third of the caloric intake and slightly less than half the vegetable protein intake. Maize and sorghum combined provide about one fourth of the average per capita intake of both calories and vegetable protein. In 1981, total annual consumption of wheat was 7.2 million tons compared with 6.8 million tons for other cereals combined (4.5 million tons of maize, 1.5 million tons of white rice, 0.65 million tons of sorghum and 0.10 million tons of barley).

Over the past 20 years, changes in million tons were as follows:

Wheat Consumption: 2.8 in 1960 to 7.2 in 1981 or a 157% increase.
Wheat production: 1.5 to 1.9 or a 29% increase.
Wheat imports, including flour: 1.2 to 5.2 or nearly a 5-fold increase.

The share of wheat imports in wheat consumption increased from 46% in 1960 to 73% in 1981.

In the paragraphs that follow, factors that relate to consumption of wheat are discussed first. Long-term factors relating to area, yield per feddan, and production of wheat are considered next. Historic imports and related price and subsidy aspects are then reviewed. These components are combined to indicate the likely extent to which Egypt can achieve self-sufficiency in wheat in the target year 2000 under alternative assumptions.

A. Trends and factors relating to consumption

Total wheat consumption has increased in part because of an overall population growth of about 2.5% per year. However, annual per capita consumption of wheat increased from 108 kg in 1969 to 136 kg in 1973 and 167 kg in 1981. The annual rate of increase was 1.8% in 1960-1973 and 2.6% in 1973-1981, giving an overall average for the 20-year period of 2.1%. Increasing per capita consumption reflects mainly (a) population shifts from rural to urban areas, (b) the increase in per capita income, and (c) the subsidized low price of wheat bread and flour.

In 1960-1981, total population increased from 25.8 to 43.5 million or by 69%. Urban population more than doubled, increasing from 9.5 million to 20 million. The proportion of urban to total population increased from 37 to 47%.

Long-term projection of future needs of wheat for the Egyptian population is not an easy task. Estimates for past and present levels of total and per capita wheat consumption in urban and rural areas differ. A number of projections also exist for the future size and distribution of population. Difficulties exist in estimating income and price elasticities and present and future income and per capita income for urban and rural populations. Other important factors include future international and local prices and price relationships of wheat to other cereals, other starchy foods and other food commodities, reduction of waste in wheat and bread use, changes in bread technology, the modernization of bakeries and the baking industry, changes in food habits and nutritional targets.

Different projections of future wheat requirements, under different assumptions and with widely different results, have been made by the Ministry of Supply and others. Presented here are rough estimates and projections of wheat grain consumption requirements for the urban and rural population in 1981 and 2000:

Item	1981			2000		
	Urban	Rural	Total	Urban	Rural	Total
Population, millions	20	23	43	37	29	66
Per capita Consumption, Kg/year	210	130	167	215	150	188
Total Consumption, million tons	4.2	3.0	7.2	8.0	4.4	12.4

These estimates assume that between 1981 and 2000 total population will increase from 43 to 66 million or by 53% at an annual rate of 2.3%. Urban population is expected to increase from 20 to 37 million at an annual rate of growth of 3.3% and its share in the total population will increase from 46 to 56%. Rural population is expected to increase from 23 to 29 million or by 26% at an annual rate of growth of 1.1% and its share in the total population will decline from 54% to 44%. The expected increase in total wheat consumption of 5.2 million tons is about equal to the present annual wheat imports or two and a half times the present local wheat production.

B. Trends and factors relating to production

Wheat area of 1.4 million feddans in 1981 accounted for:

1. 24% of the 5.8 million feddans in the total cultivated area in the old land.
2. 12.5% of the 11.2 million feddans of the total cropped area.
3. 29% of the 4.9 million feddans of cereal crops as compared to maize, 39%; rice, 20%; sorghum, 10%; and barley, 2%.

The area in wheat depends mainly on (1) land used for cotton and (2) that used for other winter crops, of which the most important is full-term berseem clover. In million feddans, wheat area declined from 1.45 in 1958-1960 to 1.39 in 1961-63 to 1.28 in 1964-1970. During 1964-1973, the area of full-term clover increased from 1.13 to 1.59 million feddans, with a concurrent reduction in area for wheat, cotton and faba beans. Wheat area in 1973 was 1.25 million feddans. During 1974-1981, the area of cotton declined significantly, the area of full-term clover continued to expand, and the area in wheat increased to 1.39 million feddans in 1974-1975 and remained at about that level in 1981.

Average yield per feddan of wheat grain was 1.0 ton in 1958-1960 and 1.1 tons in 1961-1963 and 1964-1970. In 1971-1973, yields increased to 1.35 tons, reflecting wide use of Giza 155, a new high-yielding variety. Yields averaged 1.4 tons in 1974-1978 and 1.35 tons in 1979-1981.

Production reflects both area and yield per unit of land. Wheat production in million tons averaged 1.48 in 1958-1963, fluctuated around 1.4 in 1964-1970, rose to 1.82 in 1971-1973, and reached 1.94 in 1981.

In addition to grain, wheat straw is an important animal feed. Production of wheat straw in million tons increased from 2.26 in 1960 to 2.82 in 1975 and 2.98 in 1981. Value of wheat straw in 1981 exceeded that for grain for the first time.

The present area in wheat in the old land of 1.4 million feddans might be expected to remain unchanged under the present crop rotation in 2000. If present cotton varieties could be replaced by those of shorter staple that could be grown after the harvest of winter crops and consequently short-term clover could be dispensed with, a new 2-year crop rotation might emerge consisting of wheat, occupying half of the total area, with full-term clover and other winter crops occupying the othor half. Under this crop rotation, the area under wheat on old land would be about 2.5 million feddans. Wheat production at the present yield level would then increase to 3.5 million tons, exceeding the production from the present area by 1.5 million tons or 77%. Reclaimed land may reach 3 million feddans by 2000. If so, this could add another half million feddans or more to the wheat area. If the present reclaimed land wheat yield remained unchanged, however, the production contributed from this source would be limited.

At present, wheat yields in Egypt are higher than those in any of the ten largest wheat producing countries except France (table 1). Most of the wheat areas in these countries, however, are under uncertain rain-fed agriculture, some are subject to winter frost damage, and most have less fertile soil in comparison with Egypt. Most European countries have wheat yields that are much higher than that of Egypt (table 2). Based on the 1976-78 yield average, the Netherlands had the highest wheat yield of 5.7 tons per ha, exceeding the wheat yield in Egypt of 3.3 tons by 72%. The United Kingdom, France, Federal Republic of Germany and other European countries had wheat yields exceeding that of Egypt by 22-39%. Wheat yield in Mexico exceeded that of Egypt by 7.6%.

EMCIP wheat production demonstration plots in 65 Districts in eight Egyptian governorates in 1981 showed that wheat yield could be increased by 58% on the average, in one year, with wheat varieties recently released by researchers by applying recommended cultural practices transferred to farmers by extension service personnel. Adding expected results of serious breeding efforts for producing new high-yielding varieties, doubling the

present wheat yield in Egypt before the year 2000 should be a modest objective. Its realization, however, requires serious efforts and close coordination of both research and extension and the solution of other problems of infrastructure, price policy, and organization in Egyptian agriculture. If the average wheat yield should increase to twice the present level and the area under wheat could economically expand to 3.0 million feddans in the old and new land, local wheat production would exceed 8.0 million tons by 2000, or more than four times its present level.

C. Imports, consumer subsidies and prices received by farmers

Imports of wheat and wheat flour in million tons increased from 2.0 in 1963 to 3.0 in 1973 to 5.2 in 1981. Import value increased more rapidly because, after 1973, world inflation and strong world demand for major cereals boosted import prices. The import price per ton of wheat rose from L.E.37 in 1973 to L.E.103 in 1974, L.E.125 in 1979 and L.E.146 in 1980. Total value of wheat and flour imports in million L.E. increased from 66 in 1973 to 262 in 1974 and reached 667 in 1979 and 732 in 1980, or over eleven times the 1973 level.

To curb inflation and reduce the cost of living for the urban population, the Egyptian Government absorbed the increase in the import price of wheat and subsidized the consumer price of wheat bread and flour. This wheat subsidy in million L.E. increased from 79 in 1973 to 691 in 1980 and 790 in 1981/82. However, grain prices received by farmers tend to be low relative to production costs such that farmers are more concerned with straw output than they are with grain output.

D. Potential required imports in 2000

Based on the most optimistic of the above assumptions, and realizing that they depend in part on solutions to problems of infrastructure, price policy, and improved organization in Egyptian agriculture, wheat imports in 2000 could be reduced from the present level by about 20% and the self-sufficiency rate of wheat could be increased from the present level of 27% to 64%. If both the present area and yield of wheat remain constant, wheat imports in the year 2000 might reach 10 million tons or double the present level.

II. Changes In the Area Under Wheat, 1950-1981

The area in wheat fluctuated greatly through the period 1950-1980, with an average of 1.40 mf* (tables 3 and 4). In 1950-1952, the area in wheat averaged 1.42 mf. In the two exceptional years 1953 and 1954, the area in wheat increased to 1.79 mf due to a Government policy that aimed at self-sufficiency in wheat. The increase in the area of wheat caused an equal decline in the area of cotton. The aim of self-sufficiency in wheat, therefore, was discontinued. The average annual area of wheat was 1.54 mf in 1955-1957, 1.45 mf in 1958-1959 and 1.41 mf in 1960-1963. From 1964 to 1973 an expansion of the area in full-term clover resulted in a decline in the area of wheat, cotton and faba beans. While there was an expansion from 1974 to 1981 in the full-term clover and wheat areas, this was associated with a further decline in the cotton area. Thus, the wheat area declined to an average of 1.28 mf in 1964-1973 and increased to 1.37 in 1974 and 1.39 mf in 1975 and 1976. It declined sharply to 1.21 mf in 1977; 1.39 mf in 1978 and 1979; declined to 1.33 mf in 1980 and increased to 1.4 mf in 1981.

III. Changes In Wheat Yield, 1950-1981

The average yield per feddan of wheat grain increased from 0.78 ton in 1950-1952 to 1.38 tons in 1981, an increase of 0.60 ton or 77% in 30 years. The average annual rate of increase was 1.92%. Yield increments were 0.21 ton or 35% of the total increase in 1950-1956, 0.11 ton or 18% in 1957-1969, 0.28 ton or 47% in 1970-1973, but no increase during 1974-1981.

In breaking down the trend in yields per feddan of wheat grain further, the increase in yield from 0.78 ton in 1950-1952, 0.96 ton in 1954 and 0.99 ton in 1956 shows a yield increase of 0.21 t/f or 27% in five years. No increase in yield took place in 1957-1959. The yield per feddan increased to 1.03 tons in 1960, 1.10 tons in 1962 and 1.14 tons in 1966, an increase over the seven years from 1959 to 1966 of 0.15 ton/feddan or 15%. The yield declined to 1.04 t/f in 1967-1969.

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* See "Abbreviations", p. iii.

The increase in wheat yield during 1950-1969 amounted to 0.32 t/f or 41% of the low 1950 level. This yield increase could be attributed to increased use of nitrogenous chemical fertilizers and to a limited varietal improvement. In that period, the rate of nitrogenous chemical fertilizer per feddan of wheat was more than doubled and a number of improved wheat varieties were introduced.

The yield of wheat grain per feddan increased from an average of 1.1 tons in 1962-1969 to 1.16 tons in 1970, 1.28 tons in 1971 and 1.38 tons in 1972-1973. Thus, in the four years 1970-1973, wheat yield per feddan increased by 0.28 ton or by 25%. This yield increase was attributed to the wide coverage of the then new high-yielding wheat variety, Giza 155. The area in this variety increased from 31,000 f in 1968 to 1.24 mf in 1971 or 92% of the total area of wheat.

No improvement in the average yield of wheat took place in 1974-1981. The average yield per feddan was 1.41 tons in 1974-1978 and declined to 1.36 tons in 1979-1981. The period 1974-1981 witnessed the introduction of new-varieties besides Giza 155, especially the Mexican crosses, Giza 156 and Giza 157. These gave a slight increase in yield which compensated for a slight decline in the yield of Giza 155.

IV. Changes In Wheat Production, 1950-1981

Wheat production in Egypt increased from 1.1 million tons in 1950-1952 to 1.9 million tons in 1981. In that period of 30 years, wheat production increased by 833,000 tons or 75% at an average annual rate of growth of 1.9%. This increase in wheat production was due completely to the increase in wheat yield which increased by 77% in the same period, rising from 0.78 to 1.38 tons per feddan, while the area declined slightly from 1,423 to 1,399 thousand feddans or by 1.7%.

Throughout the period 1950-1981, wheat production change followed changes in both area and yield of wheat. As mentioned earlier, the two years 1953 and 1954 had extraordinarily large areas of wheat and, with a slight improvement in yield in 1954, that year had a wheat production of 1.73 million tons, a level that was reached again only in 1971 and was surpassed in 1973 from a smaller area and a higher yield.

Through the period 1955-1970, annual wheat production ranged between 1.4 and 1.5 million tons. The area of wheat ranged between 1.4 and 1.5 million feddans in 1955-1962 and declined thereafter. In three years, the area fell below 1.3 million feddans and production fell below 1.3 million tons.

The three years 1971-73 marked the beginning of a relatively higher level of wheat production due to the realized increase in yield. Wheat production was 1.73 and 1.84 million tons in 1971 and 1973, respectively, although the area of wheat was relatively limited at 1.35 and 1.25 million feddans in the two years respectively.

In the last 8-year period, 1974-1981, the area of wheat increased to an average of 1.36 mf, yield per feddan averaged 1.39 tons and wheat production averaged 1.89 million tons compared with 1.84 million tons in 1973. In the two years 1977 and 1980, the area of wheat declined to 1.20 and 1.33 mf and wheat production declined to 1.7 and 1.8 million tons respectively. In the 5-year period 1974-1978, the area of wheat averaged 1.35 mf, yield per feddan averaged 1.41 tons and wheat production averaged 1.9 million tons. In the last three years, 1979-1981, the area of wheat averaged 1.37 mf, yield per feddan averaged 1.36 tons, and wheat production averaged 1.86 million tons (table 3 and 4).

V. Improved Wheat Varieties

Rusts are the most serious wheat diseases in Egypt. The most serious of these is stem rust, followed by stripe or yellow rust, and the least serious is leaf or orange rust. Since 1950, a number of rust-resistant and relatively high-yielding varieties have been bred in Egypt. These are soft, white, spring wheat though fall sown.

Tables 5 and 6 indicate areas and yields of the dominant wheat varieties through the period 1960-1981. In 1960-1968, eight varieties were dominant, namely Balady, Toson, Hindi Toson, and Giza varieties 139, 144, 145, 147 and 150. These varieties were localized, i.e. each one or two varieties were grown in a certain Region or in certain Governorates according to soil and weather conditions. Balady was grown mainly in Sohag, Qena and Aswan Governorates of Upper Egypt and in Sharqiya and Beheira Governorates of Lower Egypt. The two varieties Toson and Hindi Toson were concentrated in

Middle and Upper Egypt. Giza 139 and 144 were grown in Lower Egypt. Giza 145 was grown in Minofiya Governorate, Giza 147 was grown in Sohag Governorate and Giza 150 was grown in Assiut, Minya and Beni-Suef Governorates.

Variation in yields of these varieties reflect both varietal and locational differences. While Balady and Giza 139 had average yields per feddan of 1.0 ton, the average yields for Toson, Hindi Toson, and Giza 144 were 1.1 ton, but deteriorated to 1.0 ton before the end of the period. Giza 147 had an average yield of 1.2 tons, while Giza 145 and 150 had average yields of 1.3 tons. These three wheat varieties, however, had relatively limited coverage and were grown in areas having higher soil fertility.

In 1968-1972, the area in Balady variety declined significantly, while the other varieties mentioned above ceased to be grown by farmers and were replaced by the then new high-yielding variety Giza 155.

The wheat variety Giza 155 was released to farmers in 1967 and was grown in a limited area of 2,200 feddans which increased to 31,000 feddans in 1968. Coverage increased rapidly there after, and it was grown all over the country. In the three years 1969, 1970 and 1971, the area of wheat in Giza 155 increased to 357,000 f, 1.0 mf and 1.24 mf respectively. These areas represented 30%, 77% and 92% of the total area of wheat in these three years.

Giza 155 had an average yield per feddan of 1.30 tons in 1968, 1.24 tons in 1969 and 1970 and 1.31 tons in 1971 and 1972. Its yield reached 1.44 tons in 1973 and 1975 but that was mostly due to more favorable weather. The yield per feddan for Giza 155 averaged 1.36 tons in 1971-1978. In the last three years, 1979-1981, its yield declined to an average of 1.28 t/f, resulting in a decline in the overall average wheat yield.

The introduction and speedy coverage of Giza 155 increased the national average yield per feddan of wheat from its level of 1.1 tons in 1963-1969 to 1.38 tons in 1972-1973, an increase in this short period of 0.28 t/f or 25%. Except for 1974, Giza 155 occupied more than 80% of the total wheat area up to 1980; in 1981 its share declined to 48%.

In 1972, Giza 156 was released to be grown in Middle Egypt. Its area increased from 585 f in 1972 to 11,000 f in 1973 and to 98,000 f in 1974.

Its area declined there after, however, but increased again in 1981 to 90,000 feddans. Its yield is about equal to that of Giza 155, an average of 1.35 t/f in 1974-1976.

Work started in Egypt in 1962 for selecting the most promising Mexican varieties under Egyptian conditions. Thereafter a program for crossing the selected Mexican varieties with local varieties was implemented. Two semi-dwarf varieties, Mexipack and Chinab, were released to farmers in 1970 and were grown on 95 f. The area expended to 364 f in 1971, 4,400 f in 1972 and 67,100 f in 1973. The limited areas under these varieties were distributed over all Governorates and gave high average yields per feddan amounting to 1.73 tons in 1971 and 1972 and 2.05 tons in 1973. . These exceed yields of Giza 155 by 0.4 and 0.6 t/f, 31% and 42%, in the mentioned years respectively. Such a high yield level encouraged the Ministry of Agriculture to increase the area under Mexican crosses in 1974 to 507,000 f or 37% of the total wheat area, and the area under Giza 155 was reduced to 746,000 f. About two thirds of the expanded area in Mexican varieties was in Lower Egypt and one-third in Middle and Upper Egypt. Yield of Mexican varieties declined in that year, however, to an average of 1.54 t/f, which exceeded the yield of Giza 155 by 0.26 ton or 20% only. This limited yield increase was much less than needed to compensate farmers for the increase in fertilizers and irrigation and the care in harvesting required for Mexican varieties. Moreover, farmers did not like these varieties because of the dark color of the grain and the roughness of the straw that reduced its quality as animal feed. The area in Mexican varieties fell to 180,000 f in 1975 and 1976, increased to 300,000 f in 1977 and 1978 and declined to 109,000 f in 1979 and to 3,000 f in 1980. Yields were 1.70 t/f in 1975 and 1976, but fell to an average of 1.56 t/f in 1977-1980, compared with an average yield for Giza 155 of 1.31 t/f in the same period. The area of Giza 155 increased again after 1974 and occupied more than 80% of the total area of wheat in 1975-1980.

In 1978 two new wheat varieties were released to farmers, namely Giza 157 and Sakha 8. Giza 157 resulted from crossing Giza 155 with semi-dwarf varieties, while Sakha 8 resulted from crossing Giza 156 with semi-dwarf varieties. These two new varieties are, to a relatively large extent, free of the disadvantages existing in the previous two Mexican varieties concerning the color of grain and flour and the quality of straw as animal feed.

The area of Giza 157 increased from 3,000 f in 1978 to 45,000 f in 1979, 320,000 f in 1980 and 461,000 f in 1981. With such a speedy coverage, it occupied 24% and 33% of the total area in 1980 and 1981 respectively. It was grown in Lower Egypt except for the North Delta, Middle Egypt, and in Assiut and Sohag Governorates of Upper Egypt. The average yield for Giza 157 in 1979-1981 was 1.43 tons/feddan or 10% higher than the average yield for Giza 155.

The area for Sakha 8 increased from 8,000 feddans in 1979 to 98,000 feddans in 1980 and 143,000 feddans in 1981. Sakha 8 stands soil salinity and therefore is grown in Governorates of the North Delta having saline soil, namely Beheira, Kafr El-Sheikh, Dakahliya and Domyat. The average yield for Sakha 8 was 1.54 tons/feddan in 1979-1981. This was the highest yield compared with other varieties grown in the last three years. It was 18% higher than the average yield for Giza 155 and 8% higher than the average yield for Giza 157.

Sakha 61 variety was released to farmers in 1978. Its area in 1981 was 3,800 f only in Kafr El-Sheikh, Dakahliya and Beheira Governorates. Its yield was slightly less that that of Sakha 8. Another new variety, Sakha 69, was released in 1981 and occupied 100 f only.

In 1980, a durum variety named stork was released to farmers. Its area in 1980 was 52,000 f, mainly in Qena Governorate, and gave a low yield of 1.10 t/f. Its area declined in 1981 to 6,000 feddans grown in Fayum, Minya and Sohag and gave a high yield of 1.54 tons/feddan.

For the year 1981/82, it is expected that the area for Giza 157 will increase to 700,000 feddans and the area for Sakha 8 will be 300,000 feddans. The area for Giza 155 will decline to 300,000 feddans. About 100,000 feddans will be planted with Sakha 61, Sakha 69 and Stork.

VI. Potential Increase In National Average Yield Of Wheat

The trend of wheat grain yield through the past twenty-five years, 1957-1981, shows a slow and limited rate of increase. Yield increased from 0.99 t/f in 1956 to 1.38 t/f in 1981, increasing by 0.39 t/f or 39% at an annual rate of growth of 1.34%. Moreover, most of this increase in yield was

realized in the short period of 1970-1973 due to the introduction and spread of Giza 155 wheat variety.

Results of research plots on experimental farms and of expanded demonstrations in farmers' fields show, however, that wheat yield could be increased significantly with present wheat varieties and presently known scientific cultural practices. Yields on experimental plots exceed farmers' yields by 80% or more. The high potential increase in wheat yield in farmers' fields through serious and coordinated effort of research and extension has been recently proved by the results of the EMCIP wheat production demonstration program for 1980/81. A brief account of the program is given in the next section.

VII. Results Of EMCIP Wheat Production Demonstration Programs In Eight Governorates, 1980/81

The Egyptian Major Cereals Improvement Project (EMCIP) aims at increasing the yields of major cereals, wheat, maize, sorghum and barley, by 25% in five years, 1980-1984, through the coordination and development of research and extension. In the crop season 1980/81, EMCIP launched a research-extension program for the improvement of wheat yield. The program conducted wheat production demonstration plots in consolidated farmers' fields utilizing a package of research advice transferred to farmers by selected and trained District Agronomists. The program covered 6,363 small farmers having a total wheat area of 5,844 f located in 65 Districts of the eight Governorates covered by EMCIP (Dakahliya, Kafr El-Sheikh, Gharbiya, Menofiya , Beni-Suef, Minya, Assiut and Sohag). In each District, 100 small farmers, having a total of about 100 feddans to be planted in wheat, were selected and agreed to participate in wheat production demonstration plots. These were located in 2-3 villages in each District, with one group of small farmers having adjacent fields in each village. The small fields of each farmer comprised a relatively large consolidated demonstration plot. In addition to its importance for educational purposes, consolidated areas permit proper utilization of machinery in land preparation, irrigation, insect control, harvesting and threshing. Participating farmers grew wheat in their fields following recommended agronomic practices. They were visited regularly by a District Agronomist who provided them with recommended cultural practices, detected arising problems, and

initiated appropriate action. A committee for supervising the work in each Governorate was formed, headed by the Under-Secretary of Agriculture in the Governorate. The research staff formulated the recommended cultural practices and cooperated with the extension staff in program implementation. The recommended cultural practices included tractor plowing for better seed-bed preparation, planting wheat in November (three weeks earlier than normal), using certified seed of a recommended high-yielding variety, use of P_2O_5 fertilizer (not used previously), and other advice concerning the method of planting, number and dates of irrigation, time and method of fertilization, insect control, and harvesting date. Incentives to farmers of L.E.20 per feddan were furnished to cover seedbed preparation, seed, increased fertilizers, required use of insecticides and extra labor at harvest.

At the time of harvest, wheat yields were estimated in each village for randomly-selected areas in both the demonstration plots and for comparison fields out of the demonstration plots. These yield estimates were made by the Statistical Sampling Department of the Ministry of Agriculture. Results of these yield estimates are presented in table 7. The average yield of wheat grain per feddan for the eight Governorates was 2.30 tons in EMCIP demonstration plots and 1.45 tons in comparison fields; the former outyielded the latter by 850 kg per feddan or 58%. The increase in wheat yield per feddan in the demonstration plots over that in comparison fields ranged from 795 to 866 kg in Garbiya, Minufiya, Minya and Assiut Governorates. The lowest increase was 620 kg or 34% in Kafr El-Sheikh and 718 kgs or 43% in Dakahliya Governorates. The highest increase in yield was 1,220 kgs or 93% in Beni Suef and 921 kgs or 84% in Sohag Governorates. The average yield of wheat straw per feddan for the eight Governorates was 2.86 tons in the demonstration plots and 2.18 tons in the comparison fields; the former outyielded the latter by 680 kg or 31%. The increases in the yield of wheat grain and straw were realized in one season at very low costs. The program proved that the close coordination and serious efforts of research and extension could increase significantly wheat yield, production, farmers' income and national income.

The realized increase in yield per feddan in the demonstration plots of 850 kg of grain and 680 kg of straw means an increase in gross income per feddan of L.E.68 from the increase in grain yield and L.E.32 from the

increase in straw yield or a total of L.E.100 per feddan. The average increase in the production cost per feddan incurred by the farmer participating in the demonstration plot was estimated at L.E.35 or about 33% of the total production cost excluding land rent. Consequently, the increase in his net farm income was L.E.65 per feddan or about 50%. From the viewpoint of the national economy, the total increase in gross income per feddan would rise to L.E.155, instead of L.E.100 on the farmers' level, because of the higher level of the import price in relation to the local price per ton of wheat. The increase in the production cost per feddan might rise to L.E.45 including an administrative cost added to the abovementioned increase in cost incurred by the farmer. Consequently, the increase in net farm income per feddan for the national economy would be about L.E.110 per feddan. The EMCIP 1980/81 demonstration program covered 5,844 f of wheat. The net benefit of the program from this area was L.E. 380 thousand to farmers plus L.E.263 thousand to the Government or a total of L.E.643 thousand to the national economy. That was a demonstration program however. If the same increase in wheat yield and net benefit per feddan could be realized on the total area of 1.4 mf of wheat, the national wheat grain production would be increased by 1.2 million tons or 58%. It would increase national production of wheat straw by 0.95 million tons or 31%, and national income would increase L.E.154 million per year. There would also be a saving in foreign currency resulting from substituting 1.2 million tons of imported wheat grain by the increase in local wheat production.

The above shows that yield of wheat likely could be increased by more than 50% through improved cultural practices transfered to the farmers by well-organized and trained extension personnel. This would require solving other agricultural problems, especially the provision of adequate superior seed and other supplies at the proper time; increasing the availability of agricultural machinery; improving irrigation, drainage and soil fertility; and the breeding of new high-yielding wheat varieties. The doubling of the present wheat yield before 2000 should be a feasible objective if all of these problems can be solved.

VIII. Wheat Straw Production

Wheat straw is a principal animal feed in Egypt. While berseem clover,

the principal green animal fodder, is available from December through May, green fodder is very scarce in the second half of the year from June to November, and farm animals are fed mainly on wheat straw and feed concentrates.

Average yield of wheat straw per feddan increased from 1.55 tons in 1960 to 1.80 tons in 1964-1970, 1.93 tons in 1973, 2.02 tons in 1975 and 2.15 tons in 1980-1981. The increase in straw yield was 0.35 t/f or 19% during 1970-1981. The amount of wheat straw produced with one ton of grain production was 1.55 tons in 1970, 1.38 tons in 1975 and 1.55 tons in 1981 (table 8).

Production of wheat straw was 2.4 million tons in 1970-1973. It increased, due to the increase in the wheat area and the straw yield, to 2.8 million tons in 1978-1979 and to 2.9 million tons in 1980-1981. The increase in wheat straw production during 1970-1981 was 0.6 million tons or 27%.

IX. Potential Future Changes In the Area Under Wheat

Wheat, full-term clover, and cotton compete with each other for the cultivated land area. An expansion in the area in any one of these crops for the most part is at the cost of a decline in the area of the other crops. This was reflected in the changes of areas of the three crops in 1960-1981 (table 9). The area of full-term clover expanded greatly in 1965-1973 at the cost of a sharp decline in the area in cotton and a decline in the area in wheat. In 1973-1978, the area in full-term clover continued to increase and the area in wheat increased at the cost of a further decline in the area in cotton. In 1978-1981, some stability took place in the areas of the three crops.

The area in full-term clover increased from 1.18 mf in 1965 to 1.24 mf in 1966, 1.48 mf in 1967 and 1.59 mf in 1971-72. The area in cotton declined from 1.90 mf in 1965 to 1.86 mf in 1966, 1.63 mf in 1967 and 1.55 mf in 1971-72. The area in wheat declined from 1.45 mf in 1962 to 1.14 mf in 1965, 1.29 mf in 1966, and 1.24 in 1967 and 1972-1973.

In 1973-1978, the area in full-term clover increased from 1.59 to 1.79 mf, the area in wheat increased from 1.25 to 1.38 mf and the area

in cotton declined from 1.60 to 1.19 mf. During 1978-1981, the area in wheat averaged 1.39 mf, the area in full-term clover averaged 1.76 mf and the area in cotton averaged 1.2 mf. Between 1960 and 1981, cotton and full-term clover almost changed places in terms of area occupied while the area in wheat declined slightly.

It is evident that changes in the area of wheat was associated with opposite changes in the area of cotton in many years. This was the case in 1961, 1962, 1965, 1968, 1969, 1971, 1973-1975, 1977-1978 and 1980-1981.

In the last four years, 1978-1981, the average yield of cotton increased by one third of its previous level, bringing about a similar increase in cotton production. This resulted in an annual increase in the amount of extra-long and long-staple cotton available for export from 3 to 4 million kentars. This increase, however, could not be exported, presumably because of a slack international demand, and stocks accumulated. Consequently, Government policy favored a decline in cotton area in 1982 to 1.1 mf compared with 1.18 mf in 1981. This decline in the cotton area is expected to bring about a decline in the short-term clover area and an increase in the wheat area of 50,000 f, thereby increasing the area in wheat in 1982 to 1.45 mf. It should be mentioned, however, that the present low-farm-gate price of wheat grain does not encourage farmers to increase the area of wheat.

As mentioned earlier, the area in full-term clover increased from 1.18 mf in 1960 to 1.71 mf in 1973 and to 1.76 in 1981. With respect to short-term clover, which precedes cotton, its area declined from 1.28 mf in 1973 to 1.02 mf in 1981 at the same time that the area in cotton declined from 1.60 mf to 1.18 mf respectively. The question is often asked, "Is it economical to devote 2.8 million feddans out of Egypt's scarce cultivated land for full-term and short-term clover to feed animals of low productivity in meat and milk production?" The use of cows and buffalos in land preparation, irrigation and threshing has been replaced to a large extent by tractors, irrigation pumps and threshing machines. The area in clover continued to expand, however, because of the sharp increase in the demand for meat and milk and the resulting sharp increase in clover's prices and profitability to farmers. This situation is

expected to persist in the future in spite of the recent increase in meat, milk and fish imports and the local production expansion in poultry, eggs and fish. Therefore, a future decline from the present area of full-term clover and a consequent increase in the area of wheat from this source cannot be expected in the near future.

Under the present crop rotation, wheat and dry broad beans cannot replace short-term clover because the growing season of these winter crops is longer than the duration of short-term clover. The latter ends before March, which is the planting month for cotton, while winter crops are not harvested before the end of May. The present Egyptian extra-long and medium-long staple cotton varieties require a growing season of seven months, March to September. In 1980 and 1981, the Academy of Science and the Ministry of Agriculture in Egypt have experimented with short-growing-season and short-staple cotton varieties whose lint-length is satisfactory for manufacturing the textiles needed for local consumption. These varieties require a growing season of four months and could be planted in June following the harvest of wheat and other winter crops.

If the short-growing-season cotton varieties proved to be technically and economically superior to the present cotton varieties and the former replaced the latter, wheat could be grown before cotton in place of short-term clover. A new crop rotation or cropping pattern could emerge allowing a significant expansion of the wheat area. If this cotton varietal replacement took place in all of the present cotton area, the resulting increase in the area of wheat over its present area would equal the present area of short-term clover of about one million feddans. The annual area of wheat could increase to 2.4 mf, increasing by 1.0 mf or 42%.

Experiments during the last two years gave conflicting results on yields of the short-growing-season cotton varieties in Egypt. Experiments will be repeated in the 1982 season and perhaps in two more coming seasons before definite conclusions are obtained. Another issue that should be settled is the suitability of the lint of the new cotton varieties for the present yarn and textile machinery and the adaptations that might be needed in the machinery. The mechanical harvest of both wheat and cotton would be necessary for the proposed change.

X. Areas of Wheat And Other Winter Field Crops, Average 1975-1979

In the 5-year period 1975-1979, the area of wheat averaged 1.35 million feddans, production of wheat averaged 1.9 million tons and wheat yield averaged 1.4 t/f. Of this total, Lower Egypt accounted for 57.2% of the wheat area, 58.6% of wheat production, and wheat yield was 2.1% higher than the national average. Middle Egypt accounted for 17.1% of the wheat area, 17.7% of wheat production, and wheat yield was 3.6% higher than the national average. Upper Egypt accounted for 25.7% of the wheat area, 23.7% of wheat production, and wheat yield was 7.9% lower than the national average (table 10).

In the same period, the total area of winter field crops averaged 4.76 mf. The principal winter field crops, in terms of area occupied, were in descending order, full-term clover, wheat and short-term clover. Other winter crops include broad or faba beans, barley and "other" crops (flax, lentils, fenugreek, onions, chick peas, lupins and aromatic and medicinal crops). These winter field crops compete with each other for available land and other agricultural resources. Cotton, although considered a summer crop, enters also into this competition. Short-term clover precedes cotton but the area of the former is usually less than the area of the latter because some other winter field crops, such as onions, faba beans and vegetables, also precede cotton in some villages. In 1975-1979 the average annual area in cotton was 1.28 mf, exceeding short-term clover by 0.21 mf or 20%. Cotton, therefore, might be mentioned, instead of short-term clover, when analysing the competitive situation of winter field crops. Within the present dominant crop rotation, full-term clover, wheat and cotton are three major crops competing with each other for the land and other production resources (see tables 11 and 12).

In 1975-1979, the average annual area of winter field crops, excluding short-term clover, plus the area in cotton was 4.97 mf.

Out of this total, the land was occupied as follows (table 11):

1. Full-term clover, 1.73 mf or 34.8%.

2. Wheat, 1.35 mf or 27.1%.
3. Cotton, 1.28 mf or 25.8%.
4. Broad beans, 0.26 mf or 5.2%.
5. Barley, 0.10 mf or 2.1%.
6. Other winter crops, 0.24 mf or 4.9%.

The shares of these crops varied in the main Egyptian regions as follows:

1. Lower Egypt

   A high percentage of its area in clover, 40.1%; relatively low percentage in wheat, 24.7%; relatively high percentage in cotton, 27.6%;broad beans, barley and other crops, 7.6%.

2. Middle Egypt

   Full-term clover area, 32.6%; wheat, 23.1%; cotton, 25.4%; broad beans, 11.1%; barley, 1.3%; and other crops, 6.5%.

3. Upper Egypt

   Low percentages of the area in cotton, 19.4% and clover 17.2%; high percentage in wheat, 42.0%; faba beans, 7.7%; barley, 1.6%; and other crops 12.1%.

XI. Area And Production Of Wheat by Governorates, Average 1975-1979

Table 14 gives a classification of Egyptian Governorates into five groups according to wheat production based on averages for the period 1975-1979. Sharqiya and Dakahliya are the largest wheat producers among Egyptian Governorates. The two Governorates combined had 22.7% and 23.6% of the total area and total production in wheat. The second group includes six Governorates, namely Beheira, Sohag, Gharbiya, Minya, Assiut and Kafr El-Sheikh. They had 45.9% and 46.2% of the total area and total production in wheat. The third group includes three Governorates, namely Qena, Minofiya and Fayum. These had 19.1% and 18.4% of the total area and the total production in wheat. The fourth group, Beni-Suef, Qalyubiya, Giza and Aswan, had 10.2% and 9.9% of the total area and the total production in wheat. The fifth group includes four Governorates which are the smallest in terms of total agricultural area and in terms of wheat production. These are Domyat, Ismailiya, Alexandria and Suez. They had 2.1% and 1.9% of the total area and total production in wheat respectively.

The areas in wheat in the Governorates are affected by the total cultivated area, the total area in field crops, and the areas of competing crops, mainly full-term clover, cotton and, in some Governorates, broad beans and other crops. In most cases, there is a positive correlation between the total cultivated area, the total area of field crops, and the area in wheat. Most Governorates in Lower and Middle Egypt had low shares of land in wheat (20-25%) and high shares in full-term clover (38-45%). A few of these had relatively high shares in cotton (30-34%) and a few others had relatively high shares in faba beans and other crops. Sharqiya, Minofiya, Qualyubiya, Fayum and Assiut had larger shares of their areas in wheat (27-30%) and lower shares in clover and/or cotton. Sohag, Qena and Aswan Governorates had the highest share of the total area of field crops in wheat (45%, 61% and 61% respectively) and low shares in full-term clover (18%, 12% and 19%). The share of cotton was 25.0% in Sohag, 1.0% only in Qena, and no cotton was grown in Aswan.

XII. Wheat Yield by Governorates, Average 1975-1979

Overall wheat yield averaged 1.4 ton/feddan in 1975-1979. Yield averages in the Governorates ranged from 1.64 to 0.97 t/f. Table 15 classifys Governorates into five groups according to wheat yield based on yield averages of 1975-1979. The highest yield group includes five Governorates, namely Qualyubiya, Minya, Minofiya, Assiut and Gharbiya. These had a group yield average of 1.55 t/f, 11% higher then the national yield average. Total wheat area was 29% and production was 32%. Sharqiya and Dakahliya Governorates, the largest wheat producers, and Giza Governorate were in the second yield group with a group yield average of 1.45 t/f, 3.6% higher than the national yield average. These accounted for 24.2% and 25.2% of the total area and total production of wheat. The third yield group includes six Governorates, four of which are relatively large wheat producers, namely Fayum, Kafr El-Sheikh, Beni-Suef and Beheira, and two small Governorates, Suez and Domyat. The six Governorates had a group yield average of 1.33 t/f, 5.0% lower than the national yield average. They had 26.6% and 25.3% of the total wheat area and production respectively. The fourth and fifth yield groups include

two relatively large Governorates, Sohag and Qena, and three small Governorates, Ismailiya, Aswan and Alexandria. These had group yield averages of 1.26 and 1.15 ton/feddan, which were 10% and 12% lower than the national average. The five Governorates had 20.2% and 17.4% of total wheat area and production respectively.

Most of the Governorates in the last three yield groups have salty and/or sandy soils. Improvement of drainage and other soil improvement measures are important for yield improvement. The Sakha wheat variety can stand relatively high soil salinity and has been recently introduced to the North Delta. Minya and Assiut Governorates are in the highest yield group, while Sohag, Qena and Aswan, affected by higher temperature, are in the lowest yield group. Detailed research and farm system surveys and analysis are needed to determine technological, economic and social constraints and to develop improvement measures.

XII. Government Wheat Policy

Government wheat policy became active in 1940 at the beginning of the Second World War. At that time, the Government was interested in increasing local wheat production and procuring part of that production for use by Allied troops stationed in Egypt during the war period. To realize this objective, the Government applied three measures:

(1) Fixing a minimum limit to the area in wheat at 50% or more of the cultivated area.

(2) Fixing a farm-gate price for wheat that was higher than the previous market price.

(3) Purchasing wheat at the fixed price through the Agricultural Credit Banks.

In 1942-1945, the area in cotton was restricted and dropped to about half of its usual level while the area in wheat increased to 1.8 mf feddans or 30% higher than its prior level. Local wheat production was 1.3 million tons, which was adequate for local consumption of the population and the stationed troops.

Following the end of the Second World War, Egypt started importing wheat. Wheat consumption increased greatly due to the sharp increase in the rate of population growth and urbanization. Both the area and

production of wheat declined, and the increase in wheat consumption was met through greatly increased wheat imports from wheat exporting countries. Government wheat policy acquired increased momentum and new dimensions. The Government became responsible for the organization of local wheat production, marketing and for the procurement and distribution of huge amounts of wheat imports.

Wheat consumption increased from 1.38 million tons in 1945-1949 to 1.80 million tons in 1950-1952. Local wheat production declined to 1.13 and 1.10 million tons, and annual wheat imports increased from 183,000 tons in 1945-1949 to 700,000 tons in 1950-1952. Government minimum levels for the area in wheat was fixed at one third of the farm holding, and farmers had to deliver wheat quotas averaging 300 kg per feddan of wheat to Agricultural Credit Banks at the Government price. When wheat imports increased immensely in 1950-1952, the Government wheat policy adopted the aim of self sufficiency in wheat in 1953 and 1954. The area in wheat increased to 1.8 mf, wheat production increased to 1.7 million tons and wheat imports declined to 150,000 tons. The increase in the area and production of wheat, however, was at the cost of an equal decline in the area of cotton, and cotton production and exports declined. Therefore, the aim of self sufficiency in wheat was dropped.

The area in wheat averaged 1.55 mf in 1955-1957, 1.45 mf in 1958-1962 and 1.25 mf in 1963-1970. Annual wheat production was 1.5 million tons during most of the period. Annual wheat consumption in million tons increased to 2.5 in 1952, 2.8 in 1960 and 3.8 in 1968. Wheat imports in the same units increased from 1.1 in 1957 to 1.3 in 1961 and to 2.1 in 1963, exceeding local production for the first time. In 1966 wheat imports were 2.25 million tons, comprising 61% of wheat consumption, and its import value was L.E.66 million. Local wheat production increased to 1.7 million tons in 1971-1972 and imports maintained their level.

The Government farm gate price of local wheat was constant at L.E. 26.7 per ton in the 15-year period 1955-1969. This was about equal to the C.I.F. price of imported wheat in 1955-1961 and 15% lower in 1962-1967. The Government price increased to L.E.31.7 per ton in 1970-1973 and was about equal to the C.I.F. price of imported wheat except for 1973, when the import price increased to L.E.37 per ton. Government instructions

concerning the minimum level of wheat area were relaxed after 1962 and the area of wheat started to decline. At the same time, the cotton area declined from 1.85 million feddans in 1957-1961 to 1.63 million feddans in 1963-1964. This was offset by an equal increase in the rice area in the Delta Governorates. Government policy supported an increase in the cotton area in 1965 and 1966. In these two years, the cotton area increased to its previous level and farmers also increased the full-term clover area. In 1967-1973, the area in cotton declined and so did the wheat area, while the full-term clover area increased sharply.

By the end of 1973, Government wheat policy, as well as the international economic situation, entered a new era. In 1974-1982, the size of local wheat consumption and wheat imports increased greatly, price per ton of imported wheat increased sharply, and the value of wheat imports increased even faster. The Government chose not to increase the local price of wheat bread made by bakeries to keep the cost of living down for the masses, especially in cities or urban areas. This has been affected through an enormous Government-paid consumer subsidy. Imported wheat is sold by the Ministry of Supply to local mills and bakeries, and imported wheat flour is sold to bakeries and consumers, at highly subsidized prices.

According to the estimates of the Ministry of Supply, imports in million tons of wheat and wheat flour increased from 2.58 in 1971/72 to 2.96 in 1973, 3.03 in 1974, 3.86 in 1975, 5.01 in 1978, 5.30 in 1979 and 4.90 in 1980. The import value in mi-lion L.E. of these amounts increased from 72 in 1971/72 to 187 in 1973, 272 in 1974, 292 in 1975, and 264 in 1978. It increased to L.E.667 million in 1979 and L.E.723 million in 1980. Between 1970/71 and 1980, the amount of imported wheat and wheat flour nearly doubled, its import value increased ten times and the import price per ton increased about five and a half times (from L.E.27.9 to 150.9).

Since 1974, about 1.5 million tons of wheat per year has come through soft loans and grants from the United States under the PL 480 program.

To control inflation and keep down the cost of living for the urban population, most of the increase in the import price for the total amounts of imported wheat and wheat flour has been paid by the Government treasury.

The price per ton of imported wheat sold by the Ministry of Supply to mills, and sold thereafter as flour to bakeries (for balady bread), was unchanged in 1970-1977 and remained at L.E.29.5. It was reduced to L.E.24.7 in 1978-1979 and to L.E.22.3 in 1980 to counter the increase in internal cost items. The price per ton of imported wheat flour sold by the Ministry of Supply to bakeries and consumers was increased from L.E.52 in 1970-1973 to L.E.67 in 1974-1979 and to L.E.82.1 in 1980. The price of bread sold by bakeries to consumers was maintained at its previous level of 5 millimes per loaf of balady bread and 10 millimes per loaf of American bread (made of imported "extra" wheat flour). In 1980/81, the price per ton of imported wheat sold to mills, and thereafter to bakeries as flour, was increased to L.E.41.3 and the balady bread was improved in weight and quality and sold at 10 millimes. The 1980 consumer price of wheat flour and American bread has been maintained.

Since 1973, consumers in all cities and nearby villages buy bread from bakeries made of imported wheat and wheat flour and buy imported wheat flour from stores at Government-subsidized prices amounting to 25-35% of actual cost. Due to the sharp increase in both the import prices and the imported amounts, the total amount of subsidy increased greatly. Published data of the Government General Budget show that the annual bread subsidy in L.E. million increased from 20 in 1971/72 to 79 in 1973, 221 in 1974, 163 in 1975-1977, 588 in 1978/79, 691 in 1980 and 790 in 1981/82.

The Government increased the local farm-gate price per ton of wheat grain from L.E.33.33 in 1973 to L.E.43.33 in 1974 and this level was maintained through 1977. The price per ton was increased in 1978 to L.E.66.7 for Giza varieties comprising the bulk of production and to L.E. 73.3 for Mexican varieties to encourage their expansion by farmers. In 1980, the price per ton was increased to L.E.80 for Giza varieties and to L.E.86.7 for Mexican varieties. The Ministry of Supply, through the Agricultural Credit Banks, continued to buy wheat quotas from farmers at the Governmental price. The total annual amounts sold by farmers to the Government averaged 300,000 tons in 1971-1974, accounting for 70% of the requested quota and for 17% of total wheat production. In 1975, the quota

was abolished, and selling wheat by farmers to the Government become optional. Amounts sold were maintained at the same level in 1975-1977 and declined thereafter by about one half.

The amounts of local wheat bought from farmers by the Ministry of Supply is sold to mills and bakeries at the same subsidized price as for imported wheat. The import price of imported wheat is about twice the purchase price of local wheat. The consumer subsidy per ton of imported wheat figured at L.E.47, L.E.113 and L.E.131 in 1978, 1979 and 1980, respectively, compared with the subsidy of L.E.27, L.E.40 and L.E.55, respectively, for local wheat.

Prices of wheat grain paid to farmers by private dealers were about 10% above Government prices in 1970-1977 and declined below Government prices by about 5% in 1978-1980 and were lower also in 1981.

In 1973-1981, farm-gate prices of wheat grain fixed by the Government and paid by private dealers increased slowly relative to the production cost of wheat and the prices of other crops. It is evident that the increased amounts of bread made from imported wheat, as well as imported wheat flour sold at low subsidized prices to consumers in cities and nearby villages, have spoiled the market for local wheat and reduced its price and the farm income per feddan. Another aspect of the problem is that some amounts of bread and wheat are used as animal feed because their prices are lower than maize and even lower than wheat straw used for animal feed.

The above shows that Government wheat policy is one of the most important policies in Egypt. Decisions and activities involved in the annual importation and local distribution of huge amounts of wheat and wheat flour are enormous. The high subsidy and low consumer price of bread and wheat flour appears to be responsible for some waste in bread and wheat consumption. In addition, it keeps down the farm-gate price of local wheat production.

This writer believes that the present consumer prices of bread and wheat flour could be doubled without social mal-effects, and such an increase would contribute to more economy in wheat consumption. Other measures to reduce waste in imported and local wheat use are needed for

the realization of a more rational policy in this area. This includes:

1. Improvement of handling, transportation and storage.
2. Improvement and modernization of bakeries, the bakery industry and bread technology.

Careful and detailed studies are needed on:

1. Nutritional levels and targets.
2. Consumption patterns.
3. Per capita wheat consumption in rural and urban areas.
4. Annual consumption requirements of wheat.
5. Imports of wheat grain and flour and other related subjects and activities.

XIV. Changes In Total Wheat Consumption And Wheat Imports, 1960-1980

For this study, total wheat consumption is estimated by combining local wheat production and wheat imports. The annual change in wheat stocks was neglected since it constituted a small fraction and exceeded ninty thousand tons only in five of the past twenty years. Wheat imports include the imports of wheat and wheat flour after converting the latter to wheat grain equivalent. Imported wheat flour, comprising about one third of total wheat imports, has an extraction rate from wheat grain of 72 percent and has been converted to wheat grain equivalent by multiplying its amounts by the reciprocal of the extraction rate, that is, by 1.389.

Local wheat production in Egypt is estimated by the Statistics Department of the Ministry of Agriculture. For annual wheat imports, however, there are two or more estimates and they differ widely for the same year. Consequently, one could compute two or more different estimates of total wheat consumption. For this study, annual data of the amounts and value of the imports of wheat and wheat flour were collected for 1960-1980 from the annual issue of the Bulletin of Foreign Trade Statistics published by the Central Agency for Public Mobilization and Statistics. Total wheat consumption was calculated by combining data on wheat and flour imports and the estimate of local wheat production. The results are presented in table 16. It was possible to obtain official data, not published regularly,

from the Ministry of Supply, the responsible authority for the procurement and distribution of wheat imports, on the amount and value of imported wheat and wheat flour in the past ten years 1970/71-1980. Total wheat consumption was calculated also from these wheat and flour import data and the estimate of local wheat production. The results are presented in table 17. Data in table 16 were used for the period 1960-1969, while a comparison between the two estimates could be made for the period 1970-1980. The difference between the two estimates for certain years has been referred to in some other studies.

According to the foreign trade statistics published by the Central Agency for Public Mobilization and Statistics, annual wheat imports, in million tons, increased from 1.29 in 1960 to 1.57 in 1962, 2.02 in 1963-65 and 2.42 in 1966-68. In other words, wheat imports increased by 1.13 million tons or 88% between 1960 and 1968. Local wheat production averaged 1.45 million tons in the same period. Consequently, total wheat consumption increased from 2.8 million tons in 1960 to 3.9 million tons in 1966-68, an increase of 40% in eight years. Per capita total wheat consumption increased from 108 to 124 kg/year or by 15%. The contribution of imports to total wheat consumption increased from 46% to 63% between 1960 and 1968.

A sharp decline in wheat imports, based on these data, took place in the 5-year period 1969-1973. The wheat import average was 1.73 million tons, 29% below the 1966-68 level. Local wheat production averaged 1.59 million tons. Consequently, total wheat consumption averaged 3.32 million tons or less than the previous level by 12%. Per capita total wheat consumption per year averaged 90 kg in three years and 123 kg in two years. The contribution of imports to total wheat consumption averaged 52%.

Wheat imports increased in 1974-1980. Its amount, in million tons, increased to 2.61 in 1974, 3.40 in 1975 and averaged 3.62 in 1977-1980, increasing by 39% in the 6-year period 1974-1980. Local production averaged 1.88 million tons in 1974 and 1.82 million tons in 1977-1980. Total wheat consumption averaged 4.5 and 5.5 million tons, respectively, increasing by 22%. Per capita total wheat consumption increased from 124 to 130 kg or by 5%. The contribution of wheat imports to total wheat consumption was 58% in 1974 and 66% in 1977-1980.

For the whole period, 1960-1980, these data show that wheat imports increased from 1.29 million tons in 1960 to 3.62 million tons in 1977-1980 or by 181%. Local wheat production increased from 1.50 to 1.82 million tons or by 21%. Total wheat consumption increased from 2.8 to 5.5 million tons or by 96%. Per capita total wheat consumption increased from 108 to 130 kg/year or by 20%. The contribution of imports to total wheat consumption increased from 46% to 66%.

Estimates of the Ministry of Supply for wheat imports in 1970/71-1980 were much higher than the above mentioned estimates in all years of the period. The increase over the alternative estimates discussed previously ranged from 0.87 million tons or 49% in 1970-1972 to 1.16 million tons or 64% in 1973, 0.43 million tons or 14% in 1974-75, 0.86 million tons or 24% in 1976-1978 and 2.18 million tons or 74% in 1979 and 1980. Consequently, estimates of total wheat consumption based on the import estimates of the Ministry of Supply are much higher than those based on the previously discussed consumption estimates based on import estimates published by the Central Agency for Public Mobilization and Statistics.

According to the estimates of the Ministry of Supply, wheat imports in million tons increased from 2.71 in 1970/71 to 3.00 in 1973-74, 3.78 1975-76, 4.27 in 1977, 5.06 in 1978, 5.33 in 1979 and were 4.91 in 1980. In other words, wheat imports about doubled in these nine years, increasing from 2.71 million tons in 1970/71 to 5.1 million tons in 1978-1980. Local wheat production increased from 1.62 million tons in 1970/71 to 1.86 million tons in 1978-1980. Consequently, total wheat consumption increased from 4.33 million tons in 1970-71 to 6.96 million tons in 1978-1980, increasing by 61% in nine years or 5.5% per year. The per capita total wheat consumption increased from 130 kg in 1970/71 to 170 kg in 1978-1980, increasing by 31% in nine years or 3.2% per year. The contribution of wheat imports to total wheat consumption increased from 62% in 1970/71 to 73% in 1978-1980.

For the period 1960-1980, wheat imports increased about four times, from 1.29 to 5.10 million tons. Local wheat production increased from 1.50 to 1.86 million tons or by 24%. Total wheat consumption increased from 2.80 to 6.96 million tons or two and half times. Per capita total

wheat consumption increased from 108 to 170 kg/year or by 57%. The contribution of imports to total wheat consumption increased from 46% to 73%.

XV. Value And Prices Of Wheat Imports, 1960-1980

The value of wheat imports in 1960-1980 changed significantly due to changes in the quantity imported and the import price per ton of wheat and wheat flour. Related data, according to foreign trade statistics published by the Central Agency for Public Mobilization and Statistics, are presented in table 18. The value of annual Egyptian imports of wheat and wheat flour in L.E. million increased from 25.0 in 1960-61 to 41.3 in 1962 and to an average of 64.7 in 1963-1968. It declined to 33 in 1969-1970, increased to 69.5 in 1971 and was 49.4 in 1972 and 65.7 in 1973.

The four years having the lowest value of wheat imports, 1960-61 and 1969-70, had low levels of both amounts imported and import prices. Wheat imports were 1.3 million tons in these four years and import prices per ton were L.E.22 for wheat and L.E. 25 for wheat flour in 1960-61, and L.E.25 for wheat and L.E.29 for wheat flour in 1969-1970. For most of the other years, wheat imports were about 2.2 million tons and import prices per ton were about L.E.30 for wheat and L.E.35 for wheat flour. Import prices increased in 1973 to L.E.37 and L.E.47 per ton of wheat and flour, respectively.

After 1973, the value of wheat imports increased sharply due to large increases in both imported quantities and import prices. The import value of wheat increased fourfold from L.E.66 million in 1973 to L.E.262 million in 1974. Wheat imports increased from 1.8 to 2.6 million tons or by 44%, and import prices per ton increased about two and half times, from L.E.37 to L.E.103 for wheat grain and from L.E.47 to L.E.113 for wheat flour. In 1975-1979, wheat imports averaged 3.4 million tons. The import value averaged L.E.223 million and import prices per ton averaged L.E.66 for wheat grain and L.E.87 for wheat flour. In 1980, wheat imports declined to 2.65 million tons, the import value increased to L.E.373 million and import prices per ton reached L.E.145 for wheat grain and L.E.192 for wheat flour (table 18).

The value and price of wheat imports in 1973-1979 were underestimated

because a high exchange rate of the Egyptian pound was used for calculating the import values in local currency. The exchange rate was reduced by 43% in 1980 and that accounted for about half the increase in import value and prices in 1980 compared with previous years.

Data in table 18 show that in 1973-1980 wheat imports doubled, increasing from 1.8 to 3.4 million tons. The value of wheat imports increased more than five times, from L.E.66 million to L.E.373 million. Import prices per ton increased four times, from L.E.37 to L.E.145 for wheat grain and from L.E.49 to L.E.192 for wheat flour.

As mentioned earlier, estimates of the imported quantities of wheat and wheat flour, as well as their import value, given by the Ministry of Supply are much higher than the estimates discussed above given by the Central Agency for Public Mobilization and Statistics. There are also differences in import prices per ton between the two estimates.

According to the Ministry of Supply estimates (table 19), the value of imports of wheat and wheat flour in L.E. million increased from 79 in 1970/71 to 187 in 1973, 250 in 1974-1978, 667 in 1979 and 732 in 1980. The value of wheat imports increased about ten times between 1970/71 and 1980. In the same period the imported quantity of wheat and wheat flour in million tons increased from 2.7 in 1970/71 to 3.0 in 1973, 5.1 in 1978, 5.3 in 1979, and 4.9 in 1980. Quantities of wheat imports almost doubled in 1970/71-1980. Import prices per ton of wheat and wheat flour, respectively, increased from L.E.31 and L.E.33 in 1970/71 to L.E. 65 and L.E.78 in 1973, L.E.92 and L.E.107 in 1974, L.E.59 and L.E.82 in 1975-1978, L.E.125 and L.E.175 in 1979, and L.E.146 and L.E.244 in 1980. Between 1970/71 and 1980, the import price per ton increased about five times for wheat and increased about seven times for wheat flour.

XVI. Production Cost Per Feddan Of Wheat, 1981

According to the estimates of the Statistics Department of the Ministry of Agriculture, the average production cost per feddan of wheat in 1981 amounted to L.E.152.7.

Of this total:

1. Land rent was L.E.45.65 or 30% and cost of cultural operations was L.E.107.05 or 70%.
2. Cost of all cultural operations were broken down as follows:
   - harvesting and threshing, L.E.51.8 or 48.4%.
   - fertilizer, L.E.22.8 or 21.3%.
   - land tillage, L.E.11.8 or 11.0%.
   - irrigation, L.E.10.8 or 10.1%.
   - seed and planting, L.E.9.8 or 9.2%.

Distribution of cultural operation costs per feddan in 1981, figured at L.E.107.05, by input factors shows that:

1. Labor cost was L.E.42.00 or 39.2%.
2. Machinery cost was L.E.21.95 or 20.5%.
3. Draft animals cost was L.E.10.38 or 9.7%.
4. Miscellaneous cost was L.E.4.55 or 4.3%.
5. Total of these four items was L.E.78.9 or 73.7%.

The cost of material inputs (seed, manure and chemical fertilizers) amounted to L.E.28.15 or 26.3%. Seed cost L.E.7.8 or 7.3%, manure L.E. 6.5 or 6.1%, and chemical fertilizers L.E.13.8 or 12.9% of the total cost of input factors (table 21).

Production cost per feddan of wheat in 1981, which averaged L.E. 107.05 for operational cost and L.E.45.65 for land rent, varied in different Governorates. Land rent per feddan amounted to L.E.50 in most Governorates of Lower and Middle Egypt and L.E.44 in Upper Egypt. Land rent was lower on the average (L.E.30-36 per feddan) in Governorates having less fertile soils such as Beheira, Kafr El-Sheikh, Domyat, Fayum and Aswan. Operational cost per feddan varied due to variation in costs of input factors. The highest total level, L.E.110-120, was in Sohag, Gharbiya, Qualyubiya, Minofiya and Assiut. Fayum, Aswan, and Domyat had the lowest cost per feddan (L.E.90-93). Production cost in the other Governorates was L.E.96-109 per feddan.

Labor cost per feddan (considering all engaged labor as hired labor) was at the highest level in Sohag (L.E.59), Assiut (L.E.57), Qualyubiya L.E.54), Gharbiya and Kafr El-Sheikh (L.E.52). Governorates having relatively low labor cost (less than L.E.36) were Fayum, Beni Suef, Domyat,

Dakhaliya and Beheira. Other Governorates had labor cost of approximately L.E.45 per feddan (Sharqiya, Ismailiya, Minofiya, Giza, Minya, Qena and Aswan).

In a number of Governorates, high machinery cost was associated with low cost of draft animals and/or low cost of labor due to the substitution effect. Machinery cost per feddan was at its highest level, L.E.22-25, in Assiut, Sohag, Qena, Minya, Beni Suef, Minofiya, Gharbiya, Dakahliya and Domyat. Three of these Governorates had a low level of draft animal cost (L.E.5-7.5) and three had low labor cost. Aswan had the lowest cost of machinery (close to zero) and the highest cost of draft animals (L.E.22.5) and labor cost was relatively low (L.E.40).

The four Governorates of Upper Egypt plus Fayum and Gharbiya did not apply manure fertilization. The highest levels of chemical fertilization cost (L.E.16-17) was in Gharbiya and Sharqiya and the lowest level (L.E.9-12) was in Kafr El-Sheikh, Domyat, Ismailiya, Minofiya, Giza, Minya and Assiut. Cost of chemical fertilizer was around L.E.15 in other Governorates (Beheira, Dakahliya, Beni Suef, Fayum, Sohag, Qena and Aswan).

XVII. Changes In The Production Cost Per Feddan Of Wheat, 1973-1981

In the last 8-year period, 1973-1981, the production cost per feddan of wheat, like all other crops, increased about three and half times. It increased from L.E.42.19 in 1973 to L.E.152.70 or 262% in 1981. Of this total cost, land rent increased 194% from L.E.15.52 to L.E.45.65, and the cost of cultural operations, or input factors utilized, increased 301% from L.E.26.67 to L.E.107.05 (table 22). The cost for various cultural operations in Egyptian pounds increased as follows:

1. Land tillage, L.E.2.81 to 11.83 or 321%.
2. Seed and planting, L.E.3.38 to 9.79 or 190%.
3. Irrigation, L.E.3.47 to 10.85 or 277%.
4. Fertilization, L.E.7.74 to 22.76 or 194%.
5. Harvesting and threshing, L.E.9.27 to 51.82 or 459%.

The cost of harvesting and threshing had the highest rate of increase and the amount of that increase was L.E.42.5 or 53% of the total

increase in the cost of all operations which figured at L.E.80.3. Consequently, the share of harvesting and threshing in the total cost of farm operations increased from 35% in 1973 to 48% in 1981. The cost of harvesting and threshing had the highest increase in cost because it is the most labor-intensive of all operations and labor wages increased sharply between 1973 and 1981.

The distribution of the total cost of cultural operations (production cost excluding land rent) per feddan of wheat by input factors utilized in production in 1970-1980 is presented in table 23. These input factors are labor, draft animals, machinery, seed, manure, chemical fertilizers and miscellaneous items. The total cost of these input factors increased from L.E.26.67 in 1973 to L.E.107.05 in 1981 or 301%. Labor cost (including family labor estimated at market-wage level) increased from L.E.7.24 to L.E.42.00 or 480%. This was due to an increase in the average daily wage of one worker from 29 to 152 piasters and to higher levels in busy periods. Consequently, the share of labor in total input factor cost increased from 27% to 39%. The cost of draft animals increased from L.E.3.65 to L.E.10.38 or 184% and the cost of machinery increased from L.E.4.49 to L.E.21.95 or 389%. This reflects a significant degree of substitution of the former by the latter. At present, the majority of small farmers hire tractors for land tillage, pumps for irrigation and machines for threshing. The cost of labor, draft animals, machinery and miscellaneous cost combined increased from L.E.16.07 to L.E. 78.88 or 391%. Then cost of material inputs of seed, manure and chemical fertilizers combined increased from L.E.10.60 to L.E.28.17 or 166%. The increased costs are:

1. Manure, L.E.0.93 to L.E.6.57 or 606%.
2. Seed, L.E.3.19 to 7.80 or 145%.
3. Chemical fertilizers, L.E.6.48 to L.E.13.80 or 113%.

XVIII. Changes In The Farm-Gate Price Of Wheat Grain, 1970-1981

The Government fixes farm-gate prices for most crops and buys certain amounts of some farmers' crops for both local consumption and export. The Government also imports a number of commodities for local

consumption and sells them to consumers at subsidized low prices. These measures have direct and indirect effects on the supply and demand for agricultural commodities, the marketing conditions, consumer prices, and prices received by farmers from Government and private dealers.

The sharp increase in the production costs of all agricultural commodities after 1973 called for successive increases in Government fixed farm-gate prices. The Government recognizes the importance of providing farmers with adequate prices to cover the increase in production cost and to improve farmers' income for the improvement of their level of living and incentives for them to increase yields and production. Government farm-gate prices increased in a number of years and are presently two and one half-times or more their 1973 levels. For most crops, however, production cost increased faster than Government farm-gate prices and the present level of these prices are not satisfactory to farmers. The price policy for agricultural products is presently under intensive study at top Governmental levels and in the Parliament.

Farm-gate Government price per ton of wheat grain was stable at L.E. 23.3 in 1939-1952, increased to L.E.33.3 in 1953, was L.E.30 in 1954 and stabilized at L.E.26.7 in 1955 to 1969, increased to L.E.31.7 in 1970-1973, and increased to L.E.41.7 in 1974-1977, L.E.46.7 in 1978 and 80.0 in 1980. Grain from Mexican wheat varieties, having limited area and production and a lower output of straw, were given a premium of L.E.6.7 per ton since 1978 (table 24).

Since 1974 the Government has sold chemical fertilizers and seed to farmers at subsidized prices. This subsidy is estimated at L.E.15 per feddan or L.E.10 per ton of wheat. This subsidy should be added to the Government farm-gate price mentioned above to estimate the true return to the farmer.

The Government farm-gate price for wheat grain of 1980 and 1981, including the subsidy to producers, was less than the import price of wheat grain by L.E.50 per ton or 30%. This was also the case in 1974-1979 if the artifically high exchange rate is considered for the Egyptian pound when calculating the value of wheat imports.

Prices of wheat grain paid to farmers exceeded the Government prices by about 10% up to 1977 and then became lower than Government prices. As mentioned earlier, Government-subsidized bread and wheat flour is available to consumers in cities and nearby villages at low prices. This has reduced the market for local wheat. Farmers faced marketing problems and received low prices for their wheat from private dealers in 1980 and 1981 while the amount of wheat purchased by the Government was limited.

XLX. Changes In The Farm-Gate Price Of Wheat Straw, 1970-1981

The farm-gate price per ton of wheat straw for animal feed averaged L.E.8.0 in 1970-1973 and increased to L.E.13.4 in 1974-1976. In the two periods, farm-gate price per ton of wheat grain was L.E.37 and L.E.48.5, respectively. The straw-to-grain price ratio was 0.22:1 and 0.28:1, respectively. The farmer-gate price per ton of wheat straw increased sharply in the 5-year period 1977-1981 from L.E.13.4 in 1974-1976 to L.E.24.2 in 1977, L.E.37.5 in 1978, L.E.44.0 in 1980 and L.E. 68.7 in 1981 (table 24). In other words, the straw price increased by five fold in this 5-year period. In the same period the farm-gate price per ton of wheat grain increased from L.E.48.5 in 1974-1976 to L.E.88.0 in 1980 and L.E.91.8 in 1981 or 89%. The straw-to-grain price ratio increased from 0.28:1 in 1974-1976 to 0.50:1 in 1980 and to 0.75:1 in 1981.

The yield per feddan of wheat straw is higher than that of wheat grain. Both yields had equal percentage increases in 1970-1981 and the straw-to-grain quantity ratio for both yield per feddan and total production remained at 1.55:1 in the two mentioned years. Total production of wheat grain in million tons increased from 1.50 in 1970 to 1.96 in 1976 and was 1.94 in 1981, while total production of straw in the same units increased from 2.35 in 1970 to 2.99 in 1976 and 2.98 in 1981.

The sharp increase in farm-gate prices of straw in the last five years, 1977-1981, increased the monetary value of straw both in its level and relation to the monetary value of wheat grain. Thus, in 1973, the total monetary value of the national production of both wheat grain and straw was L.E.92.4 million of which wheat grain accounted for L.E.70.1 million or 76% and straw accounted for L.E.22.3 million or 24%. In

1978-1980, the total monetary value averaged L.E.237.8 million, of which grain was L.E.132.0 million or 56% and straw was L.E.105.8 million or 44%. In 1981, monetary value of straw exceeded the monetary value of grain; the total monetary value was L.E.382.4 million of which grain was L.E.177.9 million or 46.5% and straw was L.E.204.5 million or 53.5% (table 24). The gross revenue per feddan from grain and straw, respectively, was L.E.56 and L.E.18 in 1973, L.E.86 and L.E.77 in 1978, and L.E.127 and L.E.146 in 1981.

XX. Net Farm Income Per Feddan Of Wheat, 1973 and 1981

Average gross income per feddan of wheat grain at Government prices more than doubled between 1973 and 1981, increasing from L.E.49.0 to L.E. 110.4.

Other increased values per feddan are as follows:

1. Wheat straw in farm-gate prices, L.E.17.8 to L.E.146.3 or 722%.
2. Gross income of wheat from grain and straw, L.E.66.8 to L.E. 256.7 or 284%.
3. Production cost, including land rent, L.E.42.2 to L.E.152.7 or 262%.

Net farm income per feddan of wheat increased from L.E.40.2 to L.E. 149.6 or 272% for owner operators and from L.E.24.6 to L.E.104.0 or 323% for tenant farmers (tables 25 and 26).

The above figures show that the increase in the net income per feddan of wheat between 1973 and 1981 came mainly from the sharp increase in the value and price of wheat straw. The increase in the value of wheat straw per feddan was L.E.128.5, exceeding the increase in the net farm income per feddan amounting to L.E.109.4 for owner operators and L.E.79.4 for tenant operators. The majority of Egyptian farmers, about 90% of the total number of farmers farming about two thirds of the total cultivated area, are small farmers having holdings of five feddans or less. The average size of their farm is about one and half feddans and the average annual area under wheat is less than one half feddan. The majority of farmers do not sell wheat straw but instead use it for feeding their farm animals.

In 1973, the average gross income per feddan from wheat grain was L.E.49 and the average total cost of production per feddan was L.E.42. In 1981, the average gross income per feddan from wheat grain was L.E. 110.4 and the average total cost of production per feddan was L.E.152.7. In other words, in 1973 the monetary value of wheat grain per feddan covered the total production cost and gave the farmer a surplus of L.E.7.0. In 1981, the monetary value of wheat grain per feddan did not cover the total cost of production and there was a deficit of L.E.42.3. This implies that the majority of small farmers grow wheat not for wheat grain but for the wheat straw needed to feed their animals. To encourage farmers to do their best to increase yields of wheat grain, the present low price of wheat grain should be increased significantly.

XXI. Proposed Increase In Government Price For Wheat Grain

The 1981 Government farm-gate price for wheat grain of L.E.80 per ton (L.E.12 per ardeb) should be increased to L.E.120 per ton (L.E.18 per ardeb). The present subsidy to chemical fertilizers and seed should be maintained. The new proposed grain price plus the subsidy would be about L.E.130 per ton which is still below the import price of wheat grain. The proposed increase in wheat grain price would add to farmers' income per feddan of wheat about L.E.55. This would increase the monetary value of wheat grain to about equal the total production cost, leaving wheat straw as net income to the farmer. The proposed increase in wheat grain price would increase the net farm income from wheat and provide the farmers with the incentive to increase the yield of wheat grain by using the seed of new high-yielding varieties and applying improved cultural practices advocated by extension personnel.

To make the new proposed price effective in the market, the Ministry of Supply, through the Agricultural Credit Bank, should buy at the new price all quantities of wheat grains, without limit, offered by farmers.

Farm-gate prices of other crops, especially rice, maize and cotton, have also to be increased. The appropriate price level could be judged after a careful investigation of the economics of each crop.

Table 1. Wheat: Area, yield and production in the first 20 countries according to wheat production and the world total, averages 1969-1971 and 1976-1978

Rank	Country	Area (1)		Yield (2)		Production (3)	
		1969-71	1976-78	1969-71	1976-78	1969-71	1976-78
1	U.S.S.R	65,230	63,839	1,423	1,618	92,804	103,282
2	U.S.A.	18,569	26,179	2,144	2,071	40,034	54,227
3	China	28,336	31,334	1,094	1,372	31,005	43,002
4	India	16,941	20,860	1,231	1,425	20,859	29,728
5	Canada	7,669	10,650	1,813	2,022	13,901	21,532
6	France	3,892	4,183	3,626	4,345	14,112	18,177
7	Turkey	8,732	9,328	1,308	1,779	11,423	16,599
8	Australia	7,695	9,710	1,171	1,350	9,014	13,112
9	Pakistan	6,122	6,285	1,110	1,386	6,796	8,708
10	Italy	4,089	3,272	2,385	2,507	9,756	8,203
11	Argentina	4,402	5,023	1,334	1,619	5,873	8,133
12	Germany, Fed.R.	1,511	1,683	4,149	4,368	6,268	8,118
13	Romania	2,527	2,311	1,754	2,801	4,433	6,474
14	Iran	5,370	5,577	735	1,032	3,946	5,754
15	Poland	2,004	1,837	2,458	3,094	4,925	5,684
16	Yugoslavia	1,928	1,679	2,469	3,361	4,760	5,643
17	United Kingdom	980	1,188	4,223	4,620	4,140	5,488
18	Hungary	1,289	1,321	2,645	4,072	3,410	5,379
19	Czechoslovakia	1,076	1,276	3,193	4,081	3,436	5,207
20	Spain	3,727	2,737	1,270	1,619	4,734	4,432
28	EGYPT	551	560	2,741	3,330	1,509	1,865
Total (21 countries)		192,640	210,832	1,542	1,796	297,138	378,747
Other countries		23,282	22,592	1,376	1,632	32,029	36,877
World total		215,922	233,424	1,524	1,781	329,167	415,624

Source: Calculated from FAO production year book.
(1) Thousand ha.
(2) Kg per ha.
(3) Thousand tons.

Table 2. Wheat: Area, yield and production in the first 20 countries according to wheat yield and the world total, averages 1969-1971 and 1976-1978

Rank	Country	Area (1)		Yield (2)		Production (3)	
		1969-71	1976-78	1969-71	1976-78	1969-71	1976-78
1	Netherlands	145	126	4,616	5,722	675	721
2	Denmark	111	122	4,576	5,057	509	617
3	Belgium-Luxembourg	209	200	4,058	4,645	848	929
4	United Kingdom	980	1,188	4,223	4,620	4,140	5,488
5	Germany, Fed.R.	1,511	1,683	4,149	4,368	6,268	7,352
6	France	3,892	4,183	3,626	4,345	14,112	18,177
7	Sweden	259	353	3,705	4,337	958	1,531
8	Switzerland	100	90	3,785	4,189	378	377
9	Czechoslovakia	1,076	1,276	3,193	4,081	3,436	5,207
10	Hungary	1,289	1,321	2,645	4,072	3,410	5,379
11	Austria	279	287	3,273	4,066	912	1,167
12	Bulgaria	1,023	806	2,835	3,983	2,899	3,210
13	Germany, Dem.R.	597	745	3,689	3,950	2,203	2,943
14	New Zealand	112	98	3,197	3,786	357	371
15	Mexico	761	787	2,813	3,583	2,141	2,820
16	Yugoslavia	1,928	1,679	2,469	3,361	4,760	5,643
17	EGYPT	551	560	2,741	3,330	1,509	1,865
18	Japan	227	96	2,451	2,865	557	275
19	Romania	2,527	2,311	1,754	2,801	4,433	6,474
20	Finland	184	154	2,417	2,578	445	397
Total (20 countries)		17,761	18,065	3,094	3,927	54,950	70,943
Other countries		198,161	215,359	1,384	1,600	274,217	344,681
World total		215,922	233,424	1,524	1,781	329,167	415,624

Source: Calculated from FAO production year book.
(1) Thousand ha.
(2) Kg per ha.
(3) Thousand tons.

Table 3. Wheat: Area, yield and production in Egypt, annual 1950-1981

Year	Area[1]	Yield[2]	Production[3]	Year	Area[1]	Yield[2]	Production[3]
1950	1,371	0.74	1,018	1966	1,291	1.14	1,465
1951	1,497	.81	1,209	1967	1,245	1.04	1,291
1952	1,402	.78	1,089	1968	1,413	1.07	1,518
1953	1,790	.86	1,547	1969	1,246	1.02	1,269
1954	1,795	.96	1,729	1970	1,304	1.16	1,516
1955	1,523	.95	1,451	1971	1,349	1.28	1,729
1956	1,570	.99	1,547	1972	1,239	1.30	1,616
1957	1,514	.97	1,467	1973	1,248	1.47	1,837
1958	1,425	.99	1,412	1974	1,370	1.38	1,884
1959	1,475	.98	1,443	1975	1,394	1.46	2,033
1960	1,456	1.03	1,499	1976	1,396	1.40	1,960
1961	1,384	1.04	1,436	1977	1,207	1.41	1,697
1962	1,455	1.10	1,593	1978	1,381	1.40	1,933
1963	1,345	1.11	1,493	1979	1,391	1.34	1,856
1964	1,295	1.16	1,500	1980	1,326	1.35	1,796
1965	1,144	1.11	1,272	1981	1,400	1.38	1,938

Source: Department of Statistics, Ministry of Agriculture.
(1) Thousand feddans.
(2) Tons per feddan.
(3) Thousand tons.

Table 4. Wheat: Summary of changes in area, yield and production, specified periods, 1950-1981

Period		Period Averages					
No.of years	From-to	Area[1]	Yield[2]	Production[3]	Index numbers 1950-52=100		
					Area	Yield	Production
3	1950-1952	1,423	0.777	1,105	100	100	100
2	1953-1954	1,792	.914	1,638	126	118	148
3	1955-1957	1,536	.969	1,488	108	125	135
2	1958-1959	1,450	.984	1,428	102	127	129
3	1960-1963	1,407	1.070	1,505	99	138	136
7	1964-1970	1,277	1.100	1,404	90	142	127
3	1971-1973	1,279	1.350	1,727	90	174	156
3	1974-1976	1,387	1.412	1,959	97	182	177
1	1977	1,207	1.406	1,697	85	181	154
2	1978-1979	1,366	1.363	1,862	89	175	168
1	1980	1,326	1.355	1,796	93	174	162
1	1981	1,400	1.385	1,938	98	178	175

Source: Calculated from table 3.
(1) Thousand feddans.
(2) Tons per feddan.
(3) Thousand tons.

Table 5. Wheat: Area under principal varieties, 1960-1981

Year	Variety																
	Balady	Toson	Hindi Toson	Giza 139	Giza 144	Giza 145	Giza 147	Giza 150	Giza 155	Giza 156	Giza 157	Others	Mexican/Local crosses			Stork	Total
													Shnab	Sakha 8	Sakha 61		
	Thousand feddans																
1960	165	555	-	599	12	18	10	*	-	-	-	97	-	-	-	-	1,456
1961	134	508	-	508	58	92	16	2	-	-	-	66	-	-	-	-	1,384
1962	147	507	-	444	173	98	24	13	-	-	-	49	-	-	-	-	1,455
1963	131	406	-	296	352	64	20	75	-	-	-	1	-	-	-	-	1,345
1964	108	381	-	131	520	35	18	100	-	-	-	3	-	-	-	-	1,295
1965	94	-	324	80	506	21	21	98	-	-	-	-	-	-	-	-	1,144
1966	105	-	347	29	651	26	17	115	-	-	-	11	-	-	-	-	1,291
1967	91	-	241	5	696	10	12	188	2	-	-	-	-	-	-	-	1,245
1968	137	-	191	-	764	1	3	278	31	-	-	8	-	-	-	-	1,413
1969	100	-	91	-	469	-	-	211	375	-	-	-	-	-	-	-	1,246
1970	89	-	51	-	110	-	-	50	1,004	-	-	-	*	-	-	-	1,304
1971	57	-	14	-	25	-	-	14	1,239	-	-	-	*	-	-	-	1,349
1972	45	-	10	-	2	-	-	7	1,171	1	-	-	4	-	-	-	1,239
1973	27	-	-	-	-	-	-	1	1,142	11	-	-	67	-	-	-	1,248
1974	19	-	-	-	-	-	-	-	746	98	-	-	507	-	-	-	1,370
1975	13	-	-	-	-	-	-	-	1,115	79	-	-	187	-	-	-	1,394
1976	10	-	-	-	-	-	-	-	1,145	64	-	-	177	-	-	-	1,396
1977	8	-	-	-	-	-	-	-	889	11	-	-	299	-	-	-	1,207
1978	-	-	-	-	-	-	-	-	1,082	-	3	8	288	-	-	-	1,381
1979	16	-	-	-	-	-	-	-	1,213	-	45	-	109	8	-	-	1,391
1980	12	-	-	-	-	-	-	-	836	4	320	1	3	98	-	52	1,326
1981	28	-	-	-	-	-	-	-	667	90	461	1	*	143	4	6	1,400

Source: Department of Statistics, Ministry of Agriculture.
* Less than 500 feddans. Dashes indicate zeros.

Table 6. Wheat: Yield per feddan of principal varieties, 1960-1981[1]

Year	Variety																
	Balady	Toson	Hindi Toson	Giza 139	Giza 144	Giza 145	Giza 147	Giza 150	Giza 155	Giza 156	Giza 157	Others	Mexican/Local crosses			Stork	National average
													Shnab	Sakha 8	Sakha 61		
	Tons																
1960	0.96	1.12	-	0.95	1.05	1.07	1.26	0.66	-	-	-	1.10	-	-	-	-	1.03
1961	.96	1.14	-	1.12	1.09	1.15	1.25	.93	-	-	-	1.04	-	-	-	-	1.04
1962	1.01	1.16	-	1.00	1.10	1.22	1.19	1.34	-	-	-	1.15	-	-	-	-	1.10
1963	.93	1.13	-	1.01	1.14	1.27	1.19	1.24	-	-	-	1.07	-	-	-	-	1.11
1964	1.04	1.15	-	1.07	1.17	1.33	1.17	1.31	-	-	-	.97	-	-	-	-	1.16
1965	1.04	-	1.14	.95	1.08	1.31	1.20	1.31	-	-	-	-	-	-	-	-	1.11
1966	.96	-	1.13	1.00	1.13	1.35	1.27	1.33	-	-	-	1.27	-	-	-	-	1.14
1967	1.06	-	1.13	1.16	.91	1.10	1.26	1.35	1.55	-	-	-	-	-	-	-	1.04
1968	1.02	-	1.12	-	.99	1.35	1.11	1.27	1.30	-	-	1.08	-	-	-	-	1.07
1969	.83	-	.88	-	.91	-	-	1.00	1.24	-	-	-	-	-	-	-	1.02
1970	.92	-	.91	-	.87	-	-	1.08	1.23	-	-	-	1.24	-	-	-	1.16
1971	.96	-	1.03	-	87	-	-	1.26	1.31	-	-	-	1.79	-	-	-	1.28
1972	1.10	-	1.00	-	.95	-	-	1.26	1.31	1.70	-	-	1.72	-	-	-	1.30
1973	1.14	-	-	-	-	-	-	1.32	1.44	1.63	-	-	2.05	-	-	-	1.47
1974	1.07	-	-	-	-	-	-	-	1.28	1.33	-	-	1.54	-	-	-	1.38
1975	1.09	-	-	-	-	-	-	-	1.43	1.42	-	-	1.70	-	-	-	1.46
1976	.99	-	-	-	-	-	-	-	1.37	1.31	-	-	1.70	-	-	-	1.40
1977	1.19	-	-	-	-	-	-	-	1.36	1.15	-	-	1.56	-	-	-	1.41
1978	-	-	-	-	-	-	-	-	1.35	-	1.61	1.25	1.61	-	-	-	1.40
1979	1.04	-	-	-	-	-	-	-	1.32	-	1.42	-	1.55	1.36	-	-	1.34
1980	1.08	-	-	-	-	-	-	-	1.21	1.53	1.41	1.10	1.52	1.52	-	-	1.35
1981	1.05	-	-	-	-	-	-	-	1.30	1.30	1.47	1.61	-	1.63	1.56	1.54	1.38

Source: Department of Statistics, Ministry of Agriculture.
(1) Dashes indicate that little or none was grown.

Table 7. Wheat: Yield per feddan in EMCIP production demonstration plots and in comparison fields in eight governorates, 1980/81

Governorate	Yield average		Yield increase in demonstration over comparison plots	
	Demonstration plots	Comparison fields		
	Tons		Tons	Percent
Dakahliya	2.379	1.660	0.719	43.3
Kafr El-Sheikh	2.468	1.847	.621	33.6
Gharbiya	2.271	1.406	.865	61.5
Minufiya	2.246	1.450	.796	54.9
Beni-Suef	2.534	1.314	1.220	92.8
Minya	2.284	1.453	.831	57.2
Assyut	2.174	1.362	.812	59.6
Sohag	2.016	1.095	.921	84.1
Average	2.296	1.449	.847	58.5

Source: Economics/Statistics Unit, EMCIP.

Table 8. Area of wheat and yield and production of wheat grain and straw, annual, 1960, 1970-1981

Year	Area	Yield per feddan		Production	
		Grain	Straw	Grain	Straw
	1,000 feddans	Tons		1,000 tons	
1960	1,456	1.03	1.55	1,499	2,257
1970	1,304	1.16	1.80	1,516	2,345
1971	1,349	1.28	1.91	1,729	2,574
1972	1,239	1.30	1.92	1,616	2,384
1973	1,248	1.47	1.93	1,837	2,410
1974	1,370	1.38	1.94	1,884	2,648
1975	1,394	1.46	2.02	2,033	2,819
1976	1,396	1.40	2.14	1,960	2,986
1977	1,207	1.41	2.07	1,697	2,515
1978	1,381	1.40	2.05	1,933	2,826
1979	1,391	1.34	2.05	1,856	2,837
1980	1,326	1.35	2.16	1,796	2,858
1981	1,400	1.38	2.13	1,938	2,978

Source: Department of Statistics, Ministry of Agriculture.

Table 9. Principal winter field crops and cotton: Area 1960-1981

Year	Crop				
	Wheat	Full-term clover	Cotton	Short-term clover	Broad beans
	1,000 feddans				
1960	1,456	1,131	1,873	1,283	362
1961	1,384	1,113	1,986	1,335	328
1962	1,455	1,140	1,657	1,352	368
1963	1,345	1,133	1,627	1,302	360
1964	1,295	1,178	1,611	1,301	408
1965	1,144	1,178	1,900	1,315	402
1966	1,291	1,235	1,859	1,297	398
1967	1,245	1,475	1,626	1,242	300
1968	1,413	1,500	1,464	1,179	306
1969	1,246	1,520	1,622	1,207	338
1970	1,304	1,520	1,627	1,227	302
1971	1,349	1,585	1,525	1,185	261
1972	1,239	1,586	1,552	1,233	336
1973	1,248	1,590	1,600	1,284	270
1974	1,370	1,618	1,453	1,178	244
1975	1,394	1,688	1,346	1,124	246
1976	1,396	1,711	1,248	1,046	260
1977	1,207	1,697	1,423	1,158	292
1978	1,381	1,789	1,189	993	239
1979	1,391	1,746	1,196	1,031	250
1980	1,326	1,722	1,245	990	245
1981	1,400	1,756	1,178	1,022	238

Source: Department of Statistics, Ministry of Agriculture.

Table 10. Wheat: Area, yield and production by regions, average 1975-79

Region	Area	Yield per feddan	Production	Proportion of all Egypt		
				Area	Yield	Production
	1,000 feddans	Tons	1,000 tons		Percent	
Lower	774	1.43	1,111	57.2	58.6	102.1
Middle	232	1.54	335	17.1	17.7	103.6
Upper	348	1.29	450	25.7	23.7	92.1
All Egypt	1,354	1.40	1,896	100.0	100.0	100.0

Source: Calculated from annual crop data published by Department of Statistics, Ministry of Agriculture.

Table 11. Winter field crops and cotton: Area by crop by regions, average 1975-1979(1)

Region	Crop						
	Wheat	Full-term clover	Cotton	Broad beans	Barley	Others(2)	Total
	Area (1,000 feddans)						
Lower	774	1,257	864	82	78	80	3,135
Middle	232	327	255	111	13	65	1,003
Upper	348	142	161	64	13	100	828
All Egypt	1,354	1,726	1,280	257	104	245	4,966
	Percent of regional total						
Lower	24.7	40.1	27.6	2.6	2.5	2.5	100.0
Middle	23.1	32.6	25.4	11.1	1.3	6.5	100.0
Upper	42.0	17.2	19.4	7.7	1.6	12.1	100.0
All Egypt	27.1	34.8	25.8	5.2	2.1	4.9	100.0
	Percent of total in Egypt						
Lower	57.2	72.8	67.5	31.9	75.0	32.7	63.1
Middle	17.1	19.0	19.9	43.2	12.5	26.5	20.2
Upper	25.7	8.2	12.6	24.9	12.5	40.8	16.7
All Egypt	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from annual crop data published by the Department of Statistics, Ministry of Agriculture.

(1) Excluding short-term clover.

(2) Includes flax, lentils, fenugreek, chick-peas, lupines, onions and aromatic and medicinal crops.

Table 12. Winter field crops: Area by crop by regions, average 1975-79

Region	Crop							
	Wheat	Clover		Broad beans	Barley	Others		Total
		Full term	Short term			(1)	(2)	
	Area (1,000 feddans							
Lower	774	1,257	788	82	78	80	76	3,135
Middle	232	327	176	111	13	65	79	1,003
Upper	348	142	106	64	13	100	55	828
All Egypt	1,354	1,726	1,070	257	104	245	210	4,966
	Percent of regional total							
Lower	24.7	40.1	25.1	2.6	2.5	2.5	2.4	100.0
Middle	23.1	32.6	17.5	11.1	1.3	6.5	7.9	100.0
Upper	42.0	17.2	12.8	7.7	1.6	12.1	6.6	100.0
All Egypt	27.1	34.8	21.5	5.2	2.1	4.9	4.2	100.0
	Percent of total in Egypt							
Lower	57.2	72.8	73.6	31.9	75.0	32.7	36.2	63.1
Middle	17.1	19.0	16.5	43.2	12.5	26.5	37.6	20.2
Upper	25.7	8.2	9.9	24.9	12.5	40.8	26.2	16.7
All Egypt	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from data published by the Department of Statistics, Ministry of Agriculture.

(1) Other crops as shown in table 10.

(2) The excess in the area of cotton over the area of short-term clover.

Table 13. Wheat: Area, yield and production by governorates, average 1975 - 1979

Region and Governorate	Area		Yield per feddan		Production	
	1,000 feddans	%	Tons	%	1,000 Tons	%
Lower Egypt:						
Alexandria	6	0.4	0.97	69.3	6	0.3
Beheira	123	9.1	1.32	94.3	162	8.5
Gharbiya*	97	7.2	1.50	107.1	145	7.7
Kafr El-Sheikh*	101	7.4	1.34	95.7	135	7.1
Daqahliya*	145	10.7	1.44	102.9	208	11.0
Domyat	12	.9	1.32	94.3	16	.9
Sharqiya	162	12.0	1.47	105.0	238	12.6
Ismailya	10	.7	1.20	85.7	12	.6
Suez	1	.1	1.36	97.1	1	.1
Minufiya*	80	5.9	1.57	112.1	125	6.6
Qalyubiya	37	2.8	1.64	117.1	61	3.2
Total(1)	774	57.2	1.43	102.1	1,111	58.6
Middle Egypt:						
Giza	21	1.5	1.47	105.0	31	1.6
Beni-Suef*	51	3.8	1.34	95.7	69	3.6
Faiyum	72	5.3	1.35	96.4	97	5.1
Minya*	88	6.5	1.59	113.6	140	7.4
Total(1)	232	17.1	1.45	103.6	335	17.7
Upper Egypt:						
Asyut*	89	6.6	1.53	109.3	137	7.2
Sohag*	124	9.1	1.27	90.7	157	8.3
Qena	107	7.9	1.19	85.0	127	6.7
Aswan	28	2.1	1.04	74.3	29	1.5
Total(1)	348	25.7	1.29	92.1	450	23.7
Grand total(1)	1,354	100.0	1.40	100.0	1,896	100.0

Source: Calculated from annual data published by Department of Statistics, Ministry of Agriculture.

* Governorates covered by EMCIP.

(1) Based on unrounded data.

Table 14. Wheat: Classification of governorates into groups according to total production, average 1975-79

Group	Governorate	Area	Production	Yield per feddan	Proportion of all Egypt		
					Area	Production	Yield
		1,000 feddan	1,000 tons	Tons	Percent		
1	Sharqiya	162.4	238.1	1.47	12.0	12.6	105.0
	Daqahliya	145.1	208.5	1.44	10.7	11.0	102.9
	Group total	307.5	446.6	1.45	22.7	23.6	103.6
2	Beheira	122.9	161.7	1.32	9.1	8.5	94.3
	Sohag	123.7	157.0	1.27	9.1	8.3	90.7
	Gharbiya	96.9	145.1	1.50	7.2	7.7	107.1
	Minya	88.0	139.6	1.59	6.5	7.4	113.6
	Asyut	89.4	137.0	1.53	6.6	7.2	109.3
	Kafr El-Sheikh	100.6	135.0	1.34	7.4	7.1	95.7
	Group total	621.5	875.4	1.41	45.9	46.2	100.7
3	Qena	106.8	126.9	1.19	7.9	6.7	85.0
	Minufiya	79.7	125.4	1.57	5.9	6.6	112.1
	Faiyum	71.5	96.5	1.35	5.3	5.1	96.4
	Group total	258.0	348.8	1.35	19.1	18.4	96.4
4	Beni-Suef	51.2	68.6	1.34	3.8	3.6	95.7
	Qalyubiya	37.5	61.3	1.64	2.8	3.2	117.1
	Giza	21.0	30.8	1.47	1.5	1.6	105.0
	Aswan	27.8	29.1	1.04	2.1	1.5	74.3
	Group total	137.5	189.8	1.38	10.2	9.9	98.6
5	Domyat	12.4	16.4	1.32	.9	.9	94.3
	Ismailiya	10.0	11.9	1.20	.7	.6	85.7
	Alexandria	5.8	5.7	.97	.4	.3	69.3
	Suez	1.0	1.4	1.36	.1	.1	97.1
	Group total	29.2	35.4	1.21	2.1	1.9	86.4
	All Egypt	1,353.7	1,896.0	1.40	100.0	100.0	100.0

Source: Calculated from table 13.

Table 15. Wheat: Classification of governorates into groups according to yield per feddan, average 1975-79

Group	Governorate	Area	Production	Yield per feddan	Proportion of all Egypt		
					Area	Production	Yield
		1,000 feddans	1,000 tons	Tons		Percent	
1	Qalyubiya	37.4	61.3	1.64	2.8	3.2	117.1
	Minya	88.0	139.6	1.59	6.5	7.4	113.6
	Minufiya	79.7	125.4	1.57	5.9	6.6	112.1
	Asyut	89.4	137.1	1.53	6.6	7.2	109.3
	Gharbiya	96.9	145.1	1.50	7.2	7.7	107.1
	Group total	391.3	608.5	1.55	29.0	32.1	110.7
2	Sharqiya	162.4	238.1	1.47	12.0	12.6	105.0
	Giza	21.0	30.8	1.47	1.5	1.6	105.0
	Daqahliya	145.1	208.5	1.44	10.7	11.0	102.9
	Group total	328.5	477.4	1.45	24.2	25.2	103.6
3	Suez	1.0	1.4	1.36	.1	.1	97.1
	Faiyum	71.5	96.5	1.35	5.3	5.1	96.4
	Kafr El-Sheikh	100.6	135.0	1.34	7.4	7.1	95.7
	Beni-Suef	51.2	68.6	1.34	3.8	3.6	95.7
	Beheira	122.9	161.7	1.32	9.1	8.5	94.3
	Domyat	12.4	16.4	1.32	.9	.9	94.3
	Group total	359.6	479.6	1.33	26.6	25.3	95.0
4	Sohag	123.7	157.0	1.27	9.1	8.3	90.7
	Ismailya	10.0	12.0	1.20	.7	.6	85.7
	Group total	133.7	169.0	1.26	9.8	8.9	90.0
5	Qena	106.8	126.9	1.19	7.9	6.7	85.0
	Aswan	27.8	29.1	1.04	2.1	1.5	74.3
	Alexandria	5.8	5.7	.97	.4	.3	69.3
	Group total	140.5	161.6	1.15	10.4	8.5	82.0
	All Egypt	1,353.7	1,896.0	1.40	100.0	100.0	100.0

Source: Calculated from table 13.

Table 16. Wheat: Total and per capita consumption based on imports reported by the Central Agency for Public Mobilization and Statistics, annual 1960-1980

Year	Production	Wheat Imports (1)	Total Consumption	Population (2)	Wheat, Per capita Consumption
	1,000 tons			Million	Kg
1960	1,499	1,288	2,787	25.8	107.9
1961	1,436	1,260	2,696	26.6	101.4
1962	1,593	1,568	3,161	27.3	116.0
1963	1,493	2,104	3,597	27.9	128.7
1964	1,500	1,888	3,388	28.7	118.2
1965	1,272	2,077	3,349	29.4	114.0
1966	1,465	2,276	3,741	30.2	123.9
1967	1,291	2,687	3,978	30.9	128.8
1968	1,518	2,285	3,803	31.6	120.4
1969	1,269	1,517	2,786	32.3	86.2
1970	1,516	1,233	2,749	33.1	83.2
1971	1,729	2,410	4,139	33.8	122.4
1972	1,616	1,686	3,302	34.6	95.5
1973	1,837	1,805	3,642	35.4	123.0
1974	1,884	2,609	4,493	36.2	124.2
1975	2,033	3,405	5,438	37.0	147.1
1976	1,960	2,919	4,879	37.8	128.9
1977	1,697	3,273	4,970	38.8	128.1
1978	1,933	4,334	6,267	39.8	157.4
1979	1,856	3,230	5,086	41.0	124.1
1980	1,796	2,645	4,441	42.3	105.0

Source:
(1) Imports of wheat and wheat flour equivalent, published by the Central Agency for Public Mobilization in "Foreign Trade Bulletin", in Arabic.
(2) Statistical Year Book, A.R.E., 1952-1980, Central Agency for Public Mobilization and Statistics.

Table 17. Wheat: Total and per capita consumption based on imports estimated by the Ministry of Supply, annual 1970-1980

Year	Production	Wheat Imports(1)	Total Consumption	Population	Wheat, Per capita Consumption
	1,000 tons			Million	Kg
1970-71	1,622	2,711	4,333	33.4	129.6
1971-72	1,672	2,583	4,255	34.2	124.4
1973	1,837	2,960	4,797	35.4	135.6
1974	1,884	3,027	4,911	36.2	135.8
1975	2,033	3,856	5,889	37.0	159.3
1976	1,960	3,707	5,667	37.8	149.8
1977	1,697	4,273	5,970	38.8	153.9
1978	1,933	5,056	6,989	39.8	175.5
1979	1,856	5,327	7,183	41.0	175.3
1980	1,796	4,912	6,708	42.3	158.6

(1) Wheat and wheat flour equivalent according to estimates of the Ministry of Supply.

Table 18. Wheat imports: Quantity, value and price per ton as reported by the Central Agency for Public Mobilization and Statistics, annual 1960-1980

Year	Quantity		Value			Price per ton(1)		Value of all imports	Wheat in relation to all imports
	Wheat	Flour	Wheat	Flour	Total(1)	Wheat	Flour		
	1,000 tons		Million L.E.			L.E.		Million L.E.	Percent
1960	631	473	13	11	25	21	24	225	11.0
1961	661	431	15	11	25	22	25	238	10.6
1962	860	510	24	17	41	28	33	301	13.7
1963	972	815	31	30	62	32	37	398	15.4
1964	810	776	30	32	62	38	41	414	15.0
1965	1,230	610	39	23	62	32	37	406	15.2
1966	1,429	610	43	23	65	30	37	465	14.1
1967	1,783	651	55	23	78	31	36	344	22.7
1968	1,507	560	41	18	59	27	32	290	20.5
1969	1,200	228	32	7	39	27	29	277	13.9
1970	851	275	21	8	29	24	29	342	8.3
1971	1,931	345	59	11	70	30	32	400	17.4
1972	1,386	216	42	8	49	30	35	391	12.6
1973	1,490	227	55	11	66	37	47	361	18.2
1974	2,251	258	233	29	262	103	113	920	28.5
1975	2,681	521	213	47	260	79	89	1,539	16.9
1976	2,358	404	154	36	190	65	90	1,490	12.8
1977	2,419	615	129	49	178	53	80	1,884	9.4
1978	3,001	960	170	75	244	56	78	2,632	9.3
1979	2,252	704	174	68	243	77	97	2,686	9.0
1980	2,126	374	309	72	373	145	192	3,402	11.0

Source: Quantity and value compiled from Foreign Trade Bulletin, Central Bureau of Public Mobilization and Statistics.
(1) Based on unrounded data.

Table 19. Wheat imports: Quantity, value and price per ton based on Ministry of Supply Data, annual 1970-1980

Year	Quantity		Value			Price per ton	
	Wheat	Flour	Wheat	Flour	Total(1)	Wheat	Flour
	1,000 tons		Million L.E.			L.E.	
1970/71	1,983	524	61	17	78	31	33
1971/72	1,951	455	57	15	72	29	34
1972(2)	1,378	227	39	7	47	29	33
1973	2,364	429	154	33	187	65	78
1974	2,621	292	241	31	272	92	107
1975	2,913	679	227	65	292	78	96
1976	2,982	522	179	44	223	60	84
1977	3,427	609	158	43	201	46	71
1978	3,895	836	201	64	265	52	76
1979	3,973	975	497	171	667	125	175
1980	3,919	715	571	160	732	146	244

Source: Ministry of Supply (unpublished data).
(1) Based on unrounded data.
(2) Second half only.

Table 20. Wheat: Production cost per feddan by cultural operation, by governorate, 1981

Region & Governorate	Operation							
	Tillage	Seeds & planting	Irriga-tion	Fertiliza-tion	Harvesting & Threshing	Total without land	Land rent	Grand total
	L.E.							
Lower Egypt:								
Beheira	8.8	8.9	8.7	26.0	51.5	103.9	36.3	140.2
Gharbiya	14.5	9.1	18.6	17.5	63.0	122.7	52.0	174.7
Kafr El-Sheikh	7.3	9.2	9.4	25.6	57.5	109.0	34.0	143.0
Daqahliya	8.0	8.7	9.4	30.0	40.7	96.8	44.0	140.8
Domyat	12.0	9.0	10.0	21.0	41.0	93.0	30.0	123.0
Sharqiya	12.0	8.0	10.0	28.6	49.0	107.6	60.0	167.6
Ismailiya	8.4	13.0	11.5	23.5	39.7	96.1	50.0	146.1
Minufiya	10.0	10.0	9.4	25.0	59.0	113.4	50.0	163.4
Qalyubiya	7.7	8.9	11.6	28.0	60.4	116.6	52.0	168.6
Average	10.0	8.9	10.6	25.8	51.9	107.2	46.7	153.9
Middle Egypt:								
Giza	16.1	8.0	8.0	24.1	42.4	98.6	50.0	148.6
Beni Suef	12.0	10.5	8.0	27.0	50.0	107.5	50.0	157.5
Faiyum	12.0	11.4	3.1	24.2	39.5	90.2	32.0	122.2
Minya	13.0	10.5	12.0	19.2	52.0	106.7	50.0	156.7
Average	12.7	10.6	7.3	22.8	47.1	100.5	44.8	145.3
Upper Egypt:								
Asyut	15.0	10.7	17.0	15.8	56.0	114.5	44.0	158.5
Sohag	17.0	10.8	18.0	18.0	60.0	123.8	48.9	172.7
Qena	13.7	11.1	16.0	14.7	47.5	103.0	40.0	143.0
Aswan	11.0	8.7	6.0	15.2	51.4	92.3	30.0	122.3
Average	15.2	11.2	13.7	16.3	54.9	111.3	44.0	155.3
Average for all Egypt	11.8	9.8	10.8	22.8	51.8	107.0	45.7	152.7

Source: Department of statistics, Ministry of Agriculture.

Table 21. Wheat: Production cost per feddan by Input Factor, by Governorate, 1981

Region and Governorate	Input factor							
	Labor(1) wages	Draft animals	Machinery	Seed	Manure	Chemical fertilizer	Miscellaneous	Total(2)
	L.E.							
Lower Egypt:								
Beheira	33.2	10.0	19.0	7.3	8.9	15.5	10.0	103.9
Gharbiya	51.7	17.0	23.0	7.5	0	17.5	6.0	122.7
Kafr El-Sheikh	51.6	10.5	17.5	7.2	10.0	9.2	3.0	109.0
Daqahliya	32.0	7.5	22.0	7.2	10.0	15.1	3.0	96.8
Domyat	27.0	12.0	25.0	7.0	10.0	9.0	3.0	93.0
Sharqiya	45.0	8.0	18.0	6.0	10.0	16.6	4.0	107.6
Ismailiya	45.6	4.0	13.5	9.0	10.0	10.0	4.0	96.1
Minufiya	44.5	11.4	24.5	7.5	10.0	11.5	4.0	113.4
Qalyubiya	53.7	7.5	19.5	7.2	10.0	15.2	3.5	116.6
Average	40.0	10.0	22.1	7.0	8.8	14.5	4.8	107.2
Middle Egypt:								
Giza	44.5	8.0	17.0	6.0	10.0	10.1	3.0	98.6
Beni Suef	35.5	11.5	22.5	9.0	10.0	15.5	3.5	107.5
Faiyum	27.5	13.0	14.5	9.0	10.0	13.2	3.0	90.2
Minya	47.7	5.0	24.5	9.0	5.0	10.5	5.0	106.7
Average	37.8	9.0	20.5	8.8	8.0	12.4	4.0	100.5
Upper Egypt:								
Asyut	57.0	6.0	25.5	9.0	0	12.0	5.0	114.5
Sohag	59.0	14.0	23.0	8.8	0	14.0	5.0	123.8
Qena	41.5	14.0	22.5	9.0	0	13.0	3.0	103.0
Aswan	39.6	25.3	0	7.2	0	15.2	5.0	92.3
Average	50.2	12.2	22.5	8.8	0	13.2	4.4	111.3
Average for all Egypt	42.0	10.4	22.0	7.8	6.5	13.8	4.5	107.0

Source: Department of Statistics, Ministry of Agriculture.
(1) Includes cost of family labor estimated at hired labor wage level.
(2) Does not include land rent (see table 20).

Table 22. Wheat: Production cost per feddan by Cultural Operation, annual 1970-1981

Year	Operation								
	Land tillage	Seed & planting	Irri-gation	Ferti-lization	Harvesting & threshing	Miscel-laneous	Total without land	Land rent	Grand total
	L.E.								
1970	2.81	3.23	2.13	6.84	8.95	0.71	24.67	15.14	39.81
1971	2.25	3.30	2.64	7.12	8.09	.72	24.52	15.47	39.99
1972	2.80	3.41	3.13	7.22	8.20	.74	25.50	15.46	40.96
1973	2.81	3.38	3.47	7.74	8.58	.69	26.67	15.52	42.19
1974	3.24	3.88	3.95	9.52	9.39	1.06	31.04	16.45	47.49
1975	4.10	5.05	4.75	10.14	16.68	1.54	42.26	17.07	59.33
1976	4.58	5.04	5.76	10.93	19.01	1.54	46.86	18.37	65.23
1977	5.57	5.16	6.66	12.70	22.38	1.78	54.25	21.55	75.80
1978	6.92	6.16	7.66	14.36	27.44	3.17	65.70	22.74	88.44
1979	8.55	6.35	8.61	15.40	31.59	3.73	74.23	34.11	108.34
1980	10.52	7.72	9.48	18.90	48.62	-	93.00	48.62	141.62
1981	11.83	9.79	10.85	22.76	51.82	-	107.05	45.65	152.70

Source: Department of Statistics, Ministry of Agriculture.

Table 23. Wheat: Production cost per feddan by Input Factor, annual 1970-1981

Year	Input factor									
	Labor	Draft animals	Machin-ery	Seed	Manure	Chemical fertilizer	Miscel-laneous	Total without land	Land rent	Grand total
	L.E.									
1970	7.06	3.58	3.69	3.06	0.88	5.69	0.71	24.67	15.14	39.81
1971	6.71	3.81	3.40	3.10	.99	5.79	.72	24.52	15.47	39.99
1972	6.68	4.07	3.92	3.20	.83	6.06	.74	25.50	15.46	40.96
1973	7.24	3.65	4.49	3.19	.93	6.48	.69	26.67	15.52	42.19
1974	8.07	4.06	5.13	3.64	.77	8.31	1.06	31.04	16.45	47.49
1975	13.25	3.47	9.62	4.71	2.55	7.12	1.54	42.26	17.07	59.33
1976	14.80	3.80	11.19	4.62	2.29	8.02	1.54	46.86	18.37	65.23
1977	18.84	4.78	12.30	4.66	3.24	8.65	1.78	54.25	21.55	75.80
1978	24.64	5.71	13.83	5.40	3.84	9.11	3.17	65.70	22.74	88.44
1979	26.70	8.11	16.09	5.44	4.09	9.48	3.73	74.23	34.11	108.34
1980	37.77	9.61	18.35	6.37	4.90	12.18	3.82	93.00	48.62	141.62
1981	42.00	10.38	21.95	7.80	6.57	13.80	4.55	107.05	45.65	152.70

Source: Department of Statistics, Ministry of Agriculture.

Table 24. Wheat grain and straw: Farm-gate price and monetary value of total production, annual 1970-1981

Year	Farm-gate price per ton			Value of production			Proportion of total value of production(1)	
	Grain		Straw, average	Grain	Straw	Total (1)	Grain	Straw
	Official	Average						
	L.E.			Million L.E.			Percent	
1970	33.33	39.26	8.12	60	19	79	75.8	24.2
1971	33.33	35.36	6.57	61	17	78	78.3	21.7
1972	33.33	35.03	7.04	57	17	73	77.1	22.9
1973	33.33	38.17	9.24	70	22	92	75.9	24.1
1974	43.33	46.91	14.94	88	40	128	69.1	30.9
1975	43.33	51.41	13.70	105	39	143	73.0	27.0
1976	43.33	47.09	11.59	92	35	127	72.7	27.3
1977	43.33	54.10	24.15	92	61	153	60.2	39.8
1978	66.67-73.33	61.67	37.54	119	106	225	52.9	47.1
1979	66.67-73.33	63.67	30.24	119	86	204	58.0	42.0
1980	80.00-86.67	88.00	44.00	158	126	284	55.8	44.2
1981	80.00-86.67	91.80	68.68	178	205	382	46.5	53.5

Source: Department of Statistics, Ministry of Agriculture.
(1) Based on unrounded data.

Table 25. Wheat: Estimated net farm income per feddan based on the official grain price, annual 1973 and 1981

Item and Unit	1973	1981
Production (tons):		
Grain	1.47	1.38
Straw	1.93	2.13
Farm-gate price per ton (L.E.):		
Grain	33.33	80.00
Straw	9.24	68.68
Gross revenue (L.E.):		
Grain	49.00	110.40
Straw	17.83	146.29
Total	66.83	256.69
Production cost (L.E.):		
Production inputs	26.67	107.05
Land rent	15.52	45.65
Total	42.19	152.70
Net farm income from both products (L.E.):		
For owner-operator	40.16	149.64
For tenant farmer	24.64	103.99

Source: Computed from tables 23 and 24.

Table 26. Wheat: Net farm income per feddan based on reported average farm-gate price per ton, 1970-1981

Year	Yield per feddan		Farm-gate price per ton		Gross revenue			Production cost			Net income for --	
	Grain	Straw	Grain	Straw	Grain	Straw	Total	Inputs	Land rent	Total	Owner operator	Tenant
	Tons				L.E.							
1970	1.16	1.80	39.26	8.12	45.54	14.62	60.16	24.67	15.14	39.81	35.49	20.35
1971	1.28	1.91	35.36	6.57	45.26	12.55	57.81	24.52	15.47	39.99	33.29	17.82
1972	1.30	1.92	35.03	7.04	45.54	13.52	59.06	25.50	15.46	40.96	33.56	18.10
1973	1.47	1.93	38.17	9.24	56.11	17.83	73.94	26.67	15.52	42.19	47.27	31.75
1974	1.38	1.94	46.91	14.94	64.74	28.98	93.72	31.04	16.45	47.49	62.68	46.23
1975	1.46	2.02	51.41	13.70	75.06	27.67	102.73	42.26	17.07	59.33	60.47	43.40
1976	1.40	2.14	47.09	11.59	65.93	24.80	89.73	46.86	18.37	65.23	42.87	24.50
1977	1.41	2.07	54.10	24.15	76.28	49.99	126.27	54.25	21.55	75.80	72.02	50.47
1978	1.40	2.05	61.67	37.54	86.34	76.96	163.30	65.70	22.74	88.44	97.60	74.86
1979	1.34	2.05	63.67	30.24	85.32	61.99	147.31	74.23	34.11	108.34	73.08	38.97
1980	1.35	2.16	88.00	44.00	118.80	95.04	213.84	93.00	48.62	141.62	120.84	72.22
1981(1)	1.38	2.13	91.80	68.68	126.68	146.29	272.97	107.05	45.65	152.70	165.92	120.27

Source: Calculated from previous tables.
(1) For 1981, production cost and net income are preliminary estimates.

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