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Egyptian Agricultural and Food Policies in Relation with Environment

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I. – Overview

Egypt is a strategic country located at the crossroads of the Middle-East, Africa and the Eastern Mediterranean. Its chief natural resource is the Nile River. Other resources include modest oil and gas deposits as well as phosphates and iron ore. The cardinal environmental feature is the limited land base and a high population density. Only 4% of Egypt is habitable, comprising the area alongside the Nile River and around the Nile Delta. This reduced area sustains a population of 57 millions. Despite expensive land reclamation projects, there has been no net increase in arable area because of accelerating urbanization and desertification. All arable land is irrigated, however, allowing intensive, year-round cultivation with the aid of chemical fertilizers. Salinization and waterlogging are two environmental problems that are emerging as a consequence of poor drainage and intensive water use[1].

II. – Economic Background

Since the revolution of 1952, two distinct periods can be identified. The first period (1952-1973) is characterized by economic planning and pervasive state control. The government nationalized trade and heavy industries, administrated prices, and established an extensive food subsidy system. It emphasized rapid industrialization and social equity. The subsequent period is that of economic liberalization policies. Between 1986 and 1989, the growth rate of the GDP was 1.5% compared to about 2.4% for the population. The inflation rate was about 20% and the unemployment rate was 20%. The external public debt amounted to 38 billion dollars in 1985-1986, exceeding GDP 1.34 times and exports 9.04 times. The debt serving obligations (5.5 billion dollars) amounted to half of current external receipt obligations.

The important foreign exchange earners in rank order are: worker remittances, energy, tourism, cotton and textiles.

Until the early 1970s, Egypt was a net food exporter and agriculture constitued 30% of GDP. The economic and agricultural policies which transferred resources to the non-agricultural sectors have led to the fact that currently about 50% of Egyptian food needs are imported. The reason for this has been, on one hand, the expansion of population and per capita incomes and hence of demand, but also the maintenance of low internal price levels for staple foods.

The food security for the Egyptian population has been considered as a long term strategy in the 1970s and the 1980s. It is worth mentioning that the food security strategy does not mean a 100% self-sufficiency coefficient. It must be realized that technically speaking, Egypt cannot become self-sufficient in some of the basic staples such as wheat.

Food security should be interpreted to mean the best utilization of agricultural resources in order to produce the maximum value added. This supports the comparative advantage principal as more relevant than the self-sufficient one if long term food security is to be realized.

Figures of *Table 1* represents estimates of the food gap and of the coefficient of self-sufficiency for main foodstuffs. It is shown that there is an increasing tendency over time to depend on imports to satisfy the consumption needs of the population. The self-sufficiency coefficient is less than 100% for wheat, maize, edible oils, sugar, red meat, milk, poultry,

fresh fish and lentils. Given the fact that the domestic production of these commodities has recently enjoyed substantial increases, the shortage of the available supply is mainly due to the population increase and increase in the per capita real income. This can also be attributed to the adopted open door economic policy and the trade liberalization accentuated during the 1980s.

It is worth mentioning that there are some other staples—such as rice, beans and fruits and vegetables—that have a self-sufficiency coefficient greater than 100%. Some of these commodities (e.g., fruits and vegetable) represent great export potentialities for Egypt.

Table 2 shows that in spite of the fact that the daily total caloric intake in Egypt (3,313 calories) is not substantially different in other countries, the ratio of animal to total caloric intake is significantly lower than in other countries. This ratio is only 8% in Egypt compared to 17% in the Arab world and to more than 30% in developed countries. Estimates of the same table show that the annual per capita gross domestic product in Egypt is very low with respect to the other Arab countries, except for Morocco and Sudan. The comparison of the total consumption per capita of all food staples indicates that Egypt is not far away from the Arab countries' average. About 651 kg total consumption per head in Egypt is compared to 627 kg average for all Arab countries. Thus the extensive food subsidy policy in Egypt, in spite of its long term bad effects on the economy, has served to reduce malnutrition rates to the lowest levels observable for countries in the same per capita income range.

III. – Agricultural and Food Policies

Since the 1952 revolution, the overall economic policy can be identified in three main different phases. The period mid-1950s to mid-1970s is characterized by heavy government intervention and control of the economy with an import substitution oriented policy. The period mid-1970s to late 1980s represents partial withdrawal of the government control on the economic activities and gradual promotion of the private sector. The open-door-economic policy is the main orientation of the Egyptian economy within that period. The early 1990s marked the beginning of a transitional period towards privatization of the economy. A three-year period has been decided necessary to accomplish the privatization process of the different sectors of the Egyptian economy. By the end of this period, it is expected that the liberalization oriented policy will be the major feature of the overall country in the future.

The agricultural sector has been subjected to the overall economic policy through all these phases. During the government complete control phase, the main agricultural and food policies can be summarized as follows.

1. Regulation of the Cropping Pattern and Delivery Quotas has Been Introduced to Serve Various Objectives: Technological, Economic and Social

There was no systematic attempt to make area planning compatible with prevailing or expected prices. Thus planning of quantities (area, quotas) was divorced from planning of prices. This was the reason why farmers preferred some crops (e.g., berseem, fruits and vegetables) to some others (e.g., cotton, wheat and rice).

According to the quota delivery system farmers were obligated to deliver all or certain part of their crop to the government at fixed prices lower than the market ones. This was the case of the main food crops—rice, wheat, bean, lentils, sesame and sugarcane—for food security purposes. It was also the case for exportable crops—cotton, onions, potatoes, garlic, peanuts and oranges—for foreign exchange procurement reasons. The Principal Bank for Development and Agriculture Credit (PBDAC) was the main institution by which all agricultural policies were to be implemented.

2. Land Reclamation Policy

Land reclamation in Egypt is of ancient origin, and for several millennia focused on the alluvial soils of the Nile Valley and Delta. However, since 1952, efforts have increasingly focused on the reclamation of desert sands, as most of the remaining areas of undeveloped alluvial soils are relatively small and/or have particularly difficult reclamation problems. Some 912,000 feddans were reclaimed between 1952 and 1978 (the old-new lands) and since then 577,700 feddans have been reclaimed (the new-new lands); concurrently agricultural land was lost to urbanization; the net increase in cultivated area between 1950 and 1988 was only about a million feddans[2].

According to the Egyptian Land Master Plan (LMP 1986), about 2.88 million feddans located in 90 project areas are potentially reclaimable on the Nile.

The Water Master Plan (WMP) indicates that water released to the sea can be reduced sufficiently to allocate an additional 6.5-8.5 billion cubic meters of water to agriculture which could irrigate about 800,000 feddans. Three main institutions are involved in the land reclamation activity: Land Development Authority, Desert Development Authority and Agrarian Development Authority[2].

3. Agricultural Credit Policy

The Principal Bank for Development and Agricultural Credit (PBDAC) is the main institution through which the government implements the agricultural policies. Agricultural loans provided by the PBDAC can be of three kinds: short, medium and long terms. Farmers loans were subsidized in terms of interest rates lower than the market ones. At the same time, the PBDAC monopolizes the agricultural inputs: seeds, insecticides and fertilizers. Input delivery to farmers represented the in-kind loans of the Bank. Provision of financial loans and of inputs was tied to compulsory sales of farmers crops to the government represented by the Bank. Total agricultural loans have increased from LE 11.7 million in 1976 to LE 1,419.3 million in 1988. About 59.6% of the total credit is short term compared to 40.1% for medium-term and only 0.3% for long-term investments[3].

4. Pricing and Subsidies

To implement the development strategies adopted between the 1950s and the mid-1980s, two main policies have been followed. The agricultural price policy for food crops was established to insure the transfer of financial resources from the agricultural to the non-agricultural sectors. Thus the agricultural sector was directly and indirectly taxed in favor of the rest of the economy. On the other hand, the consumption subsidization policy for the staples means that the urban households were subsidized while the rural farmers were taxed. In other words, internal terms of trade were against agriculture. Estimates indicate that the total transfers out of agriculture, as explicit and implicit taxation implied by price policies and over-valued exchange rates, amounted to 30%-70% of the agricultural GDP and between 5.7% and 21.7% of total GDP during the period 1965–1985. Although investment and public expenditure policies tried to compensate some of these losses, the net transfer out of agriculture was still as high as 3.8%-19.2% of total GDP[4].

In his study, Detheir (1989) measured the impact of agricultural and consumption pricing policies and international trade and exchange rate policies on the redistribution of income. According to the results of the study, the nominal protection coefficients of farmers as a percentage of border prices are calculated for 1960–1985. The nominal protection coefficient for all crops as of 1985 is estimated by -15% of the border price. This means that producers are taxed 15% while consumers are subsidized by the same percentage.

It is worth mentioning that the burden of agriculture taxation is evenly distributed among different farmers. In fact, the nominal protection rate is estimated at -64% for cotton, -65% for rice, -52% for wheat, -28% for maize and 82% for sugarcane[5].

Prices for the deliverable crops were to be explicitly determined by the government. The full-cost-pricing was the method used to determine crop prices such that price should cover the production costs and leave a profit margin for the farmer. This was the case of cotton, sugarcane, rice, wheat, beans, sesame and peanuts. As for the other crops and products, prices were free and determined by the market pricing system.

The agricultural price policy was coupled with an extensive consumer food subsidy one. The main objective was to guarantee an adequate level of food commodities to all income groups. Available information indicate that the net subsidies amounted to LE 1.7 billion in 1981. A maximum of about LE 2.1 billion was allocated for that reason in 1984.

To conclude, one can say that the negative impact of agriculture taxation and consumption subsidization policies have led to market and price distorsions, inefficient use and allocation of resources, and decreases of farmers incomes.

IV. – Agricultural and Food Policy Reform

By the mid-1970s, Egypt started to establish good relation with the western block countries. Egypt became an important aid receiver of the international financing agencies in terms of loans and grants. By the mid-1980s, the international financing agencies did not seem to be convinced with the performance of the Egyptian economy. The main financing agencies, mainly the International Monetary Fund, the World Bank, and the United States Agency for International Development, started to implement a new restrictive approach of conditional assistance to Egypt. Thus the foreign assistance to

Egypt has been based upon the acceleration of the economic policy reform.

There are a number of reasons for believing that the reform and development of the agricultural sector may deserve priority, or even be a precondition for progress at the national level. This sector generates 30% of national income, employs 25% of labor force and provides 55% of nonpetroleum commodity exports. Besides, it is the sector on which depends the food security problems. These problems are closely related to the development of the economy as a whole. A 1%-increase in the cost of imported food decreases Egypt's industrial output by 1-2% by consuming hard currency that would otherwise be available for the purchase of industrial inputs.

Conversely, if government spending on food subsidies could be decreased by 10%, thereby reducing the governments budget deficit, the value of the Egyptian pound would increase by 3% and reduce the inflation rate by 5%[6].

Structural adjustment liberalization and policy reform of the agricultural sector has been the major issue in the late 1980s and early 1990s. Policy reform considered both agricultural outputs and inputs. The different steps for the agricultural policy reform can be summarized as follows:

1. Long Term Goals for Agricultural Sector Policy

i) Remove government farm price controls;
ii) Remove government crop area controls, considering technical constraints of the cropping pattern;
iii) Remove government crop procurement quotas;
iv) Remove government constraints on private sector processing and marketing of farm products and inputs (including import/export);
v) Eliminate subsidies of farm inputs;
vi) Limit state ownership of land.

2. Main Agreed Targets for the Medium Term

The government of Egypt has determined that the next phase of its economic reform program for agriculture should emphasize increased cotton procurement prices, liberalization of rice marketing, elimination of farm input subsidies, and divestiture and liberalization of farm input supply activities that were managed mainly by the Principal Bank for Development and Agricultural Credit (PBDAC). During this period of change, the government and the Ministry of Agriculture will also take necessary actions to protect and improve the longer-term financial strength of PBDAC as a sound credit institution.

A. Adjusted Cotton Prices and Reduced Government Controls Over Rice

By the 1992 season, the government of Egypt proposes to adjust the net procurement price for cotton to at least 66% of the international price and to eliminate the current requirement to deliver to the government 1.5 ton of rice per feddan. For cotton, the Higher Policy Committee has decided (November, 1989) that the average procurement price paid will be adjusted to 66% of the international price by 1992.

The intention of shifting the procurement price to this level is to provide improved incentives for the cotton farmer to produce a better yield and to grow cotton in preference to alternative field crops that have less economic value to the nation.

For rice, the Higher Policy Committee has determined that the Ministry of Supply delivery quota should be reduced to 1.0 ton in 1990 and should be eliminated by 1992. In addition, by 1992, the Ministry of Supply will remove its current prohibitions on the private sector concerning the possession, milling, and intergovernorate transport of rice.

B. Elimination of Farm Input Subsidies

By the end of 1993, all budgetary and exchange rate subsidies are planned to be removed from nitrogen and phosphate fertilizers and from all farm inputs—with the possible exception of subsidies for cotton pest control, farm credit and potassium sulfate. In addition, the government plans to modify its current administrative pricing for fertilizer and livestock feed ingredients—so that the ex-factory prices of these products will be more uniform among all buyers.

C. Government Divestiture and Liberalization of Marketing for Fertilizer, Livestock Feed and Other Inputs

In a series of steps through 1993, the government intends to eliminate substantially all controls over private processing, intergovernorate transport and wholesale and retail trade for these farm inputs. In general, all restrictions over private trade for commodities that are presently not subsidized will be eliminated at an early date, while restrictions over

other individual inputs will be removed at the point when the budget and exchange rate subsidies for the affected commodities have been eliminated. In addition, PBDAC will adapt its marketing margins for seed and other individual inputs to reflect the normal commercial cost of such wholesale and retail trade, and, thus, to permit and encourage trading by new dealers.

On a parallel track, PBDAC will reduce substantially or eliminate its current detail and wholesale distribution activities for fertilizer, livestock feed, seed and machinery. By the end of 1993, it is anticipated that the nonpublic sector distributor will be responsible for a substantial share in the distribution of fertilizer, seed, livestock feed and machinery.

D. Financial Strengthening for PBDAC as a Credit Institution

PBDAC's capital and operating income will be supported and protected by the government during the period 1990–1993 in order to correct current weakness in the capital structure and to overcome the temporary costs to the Bank from divestiture of its input trading activities.

3. Bench-Marks for Implementation of Economic Reform

A. Fourth Tranche Bench-Marks

a) The cotton procurement price will be adjusted so as to eliminate at least one third of the difference between the price prevailing in 1989 and the medium term target (i.e., two thirds of the international price).

b) The quota for mandatory delivery of rice to the government will be reduced to no more than 1.0 ton per feddan.

c) The retail prices of fertilizers handled by public sector distributors will be adjusted to reflect:

   – revision of local ex-factory prices to their full costs of production[7] or to prices based on market forces.

   – revision of the exchange rate applied to public sector imports of fertilizers.

   – adjustment of marketing margin and commissions between factory and retail points of sale to a full commercial basis.

   The combined budget subsidy for local and imported fertilizers will not exceed the corresponding budget subsidy for 1988-1989.

d) Prices and quantities of low-priced livestock feed will be adjusted so as to eliminate one third of more of preexisting, implicit subsidies for wheat bran and cottonseed cake.

e) Charges for cotton pest control will be adjusted to reflect changes in pesticide application practices and in the foreign exchange costs of cotton pesticides owing to revision of the foreign exchange rate [contingent on achievement of a cotton price that allows benchmark A.a) to be fullfilled].

f) The GOE will adjust policies, decrees and laws on the marketing of unsubsidized inputs so as to reduce the quantities of commercial farm inputs marketed by the public sector, using the following guidelines:

   – Private sector dealers will be permitted to trade and transport all farm inputs that are no longer subsidized.

   – For purposes of meeting farmers quotas of fixed price fertilizer, local factories annual distribution of fertilizer to PBDAC at fixed prices will not exceed the following amount:

     • 4.2 million tons of nitrogen (15.5% nutrient content)

     • 1.0 million tons of phosphate (15% nutrient content)

   – To meet farmers additional needs for fertilizer, private dealers, coops, or PBDAC will purchase fertilizers from local factories on equal terms and at prices based on market forces. Such fertilizer will be freely transported and will be resold on a nonsubsidized basis, free from price controls.

   – The quantity of livestock feed mixes marketed through PBDAC or other public sector dealers will be reduced by PBDAC in 1989.

   – Imports of corn by PBDAC will be reduced from a monthly target of 150,000 tons to a monthly target of 100,000 tons (or to a lesser amount, contingent on foreign exchange availability to the private sector).

   – Marketing by PBDAC of privately produced and processed seed will be reduced by raising the commission charged by PBDAC to 15% or more of the retail price. Marketing charges by PBDAC on seed supplied by public sector processors will also be reviewed for adjustment to a normal commercial level.

g) Subsidized farm credit for crop or animal production purposes will be restricted to a uniform maximum amount per feddan for each registered far-

mer. Interest rates on all other new agricultural loans (other than some loans for new activities which need promotion) will be moved to market levels. Total interest subsidies on all types of farm credit will not exceed the level of LE 105 million per year.

h) The MOA will develop a phased plan to withdraw from the affairs of cooperatives, except for selected regulatory and financial audit functions reserved for the public sector.

B. Fifth Tranche Bench-Marks

a) The cotton procurement price will be adjusted so as to eliminate at least one half of the difference between the price prevailing in 1990 and the medium term target (i.e., two thirds of the international price).

b) The quota for mandatory delivery of rice to the government will be reduced to no more than 0.5 ton per feddan. GOE restrictions on possession, milling and intergovernorate transport of rice will be relaxed so as to promote more efficient processing and marketing of overquota rice by the private sector.

c) The retail prices of fertilizers handled by public sector distributors will be adjusted to reflect elimination of the preferential exchange rate applied to public sector imports of fertilizer. The combined budget subsidy for local and imported fertilizers will not exceed the corresponding budget subsidy for 1988–1989.

d) Price and quantities of low-priced livestock feed will be adjusted so as to eliminate one half or more of the remaining implicit subsidies for wheat bran and cottonseed cake.

e) Change for cotton pest control will be adjusted so that combined total of explicit and implicit public sector subsidies will be reduced to three fourth of the corresponding total pest control subsidy for 1988–1989 [contingent on achievement of a cotton price that allows benchmark B.a) to be fullfilled].

f) The MOA will adjust policies, decrees and laws on the marketing of unsubsidized farm inputs so as to reduce the quantities of commercial farm inputs marketed by the public sector, using the following guidelines:

  – Private sector dealers will be permitted to trade and transport all farm inputs that are no longer subsidized.

  – For purposes of meeting farmers quotas of fixed price fertilizer, local factories annual distribution of fertilizer to PBDAC at fixed prices will not exceed the following amounts:

    • 4.0 million tons of nitrogen (15.5% nutrient content), plus a share of production of amonium nitrate from new facilities to compensate for the decline from the previous year in PBDAC imports of nitrogen;

    • 0.9 million tons of phosphate (15% nutrient content).

  – To meet farmers additional needs for fertilizer, private dealers, coops, or PBDAC will purchase fertilizers from local factories on equal terms and at prices based on market forces. Such fertilizer will be freely transported and will be resold of a non subsidized basis, free from price controls.

  – The quantity of livestock feed mixes marketed through PBDAC and other public sector dealers will be reduced to a maximum of 60% of the quantity marketed during 1989.

  – Imports and marketing of corn by PBDAC will be reduced to a monthly target of 50,000 tons (or to a lesser amount, contingent on foreign exchange availability to the private sector).

  – Marketing charges by PBDAC on seed supplied by public sector processors, with the possible exception for cottonseed, will be adjusted to a full commercial basis for the summer 1991 and winter 1991–1992 seasons in accordance with the findings, if available, from the review noted in bench-mark A. f) vi.

g) The system for farm credit for crop production will be reviewed by PBDAC with the intention of concentrating the benefits on farmers who bear the burden of producing low-priced, government-controlled crops or who are undertaking new activities that need promotion. Interest subsidies on agricultural loans will not exceed the level of LE 105 million per year.

h) The MOA will submit to the Higher Policy Committee a new law that would enable agricultural cooperatives to function as independent, private agribusinesses. The MOA will also have implemented its scheduled measures to withdraw from the affairs of cooperatives, except for selected regulatory and financial audit function reserved for the public sector.

i) Targets will be achieved for PBDAC capital, for its operating income, and for changes in its organization and staff, based on bench-marks to be established within one year.

j) Towards reforming the seed processing sector, additional bench-marks are:

- institutionally separating seed development (regulation, certification, control, etc.) from seed production and processing activities.
- submitting new seed legislation to Higher Policy Committee which would redefine the role of the public sector, provide increased incentives to the private sector, and allow divestiture of current seed processing facilities.
- selling or closing a number of seed processing facilities.

C. Sixth Tranche Bench-Marks

a) The cotton procurement price will be adjusted to equal or exceed the medium term target (i.e, two thirds of the international price).

b) The quota for mandatory delivery of rice to the government will be eliminated. All GOE prohibitions and restrictions on possession, milling, transport and marketing of rice by the private sector will be eliminated.

c) By the end of 1992, the retail prices of fertilizers will be adjusted so as to eliminate all remaining subsidies on fertilizer (with the possible exception of subsidies for potassium sulfate).

d) Prices for all wheat bran and cottonseed cake will be raised to levels that fully reflect either border prices or local, free-market prices.

e) Charges for cotton pest control will be adjusted so that the combined total of explicit and implicit public sector subsidies will be reduced to one half of the corresponding total pest control subsidy for 1988-1989 (contingent on achievement of a cotton price that allows benchmark C.a) to be fullfilled).

f) The MOA will adjust marketing policies for farm inputs so as to reduce the quantities of commercial farm inputs processed and marketed by the public sector, using the following guidelines:

- Private sector dealers will be permitted to trade and transport all farm inputs that are no longer subsidized.
- By the end of 1992, all fertilizer dealers (PBDAC, cooperatives, other private dealers) will have access on equal terms to imported and locally produced fertilizers. Local factories annual distribution or fertilizer to PBDAC at fixed prices will not exceed the following amounts:
  - 3.8 million tons of nitrogen (15.5% nutrient content), plus a share of production of amonium nitrate from new facilities to compensate for the cumulative decline in PBDAC imports of nitrogen;
  - 0.8 million tons of phosphate (15% nutrient content).
- By the end of 1992, public sector distribution of low-priced “unified” livestock feed will be discontinued.
- Imports and marketing of corn by PBDAC will be eliminated.

g) Interest subsidies on agricultural loans will not exceed the level of LE 105 million per year.

h) Targets will be achieved for PBDAC capital, for its operating income, and for changes in its organization and staff, based on bench-marks to be established (refer to the PBDAC strategic plans developed during 1990 and 1991).

i) An additional bench-mark will be included concerning seed legislation and the privatization of public sector seed facilities.

V. – Environmental Features of the Egyptian Agricultural Development

Within the last four decades, the economic and social development disregarded the ecological aspects for the Egyptian society. The food crises represented the first priority preoccupation of the government. Thereby, quantitative increases in production of the different sectors and activities of the economy represented the main concern when formulating the objective functions of the socio-economic development plans.

In agriculture, due to the scarcity of arable land, the limited cultivated acreage has been overused in order to obtain the possible maximum yield of different crops. The intensive year round cultivation and the flood irrigation system practiced in Egypt have led to salinization and waterlogging in a great part of the Nile Valley and Delta. Besides, the development and widespread use of industrially synthesized nitrogen fertilizers, crop-protecting pesticides and genetically improved crop varieties have combined to make today's agriculture much more chemi-

cal-intensive than ever before. Effects of agricultural practices on ecology and environment in Egypt can be summarized as follows:

– Soil deterioration of the arable land in Nile Valley and Delta because of the flood irrigation system which causes salinization and logging problems related to the inefficient drainage. Soil deterioration also has been the result of farmers practices taking the surface layer of the land to use it in construction activities.

– Transfer of a great part of the fertile land in the delta and the valley to non-agricultural uses such as urbanization, housing and industrialization.

  Soils share the surface layer of the earth with plants, animals and people. Soils are the product of ecosystems and a recorder of our earth history. By monitoring soil process, we can detect patterns and relationships significant to our understanding of ecosystems and the environments in which they exist.

– Pollution and overuse of Nile water. Overuse of Nile irrigation water is the result of flood or surface irrigation system, on one hand, and the free of charge irrigation water for farmers, on the other hand. Industries waste and municipal wastewater, human activities as agriculture, forestry, urban runoff, construction, abandoned mines and atmospheric deposition are contributors of both conventional and toxic pollutants. The problem of water hyacinth existing in huge quantities in the Nile represents a serious economic and environmental problem.

  If Egypt does not really suffer a shortage of water now, the available supply of water in the near future will not be sufficient. Total available supply of water to Egypt as of 1990-1991 amounted to 61.45 bn.m^3 out of which: 54 bn.m^3 Egypt's quota of the Nile water, 4.6 bn.m^3 reused drainage water, 2.85 bn.m^3 underground water.

  This total amount was consumed according to the following uses: 49.7 bn.m^3 for agricultural purposes, 7.7 bn.m^3 for households and industrial purposes, 1.84 bn.m^3 for maritime and balance purposes and 2.21 bn.m^3 for horizontal expansion of cultivated acreage.

  As far as the future perspectives are concerned, the average annual available supply is expected to amount to 69.8 bn.m^3. It includes 55.3 bn.m^3 Nile water, 2 bn.m^3 expected from the first phase of Jongly Canal and 4.9 bn.m^3 underground water. The requirements are expected to be 54.4 bn.m^3 for agricultural use, 11 bn.m^3 for households and industries, 0.3 bn.m^3 for maritime and balance purposes and 4.1 bn.m^3 for agricultural horizontal expansion.

  If 150,000 feddans have to be reclaimed annually as expected in the agricultural development plans, the available supply of water from the different sources will be in a shortage situation by the year 2002:

– Pollution and misuse of the Egyptian lakes which are the main source of fish production in Egypt.

– Pollution of the rural areas by the agricultural wastes such as animal manures, cereal straws and the water wastes. Annual agricultural waste of manures and straws in Egypt is estimated at 24 million tons. Out of this quantity, 60% could be recycled to produce energy, feeds and fertilizers[8].

– Chronic deseases in the rural areas caused by water pollution such as *belharzia* which affects about 50% of the rural population and affects their productivities.

– Chemical pollution due to the overuse of chemical fertilizers as a result of intensive techniques of agricultural production, on one hand, and subsidization policy of inputs, on the other hand. The government subsidies on fertilizers are estimated by about LE 176 million in 1991. The quantity used per unit of land in Egypt is very high with respect to the other countries. Consumption of nitrates (15.5%) increased from 4.3 million tons in 1983 to 5.0 million tons in 1990, that of phosphates (15%) from 0.9 million tons to 1.1 million tons, that of potash (48%) from 20,000 tons to 58,000 tons. Imports of all kinds of fertilizers increased from LE 112 million in 1981 to LE 234 million in 1991. The subsidized loans to farmers for fertilizers increased from LE 77 million in 1981 to LE 453 million in 1991, which represents about 18% of the total short-term loans offered to farmers by the PBDAC[9].

  Although chemical fertilizers are important for augmenting yields, the inapporpriate agricultural practices of irrigation and drainage result in bad effects on the soil and on the drainage water which should be reused for agricultural and other purposes.

– The overuse of pesticides and their toxic effects on the rural environment and on the rural population. The use of pesticides as the only method of pest control has very bad short and long run effects. The injury caused to farmers via the direct contact with pesticides is the major bad effect on the rural population. The consumption of food that contains residues of the pesticides is another environmental and food safety problem.

Pesticides quantity used increased from 14 million tons in 1981 to 19 million tons in 1990. Quantity used per feddan increased from 2.4 kg to 3.1 kg within the same period[10].

– The excessive use of these harmful chemicals may destroy the natural enemy species and cause the imbalance of the ecosystem as a whole. The absence of forests and grasslands in Egypt is attributed to the fact that Egypt is an arid land and the rainfed agriculture is negligible. This could be compensated by adopting the agro-forestry systems which combine crops, trees and animals. The Western North coast has good potentialities for such activities. In the new lands, fruit trees and breakwinds are the appropriate practices.

VI. – Sustainable Agriculture

"Sustainable agriculture development" is the new term used nowadays as a substitute for the "traditional" agricultural development. According to the *USA Yearbook of Agriculture*, 1991[11], this new approach of agricultural development is the use of the very best of technology in a balanced well-managed and environmentally responsible system that is at the same time economically viable. It is an economically viable and environmentally sensitive strategy of agricultural development. It guarantees current and future agricultural productivities by protecting the natural resources such as water, land and soil, and the biobalance of the ecosystem. It does not sacrifice the subsistence of future generations. This is the reason why it is qualified by the term "sustainable". It does not mean going back to the traditional ways of agricultural production, but it can depend on the state-of-the-art technologies.

According to sustainable agriculture, the integrated pest management (IPM) is supposed to substitute for the pesticide use. It is an ecological method for pest control. It relys on a combination of methods such that environmental damages and human risks are reduced to the minimum. Pesticides are not the only means for pest suppression. These are other ways more ecological (e.g., biological and genetic control, resistant varieties, timing of the growing seasons, cropping patterns and crop rotation).

The application of the IPM in the USA includes several concepts and techniques such as economic thresholds, sampling technologies, modeling national control, geographic distribution, effects of pest migrations and movement, host resistance and pesticides. The economic thresholds of a pest population is defined as the population level below which the cost of taking control action exceeds the losses caused by the pest. Pest population levels that can be tolerated with a crop system vary because of crop harvesting schedules and inherent crop tolerance to pest attack.

Notes

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Table 1*. Egyptian Food Gap and Coefficient of Self-Sufficiency During the Period 1972-1991
(main staples shortage in the doùestic production)

Year	Fresh fish		Wheat		Maize		Cooking oils		Sugar		Red meat		Milk		Chickens (non-trad. sector)	
	(8)		(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %	Gap 1000 Ton	CSS %
1972	11	90	3,022	23	98	96	127	52	-	100	39	88	64	96	-	100
1981	73	72	5,861	20	1,054	74	362	20	476	57	185	66	1,138	62	65	74
1982	89	69	6,138	21	1,354	70	388	20	621	50	196	66	1,300	61	69	75
1983	118	62	6,308	21	1,480	68	449	18	549	58	157	72	833	70	84	90
1984	134	60	7,011	19	1,320	71	443	20	651	52	326	63	1,117	64	58	81
1985	117	65	7,212	17	1,433	71	428	22	552	60	240	62	380	84	80	76
1986	106	68	7,708	17	1,437	71	467	20	513	62	237	66	298	87	39	88
1987	88	74	7,036	18	1,373	66	483	20	500	65	187	71	466	83	56	84
1988	102	72	7,113	24	1,459	70	436	21	605	58	168	74	458	82	57	80
1989	102	73	7,501	24	1,248	75	501	18	526	62	180	71	422	84	12	95
1990	134	68	6,840	28	1,183	78	485	17	484	63	217	70	250	na	6	97
Average 1981-90	106	68	6,873	21	1,335	72	444	20	548	59	199	74	701	74	47	83

* It includes the main staples shortage in the domestic production.
(1) All kinds converted in grains
(6) Powder is converted into liquid milk.
(7) Traditional sector chicken production as of 1990 is 142 thousand tons.

Source: F. Halim. Demand of staples. FAO S MALR. Cairo. 1992.
Ministry of Supply.
Ministry of Agriculture and Land Reclamation.

Table 2. Total Daily Caloric Intake Compared to Annual per Capita GDP in some countries. Average 1984-1986

Country	Daily total caloric intake	Animal calories to total calories intake	Annual per capita GDP	Annual per capita consumption
	calories	%	US $	kg
Emerates	3,713	23	15,600	1,036
Lybia	3,611	17	5,550	775
Egypt	3,313	8	680	651
Syria	3,259	14	1,760	775
Kuwait	3,078	25	16,600	807
Saudi-Arabia	3,032	20	6,930	700
Tunisia	2,942	9	1,130	621
Morocco	2,863	7	580	474
Algeria	2,687	12	2,610	509
Sudan	2,074	22	300	431
Arab countries	2,825	17	3,447	627
USA	3,642	34	17,530	995
Italy	3,494	27	8,570	1,074
France	3,273	37	10,710	1,007

Source: F. Halim. Agricultural Economic Cooperation in the Arab World. FAO. 1990.