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Agriculture and Food Policy in Tunisia

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Abstract. This paper provides an analytical description of the relevant economic environment within which agricultural activities are undertaken and of general sectoral characteristics and policies. There will be an attempt to analyze factors determining supply and demand for various food categories. First, an overview of the economy and its macroeconomic performance will be given; policy variables regarding production, consumption and trade will be analyzed subsequently. This monograph intends to lay the groundwork for future research on more precise policy questions.

In the presentation of this monograph, an attempt has been made to give a detailed picture of the agricultural and food sectors in Tunisia, including their potential as well as their problems.

In regard to the agricultural sector, technical research suggests that resource mobilization and productivity growth are feasible. Should these productivity gains prove to be economical, national goals regarding food self-sufficiency may become achievable. Research in this area is needed to indicate opportunities for public and private investment to induce the necessary adjustments in supply.

On the consumption side, major revisions in past policies of consumer assistance are taking place. Gradual public disengagement from price-fixing and/or subsidizing is being implemented. This means more reliance on market behavior. Old policies resulted in heavy public budget deficits and perhaps in over-consumption of products. Potential consumer reactions to these adjustments and their nutritional consequences have yet to be researched. The extent of direct and cross-price effects and the resulting changes in consumption patterns need to be further investigated.

The structural economic adjustment package introduced in 1986 seems to have targeted real weaknesses in the economy. Yet, getting the economic system to function more smoothly and according to efficiency criteria will need serious investigation into real constraints on agricultural development: appropriate technologies, appropriate infrastructure, removal of real market distortions such as monopolies, change in public rhetoric toward producers and consumers and, above all, better economic discipline on the part of international trading partners.

All this is neither easy to accomplish nor is it under the total control of national public policy-makers. Furthermore, social considerations that may be costly for governments to overlook will force real economic adjustment to take place only slowly.

Introduction

Despite the potential for self-sufficiency in foodstuffs, Tunisia increasingly imports basic food commodities. Why has this become necessary? Is it due to limited natural resources, inadequate technologies and inefficient markets or to inappropriate government policies and institutional choices? What are the consequences of these policies for nutritional standards?

The purpose of this study is (Bachta, 1990) to understand within a macroeconomic framework why the Tunisian agricultural sector has become increasingly unable to provide necessary food products, and thus *(Banque Centrale de Tunisie)* to evaluate national food and agricultural policies. Ultimately, the objective of the study is to make a critical assessment of these policies and to make appropriate recommendations. In particular, the on-going “structural adjustment program” introduced in 1986 will be considered, and the extent to which such a program deals with the roots of the food and agricultural problem will be ascertained.

This paper provides an analytical description of the relevant economic environment within which agricultural activities are undertaken and of general sectoral characteristics and policies. There will be an

attempt to analyze factors determining supply and demand for various food categories. First, an overview of the economy and its macroeconomic performance will be given; policy variables regarding production, consumption and trade will be analyzed subsequently. This monograph intends to lay the groundwork for future research on more precise policy questions.

I – Overview of the Tunisian Economy

This section is divided into two parts: the first part describes country characteristics in terms of physical and human resources; the second part provides a general presentation of key macroeconomic characteristics necessary to understand food policy problems.

1. Country Characteristics

A. Physical Setting

Located in North Africa, Tunisia is bound on the north and east by the Mediterranean sea, on the south by Libya and on the west by Algeria. Of all North African countries, Tunisia has the longest Mediterranean coast line, giving it a temperate climate and sizeable fishery reserves in addition to the tourist attractions which annually draw a minimum of one million foreign visitors.

Tunisia covers about 63,170 square miles, corresponding to approximately 16 million hectares. This total area consists of 30% arable land, 27% pasture and forests, and approximately 43% agriculturally unusable land. This means that only about half the country contributes to agricultural production.

With regard to climate, rainfall is a major, though variable, factor, ranging from an average of less than 100 millimeters a year in the south, to over 1000 millimeters a year in the extreme north of the country. As one goes north, however, the topography becomes more and more sloped, leaving relatively little cultivable land in areas of relatively high rainfall. The opposite is observed as one moves southwest, suggesting a negative correlation between the availability of arable land and that of water. This implies that agricultural activity is undertaken, for the most part, under limited and highly variable rainfall. Temperature and wind are no less variable, frequently causing serious damage to agricultural crops.

The country is generally divided into the following naturally homogeneous subregions: northeastern, northwestern, east central, west central and southern regions.

B. Human Resources

Tunisia's population, estimated in 1989 at about eight million, is rapidly growing. In fact, population growth is a serious problem and of major concern from the point of view of economic and social stability. Not only is the population growth rate high but the labor force is growing more rapidly still. Consequently, unemployment is high. *Table 1.1* demonstrates the population change over the past eighty years.

The population growth rate has been increasing since the beginning of this century, reaching a peak of more than 2.5% a year in 1984. Now it is apparently slowing down, but only slightly. It took almost fifty years for the population to double, from 1910 to 1960, while it doubled again in only thirty years, 1960-90. The population is very young, half being under twenty. Illiteracy, although reduced, is far from being eradicated, and a large section of the labor force is still basically uneducated.

Note that one fifth of the total labor force is made up of women, which is a relatively high proportion compared to other Arab countries.

According to the most recent labor survey conducted in 1989, almost 500,000 people are unemployed, i.e. more than 20% of the labor force. Most of this unemployment is urban, correlating with the decreasing share of agriculture in total employment. Thirty years ago the opposite was true; the peasantry represented most of the labor force and food self-sufficiency was the norm. In 1989, agricultural employment represented less than 20% of total employment as compared to almost 50% in the 1960s. What

has been happening is that rural people have been relocating to urban areas while productivity in the agricultural sector has not increased fast enough to compensate for the loss of their labor. *Table 1.3* shows the evolution of the urban versus rural share of the population.

The reduction in the share of the rural population is correlated with the development of industrial activities and more attractive urban incomes. This may also indicate that policy-makers have placed decreasing emphasis on promoting agricultural employment. Hence, both the food deficit and unemployment have become a structural feature of the macroeconomic scene.

Unemployment may not be the only social problem but it is a fundamental one, as other major problems, including the access to food, depend on it. It is intimately linked to poverty, productivity, the trade deficit and other macroeconomic variables, as described below.

2. Macroeconomic Characteristics

Industrialization has become a reality in modern Tunisia and has generated substantial growth over the last 25 years, although not enough to achieve full employment. During the twenty five years from 1964 to 1989 real GDP quadrupled, while the population less than doubled. This means that per capita GDP has more than doubled. However, the high growth performance did not continue through the 1980s. Perhaps it did not last because it was not the outcome of a robust and efficient economy. Indeed a drastic slowdown occurred during the 1980s. Many indicators reveal how vulnerable the economy has been recently, including high unemployment; heavy debt (which is partly the outcome of excessive growth of private and public expenditures and of overpopulation); decreased productivity and inefficient use of resources; and occasional social unrest.

A. The Foreign Deficit

The Tunisian trade balance, including goods and services, has been consistently negative for more than three decades. Moreover, foreign transfers (factor receipts), owing mostly to remittances from Tunisian emigrants, were often nearly enough to balance payments for foreign and borrowed capital (debt servicing) but this account has fluctuated and seems to be deteriorating. Hence, increasing amounts of foreign capital are needed, given the current account deficit. The debt became more serious in the mid-1980s, when cumulated debt neared 60% of GDP, debt servicing 30% of export earnings, and foreign currency reserves were vanishing. *Table 1.6* gives a snapshot of the general economy and how it evolved for selected years.

B. Protection and Inefficiency

This critical situation resulted in major market distortions which contributed to the adoption of a structural adjustment program, and the introduction of a new policy mix for the economy. The foreign deficit is increasingly perceived as the result of past economic policy which was heavily based on import substitution, protection, and bureaucratic regulation. Most analysts now recommend freer market mechanisms. Assessment of this picture requires a closer look at economic indicators and performances, which will be the subject of the third section.

II – Agricultural Sector Macrodecomposition

This chapter presents the main sector components in order to identify potential constraints on the agricultural development process, with special emphasis on those directly related to agricultural development policy.

In the early 1960s, agricultural share in GDP was approximately 20%. Since the mid-1960s, industry and services have begun to grow. Their share in GDP increased because of a relatively high rate of growth. Agriculture, despite the fact that its rate of growth improved during the 1970s and early 1980s, could not maintain the same share in GDP, while industry and services grew at a higher rate. Agriculture contributed an average of 18.2% to total GDP during the 1960s. The decline in this contribution is frequently

attributed to the lack of production incentives. During the 1970s, agricultural share in GDP dropped to 16.9%, and from 1980 to 1988, it dropped even further to 13.6%. This drop in the agricultural share of total GDP has resulted from, as stated earlier, the rapid growth of industrial production and also of services (mainly tourism) and from slow productivity growth in the agricultural sector.

Even though agricultural production increased over the years, its growth was not sufficient to meet increasing demand for food products. In fact, population increase (2.5% per annum) coupled with a higher per capita consumption of food products—a consequence of improved revenues and relatively low food prices—led to increasing demand. The balance of trade of food products was positive through the early 1970s as shown in *Table 2.1.* It became negative in 1975 and the deficit has increased ever since. Food imports averaged 19.2% of total imports during the period 1960-1974, and 12.2% during the period 1975-1988. Food exports averaged, respectively, 41.6% and 11.8% for the same periods. In percentage terms of total imports, it is true that food imports have come down by about 37%, but food exports fell by over 80%, suggesting there are food problems not only on the demand side, but on the supply side as well.

In 1975, the balance of trade of food products began to show a deficit that became permanent. From 1975 to 1979, food products contributed an average of 9.6% to the trade deficit. This ratio increased to 17.8% during the period 1980-1984 (with a record of 24% in 1983) and dropped to 12% in 1985-1988. This was due to increasing consumption combined with deteriorating terms of trade for food products. Even though the balance of trade of food products dramatically declined after the mid-1970s, there has been recent improvement as more diversified food products were exported. Olive oil used to contribute more than 60% to total food exports. Its share dropped to not more than 35% in the late 1980s whereas other products have increased their share in total food exports. For example, fish exports which used to contribute no more than 5% in the 1970s now contribute more than 35%.

Food nonetheless remains a major component of the Tunisian trade deficit. It is important to understand this evolution. Many human, natural and physical factors must have contributed to this performance.

1. Natural Resources

A. Land

As indicated earlier, only 30% of the total area of the country is classified as arable land, a percentage which has changed little over the years. However, if no significant measures are taken to limit desert advancement and soil and water erosion, this percentage is likely to drop. To date, these phenomena have contributed to the accelerated rural exodus to urban cities. Resource mobilization and conservation constitute a major challenge to agricultural development designers, particularly with a population growing at an average annual rate close to 2.5%. In 1956, one hectare of arable land had to feed 0.8 persons only. Today, the same hectare of arable land has to feed 2.1 persons. As shown in *Table 2.2*, arable land covers 4.8 million hectares out of the 16.2 million hectares that constitute the total area of the country. However, the 3.3 million hectares of grazing land and one million hectares of forest constituting natural agricultural resources should also be considered.

The geographic distribution of the 4.8 million hectares of arable land is critical, as the distributions of rainfall and soil fertility are uneven throughout the country. Indeed, the northern part of the country, covering only 20% of the total area, is the most favorable for agricultural activities (average rainfall over 350 mm per year and exceeding 600 mm in some areas, and land with relatively high fertility). 39% of total agricultural land is located in this area, whereas the remaining 61% is located in the central part of the country (characterized by low fertility and low rainfall, between 100 and 250 mm per year). Little arable land is found in the southern part of the country with its dry, desert characteristics.

Land distribution among farmers is also an important negative side of agriculture. According to 1986 survey data, 85% of farmers cultivate farms of less than 20 hectares and control only 37.5% of the total area; whereas the remaining 15% of the farmers run farms of over 20 hectares, and control 62.5% of the total arable land. The average farm size is 6 hectares for 85% of the farmers, which may be too little for profitable rain-fed agriculture.

Statistics pertaining to land tenure show that the distribution of agricultural land has remained almost unchanged during the last three decades, suggesting that no major structural changes have occurred during the period.

B. Water Resources

The second most important limiting natural resource is water. Tunisia has a rather arid climate and water is scarce, particularly during some seasons. Potential water resources are estimated at 4,360 million cubic meters per year allocated between surface water (60%) and ground water (40%). These water resources are characterized by high variability in accordance with variability in rainfall. Out of the 4,360 million cubic meters, only 3,830 million cubic meters are potentially exploitable, with 2,460 million cubic meters made available. There are 16 water dams in the country capturing an estimated 1,200 million cubic meters of water per year out of a potentially exploitable volume of 2,100 million cubic meters (57%).

Water dams under construction, and those planned to be constructed before 1991, will allow the volume captured to reach 1,600 million cubic meters, representing 75% of the potentially exploitable volume. With respect to ground water, there are an estimated 79,000 wells among which 40,000 are equipped with water pumps. These wells make available some 563 million cubic meters of water per year out of a potential of 586 million cubic meters. There are also 1,940 deep wells reaching a depth of 2,300 meters in some cases and providing 740 million cubic meters out of potential 1,139 million cubic meters. Eighty percent of the water made available is allocated to agriculture for irrigation. There are an estimated 250,000 hectares of irrigable land. Irrigated crops consist essentially of trees (such as citrus, table grapes, pears, apples, and dates) and vegetables (such as potatoes, tomatoes, peppers, and artichokes). It is interesting to note that in spite of the relatively high value of water, only 85% of the total area equipped for irrigation is actually irrigated, and the intensity of irrigated area use, instead of being 120% (more than one crop per year on the same land) is only 76%.

Research is therefore needed to explain this relatively low intensity and to suggest ways to make better use of the existing costly irrigation infrastructure.

C. Major Crops

The division of cultivated agricultural land by major crops shows the importance of grains (wheat and barley) and tree crops which together cover around 87% of the total: grains with 43% and tree crops with 44% (mainly olives). The remaining 17% is allocated between forage crops (7%), vegetable crops (3%), legumes (2.5%) and others (0.5%). The focus will be grains and tree crops, in view of their share in land allocation.

The share of grains in total cultivated agricultural land varies significantly in relation to the amount of rainfall recorded during the months of October and November. On average, however, grains cover 1.7 million hectares of land. The regional distribution of agricultural land cultivated under grains is as follows: 47% in the northern part of the country and 53% in the central and southern parts. The area under grain cultivation is relatively stable in the northern part while it varies greatly in the central and southern parts. This variability is strongly correlated with that of rainfall. As an example, during the crop season 1984-85, almost 1.2 million hectares were cultivated with grains in the central and southern areas of the country. During the crop season of 1986-87, however, only slightly over 0.3 million hectares were cultivated with grain, a drop of 75%. Knowing that yields are very low in central and southern Tunisia, it can be concluded that the contribution of these parts of the country to total grain production is extremely variable and could in some cases be commercially insignificant.

Tree crops on average cover 1.9 million hectares (44% of total cultivated agricultural land), out of which 1.4 million hectares are under olive cultivation. Other plantations are mainly almond, pistachio, date, apple and pear trees, and grapevines. Eighty-seven percent of the total area under tree crop cultivation is located in the center and south, and is cultivated under essentially rain-fed conditions.

Even though vegetable crops cover only 3% of total cultivated agricultural land, they contribute an average of 19% to agricultural GDP. Almost without exception they are irrigated. Part of vegetable production

occurs in greenhouses. Greenhouse production was introduced in the early 1970s and spread rapidly in the early 1980s. However, problems in marketing the vegetables on foreign markets resulted in major drops in the real, and in some cases even the nominal, prices received by farmers, which in turn brought about the stabilization of greenhouse production.

2. Human Resources

In 1986, there were an estimated 377,000 farmers in Tunisia. Between 1962 and 1986, the number of farmers had increased by 16% whereas agriculturally cultivated land had only expanded by 6% over the same period.

According to the latest surveys, Tunisian farmers today are characterized by an average age of 54 years and a high percentage of illiteracy (approximately 75%). This means that technological progress is slow and new techniques should be introduced carefully.

In 1966, agriculture employed some 519,000 workers, representing 46% of the total labor force in the country. The share of the agricultural sector in total employment decreased to 39% in 1975, then to 28% in 1984; and according to preliminary 1988 statistics, this share dropped to 26%. However, even with this decreasing share in total employment, agriculture remains labor-intensive and agricultural employment is socially and politically a sensitive domain.

One new trend contributing to this process is that farmers are hiring fewer wage laborers and relying more on family labor (two-thirds of total agricultural labor). The following table shows the evolution of agricultural labor between 1975 and 1980. Note the increasing share of female participation as males are more actively engaged in the rural exodus.

A. Research and Training Facilities

Research and training institutions, allowing for investment in human capital for agriculture, do exist. For this purpose, there is a large number of agencies, institutes and schools. Some even think there are too many.

The major institutions can be categorized as follows:

1. Five specialized research institutions: the National Agronomic Research Institute of Tunis (INRAT) which is the oldest; the Research Center for Rural Engineering (CRGR); the National Institute for Forestry Research (INRF); the Institute of Arid Regions (IRA); and the Olive Institute (IO).
2. Three institutes of research and services: the Tunisian Institute of Veterinary Research (IRVT), and the Soil and Water Resources Departments within the Ministry of Agriculture.
3. Seven university level training institutions: the National Institute of Agronomy (INAT), five schools of agriculture, and the National School of Veterinary medicine (ENMV).
4. Numerous research and experimentation centers affiliated with the government or with parastatel agencies.

In fact, not enough coordination exists between these institutions, and their product is far from adequate. These institutions often lack the right guidance and incentives.

A national program is underway to restructure research in the country by introducing better coordination between the different intervening parties, and developing a structural relationship between training, research and extension.

3. Infrastructure and Logistics

A great deal has been achieved in the field of physical capital accumulation and infrastructure, but a lot more needs to be done. For example, Tunisia inherited from the colonial period a relatively adequate

road and railroad network connecting the main cities. However, the secondary road network necessary for agriculture has been deficient. In fact, feeder roads in rural areas, if they exist, are not well maintained and become inaccessible during rainy seasons making input supply and output marketing costly, if not impossible, particularly for perishable commodities such as milk. Steps have been taken to improve these feeder roads: a major national program in this direction was initiated in the early 1970s. However, only limited improvements have been made to date.

4. Institutions and Marketing

A. Extension

Extension activities are carried out by three main intermediaries:

1. The administrative institutions directly under the Ministry of Agriculture's control.
2. The specialized parastatel agencies (livestock, cereals, wine, olive oil and irrigation parastatals).
3. The semi-professional organizations (for vegetables, citrus and other fruits, dates, poultry products and wine-grapes). However, over 90% of agricultural extension activities are carried out by public institutions. The Ministry of Agriculture has an estimated 650 extension units distributed all over the country, but with a high concentration in the northern region.

The staff working in these extension units has, in general, relatively limited training in agronomy and almost no training in the social sciences, which again raises the question of efficiency.

B. Marketing and Prices

The majority of agricultural products are marketed according to the rules of supply and demand, i.e., their prices are determined by market forces. However, some agricultural prices are set by the government for various reasons. For grains and their by-products, considered as strategic goods, prices are fixed by the government at all levels. The same goes for fluid milk. For some other agricultural products, prices are fixed by the government at the production level only. For example, tomato prices are only fixed if the tomatoes are to undergo processing.

Up until the 1970s, many more agricultural prices were government fixed, and since the mid-1970s, the pricing policy has been shifting towards more market oriented mechanisms. While liberalization and privatization are on-going processes, price controls have deeply influenced supply and demand behaviors.

During the 1960s, Tunisia experienced a collectivist period. Farmers were forced to constitute cooperatives for land cultivation. This experience did not last long as a radical change took place in the summer of 1969. However, its long term effects were important and recovery was difficult and slow. Government involvement in many areas, such as production, distribution of inputs, and marketing of outputs is among the many lingering after-effects of the 1960s trend. With respect to production, state owned lands which covered some 800,000 hectares in the mid-1960s (17% of total cultivated agricultural land) now cover 400,000 hectares (8.5% of total agricultural land): 200,000 hectares are directly managed by a state-owned institution called *Office des Terres Domaniales* (State Land Agency), and 200,000 hectares are under cooperative ownership. Again, privatization is scheduled. The first step in this direction was to create Agricultural Land Development Companies on state-owned farms by private investors on a 40-year lease basis.

C. Input Distribution

On the input distribution side, government involvement was linked to the existence of subsidies. Agricultural inputs were largely subsidized (over 50% of the price in some instances). Subsidy administration required government control and direct involvement in input distribution. Almost all agricultural inputs were marketed through parastatals, such as fertilizers, seeds, irrigation water, and chemical products for weed and pest control. Since the mid-1980s, the situation has been changing with faster liberalization and more reliance on market forces. This implied less subsidies and less price control. Present policies suggest that the private sector will gradually play a more important role.

D. Output Marketing

Marketing of agricultural outputs is shared by two main channels: the market and public enterprises.

The majority of agricultural products are marketed freely at some level, but those with fixed prices are controlled by state monopolies. Cereal grains are required to be exclusively sold to the state-owned *Office des Céréales* (grain board) which has the monopoly on buying locally produced cereal grains, and importing cereals from the international market. However, an illegal "parallel" market exists and is tolerated.

Olive oil has a similar marketing system. The *Office National de l'Huile* has a monopoly on buying and exporting locally produced olive oil and importing vegetable oil. The same applies to wine.

Initially the purpose of these monopolies was to stabilize prices, as farmers are guaranteed fixed prices with no limitation of quantity. In other words, price does not respond to variations in supply. Therefore, government agencies had to keep inventories and to build storage capacities at public cost. In some cases, privately-owned storage facilities were also used on a rental basis (such as in the case of olive oil).

This high degree of government involvement in marketing, mainly of cereal grains and edible oils, is based on the belief that these are "strategic goods"—whatever that means. Prices of these products were not only stabilized, they are also subsidized. In order to make sure that the subsidy system functions properly, so goes the argument, government involvement becomes a necessity. Obviously, this involvement is costly; adjustment has now become essential.

E. Credit

Agricultural credit too is almost entirely dominated by the government which specifies interest rates, lending terms, and conditions. The volume of funds provided according to loan purposes, methods of credit analysis and criteria governing loan decisions, and the handling of delinquent debtors are all decided by the government directly or indirectly. The *Banque Nationale Agricole* (BNA), the principal lending institution for agricultural credit, is a government bank.

The risk associated with financing farmers (most often the richest farmers are the ones to obtain loans) is apparently supported by BNA which monitors and supervises loan utilization and borrowers. Medium- and long-term agricultural credit through BNA's network (around 120 regional offices mainly located in the northern part of the country) is in fact funded through special sources external to BNA and involves a low risk. For example, the Special Fund for Agricultural Development (FOSDA), founded in 1963 and administered by BNA, depends on government budget allowances. It is a major credit source.

The main problems of the agricultural credit system are:

1. The existence of a multitude of agricultural credit lines with different lending conditions and interest rates.
2. Late payments that make debtors ineligible for credit (it is assumed now that only 10% of farmers have real access to credit).

It should be mentioned that there are experiments regarding the introduction of a special kind of credit for small and medium farmers. This kind of credit, called "supervised credit," is intended to enable small and medium-sized farmers to become bank clients. The credit is administered by the Ministry of Agriculture and channeled in part through BNA. It provides not only credit but also advice and extension, and is closely monitored by Ministry of Agriculture personnel. Its objective is to train farmers in credit acquisition procedures but not management. After 3 to 5 years under this special credit program, farmers can move on to become direct clients of the bank. So far, the experience has been somewhat successful and could be extended to cover other regions of the country outside of the pilot region.

Other kinds of credit also exist, but they are not institutional. They are exclusively in-kind credits and are distributed to small farmers by government agencies such as the National Grain Board *(Office des Céréales)*. The volume disbursed under this scheme is unimportant relative to regular credit, and is decreasing.

III – Economic Performance Indicators

This chapter is divided into five sections. The first section describes growth indicators (GDP in real and nominal terms, and GDP distribution). The second part provides a detailed picture of international agricultural trade (balance of payments, structure of trade, foreign deficit, etc.). In the third section, macroeconomic policies regarding effective protection and exchange and interest rates are discussed, followed by an analysis of household expenditures. In the final section, the behavior of main agricultural prices will be examined.

1. Growth Indicators

Tunisia's first development program was designed in the early 1960s at a time when the political environment and the main stream of development thinking favored nationwide planning and government-led investment programs. Hence, ambitious macro and sectoral government projects were proposed to enhance growth, improve welfare, and modernize the country. This involved structural planning, centralized decision-making, and the creation of public industrial enterprises and cooperative farms. Moving the saving and investment rates from the low (below 10%) rates which characterized the colonial state to much higher rates (above 20% for investment) was another structural choice. Given that per capita income was initially low, it was admitted that in order to take off, the country could not do without foreign investment. This phase of economic planning lasted less than a decade and a different approach was adopted for the 1970s.

It is not easy to evaluate the performances of development efforts adopted in the 1960s. These efforts produced profound and qualitative social transformations. For the first time the Tunisian people were educated *en masse* and were able to benefit from public health care programs and modern institutions. Investments did increase sharply and major industrial and infra-structural projects were implemented. However, many indicators show the 1960s was a fragile period and state planning led to much inefficiency:

1. The rate of growth of GDP was rather modest, though significantly positive.
2. Serious hardship had to be overcome mainly in the area of foreign trade and payments, so much that a stabilization program was undertaken in the mid-1960s.
3. Waves of rural to urban migration had appeared, and agriculture declined.

In 1969, structural adjustments were undertaken, and a major shift to less centralized planning and more free market and private ownership occurred during 1969-70.

The 1970s appeared to be glorious years, with an average rate of growth of around 7% and a particularly high rate of growth of manufactured goods (approximately 15%). However, as will be explained later, this growth was partly the outcome of short-term factors. Important hidden costs were not clearly revealed until the 1980s.

This fast progress was enhanced, especially in the mid-1970s, by favorable terms of trade regarding exported Tunisian mineral products. In particular, relatively important oil revenues helped to ease basic financial constraints. Production averaged five million tons yearly during most of the 1970s. Now it is decreasing rapidly while consumption is increasing and Tunisia may soon become a net importer of oil.

On the other hand, the newly born industries were geared towards domestic demand owing to heavy trade barriers as well as to various incentives. Because of the import substitution policy, with the exception of oil, not enough exportables were produced. Instead, investors had much higher incentives to produce import substitution and local goods for which higher profits and a stable demand were guaranteed. At the same time, the increasing share of industrial production did not really facilitate the modernization of agriculture so much as bring about its stagnation. Agriculture was much less protected than industry was until the mid-1980s.

2. International Trade

While the Tunisian economy is growing, it is at the same time becoming increasingly dependent upon the rest of the world for industrial inputs, technology, food, investment, and finance. Dependency may be

considered an important sign of weakness mainly because it determines future development possibilities. The foreign payment capacity is certainly a crucial factor for present and future policy.

For the moment, major Tunisian exports fluctuate widely while depending heavily upon the fluctuating and exogenously-determined international demand. Therefore, obtaining a better command of exports by gaining high proficiency and a clear comparative advantage in some markets will be a major challenge.

Tables 3.2 to *3.4* show the structure of the balance of payments and of trade. *Tables 3.2* to *3.4* show in particular that:

1. once again, the foreign current deficit is very important.
2. exports are concentrated in a few vulnerable areas such as tourism, textiles, oil, and phosphate products.
3. imports include mainly manufactured goods (equipment and inputs) and foods, which are essential, and hence generally price-inelastic.

As indicated above, these features reflect not only international influences, but also policy choices. Policy choices which have significant influence on international trade (and thus upon Tunisia's trade deficit) include heavy protection, determination of nominal and real exchange rates, and, hence, public finance.

A. Effective Protection

Several studies, accomplished mainly by the Institute of Quantitative Economics (IEQ), have determined the degree of protection of the Tunisian economy. It is globally estimated that the effective protection rate is around 70%, and when the effect of incentives due to the fiscal system is included, the rate reaches 87%. This indicates a serious lack of competitiveness on the world market, and explains why protected goods have only been marketed domestically. The rates of protection for locally consumed goods are much higher than those for exported goods *(Table 3.5)*.

The industrial sector is more protected than agriculture, although the situation has been changing recently *(Table 3.6)*.

B. Exchange Rates

Exchange rates are fixed officially by the central bank, yet the black market for foreign currency hardly exists. Rates used to be adjusted according to the variation of key currencies only, but for the last few years they have also depended on competing countries exchange rates. It had been estimated that the Tunisian dinar was overvalued with respect to other relevant currencies, which is why a substantial devaluation has gradually taken place since 1986.

C. Interest Rates

Low interest rates, even negative real interest rates, during the 1960s and 1970s greatly contributed to the destabilization of the economy and are an important cause of the alarming indicators regarding the foreign deficit and low productivity of capital. A low interest rate generally leads to over-investment. Hence, the opportunity cost of capital is not reflected correctly by the interest rate.

D. Inflation and Public Finance

Inflation may not be Tunisia's main problem, even though compared to some neighboring and competitor countries, it was quite high. Inflation averaged approximately 8.5% a year, less in the 1960s and more during the 1980s *(Table 3.7)*.

For trade unions, these rates were considered high and stimulated a sustained labor movement which increased the cost of industrialization.

It is traditional to explain rising inflation on the basis of a persistent government budget deficit and the subsequent increase in money supply. The data from *Table 3.7* show that inflation was highest between 1975 and 1985, as was the state budget deficit and incremental money supply *(Table 3.8)*.

While the money supply did not vary erratically, monetary policy was neither very restrictive nor well targeted. Instead, it was pragmatic, allowing government regulation according to financial needs.

It is reasonable to conjecture that a causal relationship among public finance, money supply, and prices existed. This link is more obvious with regard to the government budget deficit and increase in money supply: higher inflation did coincide with a higher deficit and a rapidly increasing money supply *(Table 3.9)*. Such macropolicies induced and consequently aggravated the Tunisian foreign deficit, which is in fact the outcome of a variety of factors and policy instruments regarding international trade.

3. Household Expenditures

The focus will now be on examining the demand side of agricultural commodities by analyzing the structure of Tunisian household consumption patterns on the basis of the available information gathered through the 1985 national household expenditures survey conducted by the National Institute of Statistics (INS).

As expected, considering the development stage of the country and local habits, food expenditures take up, on average, about 40% of total consumer expenditures. They exceed the strong budget proportion of about 28% allocated to housing, an activity most households consider as a necessary and secure long-term investment. *Table 3.10* summarizes the composition of total household expenditures on a per capita basis.

The general emphasis of public policy-makers on staple food items described above leads one to expect cereal products to account for the largest share of food consumption expenditures in an average household. However, *Table 3.11* suggests that this is not the case as expenditures for grains falls third to expenditures for meats (including poultry) and legumes.

While these figures may be striking at first glance, one must recall that cereal products are purchased at the consumer level, not at their true market value, but with major public subsidies. It may also be surprising that meat products have the highest budget share, but this group includes high market valued products. Furthermore the relatively high average expenditure share of this group needs to be broken down by household category.

A. The Case of Cereal Products

On the final consumption side, the main locally produced and consumed cereals are durum wheat, bread wheat, and barley. Durum wheat is used for making semolina, the precursor to preparing staple foods such as couscous, which is heavily consumed throughout the country. Bread wheat, as the name implies, is primarily ground and used for bread. Barley is primarily used for animal feed, but humans also consume it in various forms. *Table 3.12* provides an idea of the distribution of total cereal products consumption in physical units.

These figures indicate the tremendous weight wheat consumption occupies relative to other cereal grains. Durum wheat consumption is higher than that of bread wheat and barley. Statistics reveal also that human consumption of barley is low. However, this may be a distortion of reality resulting from subsidized relative prices, and not a true reflection of consumption habits.

The description below provides details of how household expenditure varies with income levels and geographical milieu, with a description of expenditure patterns since 1975. The role of the state in maintaining affordable food prices will also be discussed.

B. Food Consumption by Milieu

Average consumption of basic food commodities varies from rural to urban areas. On a per capita basis, traditional products such as durum and barley tend to be consumed more in rural areas. Other products with higher budget status are consumed more in urban areas (such as bread wheat, meat and milk). *Table 3.13* gives a quantitative picture of the distribution of food products between rural and urban areas.

Average consumption of other basic commodities, however, including oil, sugar and, to some extent, milk, varies little from one area of the country to another. Limited variation in eating and cooking habits are probably at the origin of such homogenous consumption patterns.

C. Food Consumption by Income

Total food expenditure as a percentage of total budget has a tendency to decline as incomes rise, regardless of milieu. *Table 3.14* shows such a pattern in both urban and rural areas.

At all income levels, the percentage of household budgets that is spent on food is higher in rural areas than in urban ones. As incomes rise, however, the general average decline is clear in both cases and it is of the same order of magnitude. The general decline of food expenditures as incomes rise is an illustration of Engel's Law of Demand.

D. Consumer Behavior since 1975

The sole information source for household consumption behavior is a national cross-section survey carried out by the National Institute of Statistics every five years or so. The following observations are based on the results given in *Table 3.15* which utilize quantitative information drawn from the 1975, 1980 and 1985 national household expenditure surveys.

Let us first look at the overall change in consumption of the main products analyzed above. An initial observation can be made regarding the relatively steady position occupied by durum wheat in the overall make-up of the consumer budget over the entire 10-year period. Bread wheat consumption has on the other hand increased by approximately 24% over 10 years. This reflects: (1) a higher per capita demand for this type of wheat and its by-products and (2) changing eating habits. As it is unlikely that the per capita consumption of bread has increased, this rise is probably due to rising incomes between 1975 and 1985 which have augmented the demand for other bread wheat flour products such as pastries. Another cause may be bread wheat substitutes arising from new consumption habits and changes in relative prices.

The average estimated consumption of liquid milk has also increased as households have become better informed about the nutritional benefits of milk, particularly for children, and also as retail consumer prices have been subsidized.

Beef consumption doubled between 1975 and 1985 whereas the consumption of mutton remained constant over the same period. Health considerations, in addition to relative price changes, play an important role in today's eating habits so that beef is preferred to mutton because it contains less fat.

Per capita poultry demand has also increased. Broilers are substituting more and more for red meats as a result of changes in relative prices.

Barley and olive oil consumption have declined somewhat, whereas the consumption of vegetable oils has increased slightly. Imported vegetable oil was mixed with olive oil to a significant degree in some years. This has made both types of oil apparently interchangeable to the consumer with a difference in price going from 1 to 4 in favor of pure oil. One might have expected an even stronger decline in olive oil consumption, but the major part of locally produced, and therefore locally consumed, oil is olive oil, causing the per capita average to remain at 1975 levels.

E. The Role of Government in Consumption

As indicated earlier, up to the mid-1970s the overall food trade balance was positive. Since then the population has continued to grow, as have per capita incomes. This has resulted in an ever expanding domestic demand for food with no matching growth in supply. The government chose to intervene by keeping food prices low, creating a Compensating Price Fund (CGC) in 1970. This body intervenes in market forces at many levels of price formation, at least indirectly, through input prices for almost all agri-

cultural products. The price ceiling mechanisms introduced by the government for major goods, over the last twenty years, have resulted in the following:

1. levels of consumption that exceeded domestic production with excess requirements met by imports.
2. rising growth in the CGC public budget, which increased from 1.3 million dinars in 1970 to around 400 million dinars in 1989.

Table 3.16 lists the cumulative amounts and the composition of the CGC food budget for the years 1987-1989.

Note the heavy position cereal products occupy in CGC budget spending. More recent figures are much higher in absolute terms but the relative distribution has changed little from the three-year total indicated above.

Current government policy aims at limiting the growth in government outlays on food consumer items by stimulating domestic agricultural production, and by better targeting of food subsidies to the needy while "well-to-do" consumers adjust their budget expenditures according to the market.

4. Agricultural Prices

This section includes a description of what has happened to prices of domestic agricultural products at the production level over time. This information should indicate how profitable agricultural production has become. A closer look will be taken at prices of a selected export crop, olive oil. Price information will be given in nominal and real terms so as to account for inflation. Then, the pattern followed by a typical import-competing food commodity group (milk products) will be examined. This section has two main objectives. First, the reader is given an idea of agricultural terms of trade, how they have evolved over the last twenty years, and a comparison of these terms with previous information on exports. Second, by comparing the prices of imported products with local prices, a picture is given of the comparative advantage domestic milk production might have.

A. Food Crops: Cereal Grains

Generally speaking, nominal cereal grain prices have known two distinct phases. During the 1970s, they increased by approximately 60%. During the 1980s the nominal price increase was more rapid as prices for all cereal grains more than doubled, going from 7.7 to 20.9, 8.6 to 24.5 and 5.9 to 15.0 dinars/quintal, respectively for bread wheat, durum wheat, and barley. This upward adjustment in cereals prices reflects a change in policy that is aimed at inducing growth in agricultural production, and thereby increasing farmers' incomes.

Indeed, prices of both types of wheat followed the same pattern through 1986 with a slight edge in favor of durum wheat, an edge which has been increasing since then. Barley nominal prices have also been increasing at about the same rate but only up to the years 1982-83. These prices continued to increase afterwards but at a much slower rate *(Fig. 3.1)*.

This generally favorable trend disappears as one looks at the same prices but in real terms *(Fig.3.2)*. Deflated by the wholesale food price index, all three cereals, durum wheat, bread wheat and barley real prices have stagnated.

Economic theory suggests that no increase in the production of any commodity can be forthcoming following a price change unless the change happens in real and/or relative terms. Price-wise, it appears that prices of the three main cereal products have remained approximately constant through time, one relative to the other. Hence, this may partly explain the relative rigidity domestic cereals supply has shown over time.

B. Export Crops: Olive Oil

Olive oil had been the main foreign exchange earning agricultural export commodity up till very recently. Indeed, with the exception of the last couple of years during which sea-food products have taken a lea-

ding position, olive oil exports have been an important permanent component of total agricultural foreign exchange earnings. This share has, however, declined recently in view of (a) developments within a number of world marketing blocks, such as the enlargement of the European Economic Community, (b) growing competition from vegetable oils on world markets, and (c) slow improvement in domestic olive production technology and processing. As a result, real export prices have not risen but are instead declining *(Fig. 3.3).*

C. Import Competing Crops and Milk Products

Milk products may be taken as an example to illustrate what has been happening to food imports. In nominal terms, prices of milk products increased significantly until 1986. Then, a downturn occurred sometime between 1986 and 1987. Since then, prices have started to pick up. In real terms, the picture is quite different, however. Roughly speaking, milk import prices have remained relatively constant over the entire period of the 1970s and 1980s. One can identify a period of relative decline in their prices, particularly between the years of 1973 and 1983, corresponding to the EEC's milk surpluses *(Fig. 3.4)*.

IV – Policy Evaluation

Adjustments and reforms have become necessary at the macro and sector levels in order to induce sustainable growth, to provide incentives for more efficient behavior, and ultimately to deal with the foreign deficit.

As has already been mentioned, agricultural and food pricing policy and institutions in Tunisia have been undergoing major revisions over the last few years and are expected to continue to do so in the future. This follows from policy makers' realization that striving for domestic agricultural production growth while maintaining low food prices at the consumption level is, at the very least, a costly endeavor. Food subsidies have resulted in rapidly increasing public budget allocations as consumer demand has constantly expanded due to population growth and extraneous income jumps, whereas domestic food supply has continued to drag behind. Inevitably, this has necessitated major food imports which, in some years, could run as high as, or exceed, domestic production (for example cereals, milk, and sugar).

The following is a critical review of past food-pricing policies and institutions, at both the production and consumption levels, which underlie on-going price policy adjustments. Emphasis will be placed on: (1) highlighting the available economic information necessary to appraise possible consequences of current adjustments, and (2) on identifying areas of information that may require additional investigation.

Ever since the mid-1970s, government pricing policy for agricultural products has been closely related to their importance in domestic consumption. Basic foodstuffs such as cereals, oils, milk, sugar and even meats have had administratively guaranteed prices for a long time. Other products such as vegetables and fruits are ordinarily sold on semi-regulated markets. The rest are freely marketed, though only very rarely are products commercialized free from government interference, be it in production, consumption and/or marketing.

International agricultural trade (both imports and exports) in food commodities is handled by specialized state monopolies. Wheat, milk, vegetable oil, and sugar imports are all channelled through government marketing boards. The same is true for the main export products, olive oil, wine, and dates.

Domestically, government involvement in the price formation of agricultural commodities is also heavy. Cereal prices are predetermined and announced to farmers prior to planting. Olive oil prices are also guaranteed, though varying slightly with oil quality.

Despite this apparent support, aimed at eliminating or reducing price uncertainty, farmers have responded by marketing only part of their produce via government channels. This means that even in areas where prices are administratively set, market forces of supply and demand are still at work for sizeable proportions of crops. This is the case with wheat in particular, for which the proportion of harvests that is marketed through government channels never reaches 50%. Does this mean that there is no role for economic variables in enhancing agricultural production? How efficient or inefficient have food subsidies been on the input and output levels?

1. Impact of Previous Marketing and Production Institutions

Since the 1960s, options for yield improvement through technical progress have been tried in order to induce production growth, given that modern inputs (such as chemical fertilizers, machinery, herbicides and improved seeds) were underutilized. The focus has been on growth and on meeting the expanding demand for food. The instruments to achieve this objective have included mainly:

1. marketing of inputs and outputs through government agencies and price subsidies;
2. investment, mainly in water mobilization for irrigation;
3. direct government involvement in agricultural production.

A. Input Supply

At the input level, the desire to induce agricultural production growth has prompted the government to subsidize all major inputs (including fertilizer, herbicides, mechanization, and animal feed). *Table 4.1* shows the percentage of public subsidies going to these inputs.

Finally, the government has been heavily involved in direct agricultural production and even more in basic agricultural investments such as water works. Since the early 1960s, the Grain Board *(Office des Céréales)*, a government agency with a relatively widespread regional network, was mandated with the marketing of agricultural inputs in addition to the monopoly it had over cereal grains marketing. These inputs were mainly cereal seeds, fertilizers (to be applied to cereal fields as well as to other crops), pesticides and herbicides. Much later, potato seeds were added to the list.

In the early 1980s, and with the extension of irrigated areas, public authorities *(Offices de Mise en Valeur)* were created to manage the hydraulic infrastructure and public water resources made available for irrigation, and also to provide technical assistance to farmers within the “irrigated perimeters.” This assistance also included input supply. Public agencies in irrigated areas strengthened the public network of input distribution.

Public intervention was not limited to the physical side of input supply and marketing, but also included credit facilities, often provided without interest. The objective of such a policy was to ensure an increase in input use on the assumption that this would lead to improved yields and production growth.

Financial records of public agencies do not provide a clear breakdown of costs between input supply and marketing of products. This accounting loophole is generally played upon so as to make all expenses come out of public funds. These costs are important as they cover not only the value of the inputs sold under credit (with zero percent interest rate), but they also include all expenses borne by the public budget to finance infrastructure and recurrent costs.

Limited information on input use until the early 1980s suggests that an increase in input use in agriculture has taken place (mainly fertilizers, improved seeds and herbicides) which must have contributed to some degree to yield improvement and increased production. However, the same production increase could have been reached with a less costly scheme as costs are inflated by management problems, leading to damages and/or to losses of significant quantities of inputs. On the other hand, due to the rigidity of administrative rules and regulations, the geographical distribution of inputs was not always adequate, and it was practically impossible to transfer inputs from a region having a surplus to another having a deficit.

However, many accredit this policy with the enhancement of input (mainly fertilizers and herbicides) in agriculture. The case of cereal crops is quite indicative.

Table 4.2 shows how ammonium nitrate and herbicide use evolved on cereal fields. Figures show the annual averages for 1974-78 and 1985-90. Average use is looked at due to substantial changes in input use between crop years due depending on variability in climatic conditions.

Despite all government efforts to enhance input use in agriculture, and even though the use of fertilizers, herbicides and other inputs has increased, a gap still persists between technical norms and observed uti-

lization levels. This gap is due to factors including limited and/or inadequate extension activities, insufficient coordination between government agencies in charge of input marketing, and a lack of adequate planning. In any case, input supply and marketing policies have been positively correlated with growth in agricultural production as reflected through agricultural GDP evolution.

During the period 1974-78, agricultural GDP averaged 480 million dinars per annum at constant 1980 prices, and 600 million dinars during the period 1986-90, showing an increase of 24% over 12 years or an average rate of growth of 1.8% per annum. This could be considered reasonable performance in view of the fact that two thirds of agricultural GDP comes from rain-fed crops which are, in the Mediterranean Basin context, extremely variable.

B. Marketing of Agricultural Products

Agricultural products could be classified under two major categories with respect to marketing: products under government control and products marketed according to market mechanisms. Products under partial government control usually benefit from a public subsidy at the consumer level. Then, all marketing stages are controlled by the government (such as farm gate prices, marketing, storage, imports and consumer prices).

Agricultural products under government control belong to the category of “strategic products,” which includes cereal grains, milk, sugar and oil. Some of these products are strictly under state monopoly (cereal grains and olive oil); whereas for others (milk, sugar beets and tomatoes for processing), government control is limited to setting producer and consumer prices.

Marketing of cereal grains and olive oil is under total government control through two state agencies: the Grain Board *(Office des Céréales)* and *Office National de l’Huile*, respectively. These two agencies have the monopoly over trading at national and international levels. Farmers are supposed to market their products through these agencies at administratively set prices. This provides a hedge for farmers against market price fluctuations. How to get prices right? How and where to store produce? When and how much to import or export? All these decisions are made by the government and implemented through the agencies. This leaves the farmers to make only those decisions regarding resource allocation based on administratively set prices.

C. Products under Price Setting Schemes

Prices for other agricultural products, including sugar beets, milk, mutton (until 1979), tomatoes for processing, and tobacco, are set at the production and retail levels by the government. Price controls on these products focus on two objectives: (1) to guarantee a “fair price” to producers, and (2) to ensure control over consumer prices for those products supposed to be staples.

The “fair” notion of prices was difficult to determine, particularly in view of the extreme variability of farming conditions. In addition, while farmers are guaranteed a price for their products, they are not guaranteed a market; they thus often sell their products (mainly milk and tomatoes for processing) at a lower price.

D. Free Market Products

All remaining agricultural products obey the market forces of supply and demand to a large extent. However, selective government price interventions are not uncommon. Examples are:

1. Ceiling prices are sometimes set for some products through spot interventions which introduce uncertainty and increase risk to producers. These ceiling prices are set to control prices at the consumer level and make food products available at “reasonable” prices.
2. Markets are not so transparent as to allow perfect competition (due to complexity of marketing regulations and unclear roles of operators, inadequate dissemination of market information and so forth). Hence some marketing regulations are often introduced.
3. Market regulation through buffer stock and/or buffer fund programs have been practiced but on a very limited scale.

What were the results of this marketing policy? Farmers react to government policy through decisions on resource allocation and input use, which in turn have direct repercussions on production. *Table 4.3* shows how agricultural GDP evolved over three decades and under various marketing schemes.

Average growth was 58.4% for products under state monopoly over the period 1965-89, and 72.4% for products under price control, whereas products under free marketing grew by 84.0%. Products marketed freely seem to have grown faster than those under government control.

However, one should be careful about such a conclusion. In fact, the relatively slow growth of production under state monopoly is certainly due not just to the marketing policy alone, but to other factors such as amounts of rainfall as well. Products that are freely marketed benefit much more from irrigation, while state controlled products are often dependent on rainfall. *Table 4.4* shows how agricultural GDP issued from rain-fed crops evolved under various marketing schemes.

Under comparable conditions, products under price control grew at a higher rate than products under state monopoly (similar to the case of total agricultural GDP, including irrigated crops). They also grew at a slightly higher rate than products under a free marketing scheme (different from the case of total agricultural GDP).

Hence, once the rain factor is eliminated, the marketing effect becomes less clear; there is no clear relationship between marketing schemes and production growth except that products under state monopoly grew at a significantly lower rate than products under price control and free marketing schemes.

Products under state monopoly marketing schemes include cereal grains and olive oil. The former is an annual crop, the latter a perennial crop. Farmers' response to government policy could be reflected by the area under cereal grains production and the levels of input use, whereas the case of olive oil is different. Olive trees are, and will continue to be, cultivated whatever government policy is. The only short-term farmers' response to policy change will be reflected by input use. However, in the long run, farmers' response could be reflected by investment in plantations.

In any case, over the period covered by *Table 4.3* above, cereal grains production grew on average by 62.8% and olive oil by 51.2%. Together, their average growth amounted to 58.4%. The area under cereal grain cultivation averaged 1.6 million hectares during the period 1960-64 and 1.5 million hectares during 1965-89. By 1976, cereal grain cultivation covered nearly 2 million hectares. In addition, as shown earlier, input use on cereal fields grew in spite of government marketing policy.

Production growth for cereal grains and olive oil has been at a lower rate than that of products under free marketing or price control. In regard to products under state monopoly, production of cereal grains grew at a higher rate than that of olive oil. As mentioned earlier, short-term farmers' response to marketing policy is more noticeable on cereal grains (an annual crop) than on olive oil (a perennial crop). But one other factor may also explain the relatively higher rate of growth for cereal grains with respect to olive oil: even though both products are under state monopoly, the share of produce marketed through the two government agencies is different. Cereal grains marketed through the Grain Board never reached 50% of total production despite the monopoly, whereas an average of 80% to 85% of total olive oil production is marketed through the *Office National de l'Huile*. Marketing studies are needed to explain this difference.

Opportunities for marketing cereal grains on the so-called "parallel market" do exist, although it seems paradoxical to do so as these cereal grains do not benefit from the subsidy which is substantial and represents around 50% of the price. Apparently some households still prefer to buy their "own" grains and make their "own" semolina and by-products to buying final subsidized products on the market, and this is not the case for olive oil. More in-depth examination of this economic and social behavior regarding cereals producers and consumers is needed to clarify this matter.

Nevertheless, this appears to reinforce our conclusion that products under strict government marketing control are subject to a lower production growth rate than those under more flexible marketing schemes.

E. Credit Policy

Agricultural credit is highly controlled by the government; terms and conditions of credit, interest rates, appropriation of funds for credit and so forth, are under total government control. Real interest rates for agricultural credit have been negative for a long time, which has led beneficiaries to regard the loans as disguised subsidies. This constitutes a major problem for policy-makers. The majority of farmers confuse credit with social subsidies, which is probably a result of unclear credit policies and procedures. Credit has been used for political purposes, and government officials often talk about agricultural credit as a type of assistance for farmers. The problem is that both sides understand assistance differently; whereas government officials intend to assist via attractive terms and conditions of credit and low interest rates, farmers think of credit as a government subsidy. This had resulted in growing agricultural debt due to lack of credit repayment, and a decreasing number of farmers eligible for credit. It is now estimated that less than 20% of farmers have access to credit, the remainder being ineligible due to unrepaid loans.

Moreover, some government decisions have damaged the agricultural credit institution. In 1988, the government decided to wipe out farmers' debts arising from loans of less than 2,000 dinars in principal. Although this measure did not concern a high number of farmers, nor did it affect a significant amount of unrepaid loans, it compromised the future of agricultural credit by adding uncertainty to an already extremely risky sector. Decision-makers have always called upon non-state commercial banks to contribute to financing agriculture through credit, but after such a decision, and despite the burden being borne by the government budget, banks will be further discouraged from guaranteeing loans to farmers.

Thorough reform is needed to improve and essentially rehabilitate the credit system. The first and most urgent thing to do is to distinguish clearly between credit and subsidy, and make farmers realize that a loan must be repaid.

Secondly, farmers could be classified in different categories with respect to credit:

1. Farmers eligible for bank credit without government endorsement (mainly large-scale farmers).
2. Farmers with economically viable farms but without solid financial warranty could be supervised through specific projects providing them with loans disbursed through banking institutions, to train them in bank loan procedures, and help them acquire the banks' confidence. Such procedures should not last more than three to five years for every farmer who would become a regular bank customer without government warranty.
3. Small-scale farmers who require special kinds of loans under relatively favorable terms and conditions. It is preferable to channel loans to them through other institutions than those disbursing credit to farmers of categories (1) and (2) above so as to make a clear distinction between bank loans and government loans.
4. Farmers producing on or near subsistence levels, with extremely small farms and no economic viability would not be introduced into the credit scheme, but could be eligible for special assistance monitored and implemented by a specific administrative unit separate from and independent of those units which monitor and implement credit programs.

F. Investment Strategy

Agricultural investment has been highly dominated by public sector intervention *(Table 4.5)*. Private investment has barely reached 40% of total investment. Direct involvement of the public sector in large irrigation schemes including dams and networks, particularly in the northern river basins, has led to heavy public investments.

Moreover, the government intervenes indirectly in private sector investment through credit and subsidies from budgetary funds. Thus, the total involvement of the government budget is even higher, as shown in *Table 4.6*.

Notice the strong inertia of private investment to rise. This is probably due to many factors, but it is a strong indication that a great deal needs to be known before agriculture can become an attractive sector for private financial investors.

Investment distribution between major sub-sectors shows the importance of the share allocated to hydraulic works *(Table 4.7)*. Extending irrigated areas has been one of the major objectives of policy makers. Even though dams and networks constructed under "agricultural hydraulic investment" served multiple objectives (such as irrigation and potable water), an average of 70% of mobilized surface water is used for irrigation.

Table 4.7 shows a clear shift in investment strategy has taken place since the mid-1970s, with hydraulic works absorbing more than 40% of total agricultural investment. With this shift, policy-makers intended to increase the irrigated area which, in turn, would alleviate the sector's dependency on variable climatic conditions such as rainfall. By 1990, irrigated areas reached nearly 300,000 hectares, contributing an average of 30 to 35% to total agricultural production. What is the return on these investments? A simple way to answer this question is to use the incremental capital-output ratios (ICORs) as indicators. ICORs will allow us to identify very roughly those sub-sectors which use capital more efficiently than others, and determine whether investment choices were efficient.

Considering the fact that only 70% of mobilized water is used for irrigation (the remaining 30% is used for other purposes), investments in hydraulic works will cover only 70% of public investment, whereas 100% of private investment will be considered (assuming that all private investment in hydraulic works is intended for irrigation purposes). Under such an assumption, total agricultural investment to be used in calculating ICORs will include 70% of public investment in hydraulics, plus all the remaining components of agricultural investment. Investment will be deflated by the wholesale price index with 1980 as a base year, and agricultural production will be in constant 1980 prices, as available from the Ministry of Agriculture's publications.

Two periods of time will be considered: 1971-79 and 1980-87. 1988-90 will not be covered because of a lack of information on the wholesale price index deflator. Before agricultural sub-sector ICORs are considered, ICORs for the agricultural sector as a whole will be calculated, and compared to that of the total economy *(Table 4.8)*.

During the 1970s, ICORs for agriculture and the whole economy were near 3 (which means that production systems are not capital-intensive, and/or capital use is efficient), even though the ICOR for agriculture was slightly higher than that for the whole economy. A major shift took place, however, during the 1980s with ICORs more than doubling. The shift is higher for the whole economy than it is for agriculture.

The economy-wide ICOR stood at almost 7 during the 1980s after having been less than 3 during the 1970s. This increase is the result of many factors, such as:

1. Low productivity.
2. Underutilization of production capacity.
3. Overinvestment.
4. Technically inappropriate equipment leading to production problems.

Government publications have acknowledged that a substantial amount of production equipment installed in various industrial units is not fully used. This applies to heavy investment industrial units (such as cement, steel, and car assembly plants) as well as relatively small industrial units (such as textile factories, agricultural product processing plants and animal feed factories). Some factories (such as tomato processing plants) use only 30% of nominal installed capacity yet are profit-making due to heavy protection.

The same tendency has been observed at the agricultural sector level, even though competition existed within borders. The ICOR for agriculture grew from 3 during the 1970s to slightly over 6 during the 1980s (doubling in a decade). Agricultural investment nearly doubled in constant prices while agricultural production remained almost at the same level, leading to a 100% increase in the ICOR. In order to try to explain this evolution, the analysis will be broken down by sub-sector. The sub-sector ICORs for irrigated crops will be looked at: rain-fed crops, livestock, fisheries, rain-fed tree crops and cereals and legumes.

The hypotheses underlying the analysis with respect to investment are:

1. Irrigated crops
   70% of public investment in hydraulics

100% of private investment in hydraulics
25% of investment in “studies, research and extension”
50% of investment in “tree crops”

2 Rain-fed crops
Total agricultural investment
30% of public investment in hydraulics
Investment in irrigated crops as defined above
3. Livestock
100% of investment in livestock
25% of investment in hydraulics (after deducting 30% from public investment)
4. Fisheries
100% of investment in fisheries
5. Rain-fed tree crops
50% of investment in tree crops
25% of investment in machinery
10% of investment in “studies, research and extension”
6. Cereals and legumes
50% of investment in machinery
40% of investment in “studies, research and extension”

With respect to production:

1. Irrigated crops
95% of vegetable production
43% of tree crop production
7% of livestock production
13% of production of “other agricultural products”
2. Rain-fed crops
Total agricultural production
Irrigated crops production
3. Livestock
100% of livestock production
4. Fisheries
100% of fisheries production
5. Rain-fed tree crops
57% of tree crops production
6. Cereals and legumes
Cereal production
Legume production

Under these hypotheses, ICORs evolved as shown in *Table 4.9*.

The ICOR for irrigated crops increased from 3 during the 1970s to over 11 during the 1980s when the ICOR for rain-fed crops went from 3 to slightly over 4. This means that tremendous efforts have been made in irrigated areas through investment (in dams and water networks for example) but production did not respond accordingly. The disequilibrium between investment and production (leading to a high increase in the ICOR) is due mainly to two major factors: (1) generally heavy investments in hydraulics and (2) under use of area equipped for irrigation.

On the other hand, the ICOR for rain-fed crops went from 3 to 4.4, meaning that while these crops remained relatively less capital intensive, their capital use efficiency is higher than that of irrigated crops. Livestock and fisheries evolved similarly, with ICORs increasing by 70%. Cereals and legumes had an ICOR of 2.9 in the 1970s, but during the 1980s, it decreased and stabilized at 2.05 which is the lowest ICOR for all agricultural sub-sectors.

From 1971-90, the agricultural investment strategy favored irrigation and irrigated crops. Investments in hydraulics took an important and growing share in agricultural investment as shown in *Table 4.10*. These investments were largely public (over 80%) for dam and network construction.

Cultivated areas may be irrigated either publicly or privately. With publicly irrigated areas (whether publicly or privately owned), public funds are used to support water mobilization and network construction. With privately irrigated areas, on the other hand, private sector funds cover all costs of water mobilization (wells, water-pumps and so forth). The distinction between publicly and privately irrigated areas is important because it has been proven that farmers in privately irrigated areas use land and water more efficiently than those in publicly irrigated areas. This has been shown through the ratio of area used with respect to area equipped for irrigation, and is also reflected in the ICORs. For example, data available for the period 1980-87 reveal that during this period, ICORs remained at 6.1 for privately irrigated areas while climbing to 8.7 for publicly irrigated areas.

It could be concluded that while investment strategy favored irrigation and irrigated crops, efficiency was higher in rain-fed agriculture (as reflected by the ICORs). Returns on investment were not only lower in irrigated agriculture, but the investment strategy also led to non-optimal resource allocation and input use, which did not allow products with comparative advantage to emerge.

2. Direct Government Involvement in Agricultural Production

Agricultural land under government control is of two kinds: (1) land owned and managed directly by a government agency (the State Land Authority, *Office des Terres Domaniales*) with employees and managers paid on a salary basis independent of farm performance, and (2) land under cooperative schemes with employees receiving a salary plus a share of the results.

A. Land Owned and Managed by a Government Agency

Land under this scheme covers around 200,000 hectares located mainly in the central and southern parts of the country. It is made up of 38 dependent farms with highly heterogeneous potentials. These farms have been sorted into three categories:

Category A including 12 farms with high resource potential and relatively important investments, covering 137,000 hectares (70% of the total)

Category B including 20 farms with poor resource potential and requiring complementary investments, covering 54,000 hectares (27% of the total).

Category C including 6 farms and requiring a whole development program and an important amount of investment, covering 6,000 hectares (3% of the total).

Of the 200,000 hectares managed by the State Land Authority, only 133,000 hectares are classified as agricultural land under cultivation, representing 2.8% of total cultivated arable land in the country. This land contributed, on average, 3.3% to total agricultural production during the period 1980-1988. Does this mean that land managed by the State Land Authority is more efficiently managed than privately-owned lands when compared to the national average? A close look at production, investment and financial records, shown in *Table 4.11*, answer the question.

With only 2.8% of total cultivated agricultural land, the State Land Authority contributed 3.3% in total agricultural production. Under state management, average annual production per hectare of cultivated land is 21% higher than the national average. This “achievement” required an investment of 71 dinars per hectare per year, compared to a national average investment of 50 dinars per annum, meaning that investment on state land has been 42% higher than the national average. An indicator of investment efficiency is the ratio of production to investment. For state land, this ratio is 3.7 during the period 1980-88, as compared to 4.4 for the national average. These figures tell us that while investment has been higher on state land, return on investment has been 16% lower on state land than it is on average. This efficiency criterion deteriorates further if all the recurrent costs borne by the State Land Authority are considered, and the salaries paid to managers and employees. Average annual financial results per hectare of cultivated land then amounts to approximately 1.6 dinars, which is extremely low in comparison with the national average of about 28 dinars per hectare. These poor results are partly due to the fact that the government often used state land farms as a means of “market regulation”. During the 1970s and the early 1980s, production from state land farms was often used to drive market prices down by selling at very low prices, sometimes below production costs.

Given these poor results and open public criticism, the government restructured these lands based on two main goals: (1) to create a distinction between management and ownership of land, and (2) to optimize land management. To achieve these goals, an action plan has been conceived which states that:

1. Small and scattered pieces of agricultural land will be sold to private farmers, with priority being given to neighboring farmers.
2. High production farms will remain within state ownership and management; however more flexibility will be introduced into their management scheme.
3. Poorly producing farms will be rented to private farmers on a 25-year lease basis and development scheme.

While this strategy might be considered a step toward solving the problem of state land management, retaining high performance farms under state ownership and management while renting the poorly producing farms does not have any rationale. If a poorly performing state farm recovers following its privatization and improvement in management, will it be returned to direct state control and management?

In any case, while this strategy has just started to be implemented and while results cannot yet be evaluated, this can be seen as a first step toward privatizing state land. The ultimate solution would be to avoid any kind of direct government involvement in production and marketing-related activities, ultimately allowing all state farms to be sold and/or rented.

B. Land under a Cooperative Scheme

The status of land under cooperative schemes is difficult and unclear. Originally, this type of land was privately but commonly owned by groups of people. During the colonial era, the status of this type of land became unclear due to expropriations by foreign settlers. After the political independence of the country in 1956, agricultural lands were recovered from foreign farmers (1964) and fell under government administrative control. By the early 1970s, there were 347 cooperative farms covering 235,000 hectares of agricultural land, located mainly in the northern part of the country. Now their number is around 170, covering almost 170,000 hectares out of which 145,000 hectares are classified as cultivable agricultural land. The decrease in the number and area of cooperative farms is due to appropriation of some farms by cooperators, and due to the renting of others. Cooperative farms also fall into three categories:

Category A with 85 financially sound cooperative farms covering 85,000 hectares of land.

Category B including 70 financially weak farms and 70,000 hectares of land.

Category C with 13 cooperative farms of deteriorating financial status, covering 14,000 hectares.

The average size of a cooperative farm is 1,000 hectares, which is far above national average farm size. The main characteristics of the cooperative farms are the low levels of investment and the low use of their potential.

Average annual financial results per hectare of cultivatable land are far better than those of state land, but remain below the national average. This is due to the low level of investment (23 dinars per hectare) and location of the majority of cooperative farms in the more fertile northern part of the country. While cooperative farms were able to make use of the inherited machinery and investment of foreign settlers before 1964 at no cost, if the low investment trend continues, farm productivity will deteriorate.

A development scheme requiring major investment is necessary to make cooperative farms work properly and to ensure optimal use of resources. However, this is a difficult task because of the unclear ownership status of the land. As an alternative, the government has started to rent these farms to private producers on a 25-year basis, with the obligation to hire all existing employees. It appears that this strategy has netted some positive results: rented cooperative farms have improved financially and have benefitted from investment, new technology, and better management. However, one should be careful about the future of these farms, mainly with respect to the rational use of resources as well as the future of their employees.

3. Economic Impact of Food Subsidies

Studies on partial equilibrium agricultural supply response using time series data and dealing mainly with cereals, have shown that farmers do respond significantly and positively to the price of the output, and negatively to price of input, just as theory predicts (Bachta, 1990; Hachicha, 1990; Rejeb, 1989). Response by commodity is, however, more important than in aggregate (Hachicha, 1990). Indeed, aggregate cereals supply elasticity has proven to be in the neighborhood of 0.2, whereas individual crop response elasticity may exceed 4.0 (for example, for durum wheat). *Table 4.13* gives information about this response, broken down into short-term and long-term by crop.

This information suggests that while aggregate short-term response is limited in view of the structural rigidities that characterize agricultural commodities, individual crop response is important both in the short and long runs as a result of factor substitution possibilities.

While similar empirical information is available for other agricultural commodities, different economic behavior by agricultural producers is not expected. Potential explanatory variables of supply determination are, therefore, likely to lie within the areas of appropriate technologies to cope with large weather fluctuations, adequate marketing channels, credit acquisition and procedures, and perhaps land tenure systems in addition to economic variables, such as prices.

Government subsidizing of products for human consumption has also been increasing ever since the lid on producer prices of basic commodities began to be lifted in the early 1970s. The end result has been a widening gap in the budget balance of the government authority in charge of subsidy management (CGC). Budget deficits kept increasing *(Table 4.14)* and the need to revise consumption pricing policy arose.

The extent of public subsidies for bread wheat can be seen in *Table 4.15*.

Government subsidies have had direct consequences in terms of the types of goods imported in order to meet consumer demand. *Table 4.16* shows how food imports evolved during the first half of the 1980s, leading to the structural adjustment program introduced in 1986.

This high growth in food imports (over 18% annually) to meet domestic consumption corresponded to sustained financing through public outlays. The associated expansion in public expenditures has both direct (demand) and indirect (money creation) inflationary impacts.

On the receiving end, while subsidies exist to support the needy segment of the population, actual expenditure statistics reveal that all segments of the population, including those not in need of subsidized foodstuffs, benefit from current policies *(Table 4.17)*.

In addition, food subsidies are unevenly distributed between consumers living in rural and urban areas. Approximately 80% of food subsidies go to urban areas, despite the fact that more than 40% of the population live in rural areas. These income redistributional consequences suggest that considerations of inequality were real and this, to some extent, prompted adoption of the ongoing structural adjustment program.

Current government priorities include identifying target groups that may require consumption assistance more than others. Subsidizing all consumers, perceived as the easiest, has become too costly for the national budget. On the other hand, a general consensus on enabling needy households to reach acceptable nutrition status exists. Consequently, there is growing concern that appropriate target groups and alternative ways of reaching them need to be identified.

A review of the literature regarding international experiences in the field of targeting food subsidies suggests ideas such as food stamp programs, direct payments, food ratios and self targeting through product differentiation (Kramer,1990). Their feasibility and relative effectiveness have yet to be analyzed.

One of the toughest challenges in economic policy facing government involvement in consumption assistance is likely to center around the necessity of ending or redirecting those food subsidies which lead to

overconsumption of basic food commodities. Meeting this challenge will require time, certainly. It also requires information on (a) relevant criteria of household classification, (b) the identification of the needy groups to be targeted and (c) a simulation of their likely response to alternatives of targeted subsidies (product differentiation and/or direct income transfers). This lies at the heart of structural adjustment. In fact, most of the revisions and reforms that have been mentioned so far are part of programs that are now being implemented in Tunisia.

4. Structural Adjustment

The 1980s were economically difficult years for Tunisia. Slow growth, inflation, unemployment and, above all, serious balance of payment problems have been quite persistent. Whether these problems were due to external factors (terms of trade, world recession and high international interest rates) or to internal factors and domestic policies (import substitution, protection and administrative control), adjustments and even radical structural reforms proved to be inevitable. The Tunisian government might have been tempted to simply postpone real changes by more borrowing from abroad had opportunities to do so been available, but petrodollars and abundant international funds were unavailable. More specifically, around 1985-86, it became very difficult for Tunisia to attract foreign capital and to borrow on the international financial market because of social and political instability, heavy indebtedness, and generally mediocre economic performance.

Due to these factors, Tunisia has asked for IMF and World Bank loans and thus has committed itself to a stabilization program along IMF lines, and to a structural adjustment program (SAP) coupled with sectoral programs. The Agricultural Sectoral Adjustment Loan (ASAL) was in fact the first adjustment program for Tunisia.

Stabilization required reducing the government budget deficit by the usual methods including devaluation of the dinar, fiscal and government expenditure limitation, wage stabilization, real interest rate increases, money supply restriction, and so forth, as follows:

1. The devaluation of the Tunisian dinar started gradually, prior to 1986. In 1986, a nominal 10% devaluation took place. Overall, by 1989-90 devaluation reached close to 40% in nominal terms and 20% in real terms, compared to the 1983-84 pre-adjustment value.
2. Severe wage repression through trade union control over several years, actually yielded a fall in real wages between 1984 and 1988.
3. Public investment was heavily reduced, bringing the national rate of investment from above 25% before 1986 to a mere 18.8% in 1988.
4. Interest rates were sharply increased and largely liberalized except for rates in agriculture, exports, and some other areas.

This stabilization program and the related foreign currency inflow led to an easier foreign payment constraint, a reduced trade deficit, higher exports, and a lower inflation rate (6 to 7%). Simultaneously, monetary policy was expectedly contractionary. Unemployment was aggravated and social costs were quite clear.

Meanwhile, the exchange rate is now widely considered competitive, clearly a result of the structural adjustment. The exchange rate adjustment presents two sides: a short-term stabilization side and a long-term structural side. There are many links between stabilization policies and structural reforms. Certain actions implemented within the SAP are also intended to support stabilization measures. Financial reforms and devaluation belong to this category. Devaluation calls for anti-inflationary measures, otherwise it would not be real. Hence, it requires price and import liberalization to prevent monopolistic pricing, to induce more competitive behavior, and, therefore, to stabilize prices.

More generally, the SAP for Tunisia aims at liberalizing the economy and removing administrative rigidities to enhance growth through efficient resource allocation, including:

1. Removal of all sources of price distortions that adversely affect efficiency and productivity.
2. Progress toward a more outward-oriented and open economy.
3. Improvement of public sector management, which entails increasing privatization and efficient mana-

gement of public projects and activities.
4. New financial sector policies to encourage saving and attract capital (foreign and national).

Price formation is ultimately to be transferred almost exclusively to free and competitive markets; trade barriers and subsidies are also to disappear, in the long run.

Given the size of the Tunisian economy, trade barriers (especially quantitative restrictions) are to be eliminated. In particular tariffs and effective protections are to be lowered and more uniformly distributed among goods. In practice, while import liberalization has taken place for producer goods, it is only very slowly implemented in the area of consumer goods, especially industrial products. Quantitative restrictions persist because of foreign currency constraints; consequently, effective protection has so far increased instead of decreased.

Direct control of investment is to be eliminated, yet a new code of investment is being implemented which still necessitates state control. Even if the procedure has changed, private investors still depend on state incentives and funding, and will, therefore, continue to apply for permission before investing.

Some state-owned enterprises have already been privatized, but the process has been rather slow, and limited to a small number of agencies and enterprises representing a small share of government assets.

Fiscal reform has been implemented, but does not allow an increase in government income so as to limit the public deficit and satisfy public needs.

In short, the most crucial reforms have not been implemented yet; fuller trade liberalization, a key component of the reform, is yet to come and seems very risky politically. Its sustainability depends to a large extent on government commitment and on sufficient popular support. This is quite a challenge.

A. The Agricultural Sectoral Adjustment Loan (ASAL)

In 1986, the first adjustment loan was allocated to Tunisia by the World Bank. According to the loan agreement, reforms are to be implemented before each payment. The main concern of the reforms is with pricing and marketing.

Price adjustments imply increasing some output prices that used to be administratively fixed very low in comparison to international levels (even below production costs in the cases of wheat, olive oil and milk), and eliminating, or at least reducing, subsidies for inputs and some consumer goods. The objective is to get the prices of inputs (such as fertilizers and animal feed) closer to world prices (calculated according to the moving average formula). Indeed, since the beginning of the adjustment in 1986, prices of inputs have become 55% higher and those of animal feed are now 200% higher. For irrigation water, prices have risen by around 43%.

On the output side cereal prices have also been increasing, as seen in *Table 4.18*.

Official objectives are to stabilize major food producer prices at their world prices net of subsidy. The result has been that producer prices have increased even faster than required by the loan conditions. A more substantial policy question arises and has not yet received a clear answer: What is the relevant international price for major food commodities, given that huge producer subsidies are allocated in the main exporting countries (North America and EEC countries)? To what extent is it legitimate and economically sound to protect Tunisia's producers, especially, since in the agricultural field, many quantitative restrictions exist against potential exports and resource transfer to alternative crops may not always be feasible? It is noticeable that so far, effective protection of agricultural goods has not increased, in contrast to industrial goods, which makes the agricultural industry's terms of trade even worse.

Marketing functions that used to be under state control or monopoly (such as for cereal, olive oil and fertilizers) are to be liberalized. Cereal assembly and storage, for example, are to be transferred to the private sector. Many options are under study, but little has been implemented in this respect. Obviously, the present system is characterized by inefficiencies and is often untargeted, but as long as food subsidies remain, some marketing control has to remain too in order to determine the exact amounts of subsidies

that should be paid. So far government policy tries to reduce food subsidies but not yet eliminate them across the board. Indeed, its objective is to be able to implement some structural reforms in order to better target subsidies toward the needier part of the population, a policy in contrast to straightforward liberalization.

In any case, the structural adjustment program and the agricultural sectoral loan put more emphasis on price and market incentives. They are indeed important. However, adequate infrastructure, appropriate institutions, managerial training, and popular support are also crucial constraints (of the X-efficiency type) for better general and agricultural performances. Removing these constraints may require more public spending and more state intervention, which would be in contradiction with IMF and World Bank conditions, and with the overall economic adjustment philosophy.

V – Conclusion

In the presentation of this monograph, an attempt has been made to give a detailed picture of the agricultural and food sectors in Tunisia, including their potential as well as their problems.

In regard to the agricultural sector, technical research suggests that resource mobilization and productivity growth are feasible. Should these productivity gains prove to be economical, national goals regarding food self-sufficiency may become achievable. Research in this area is needed to indicate opportunities for public and private investment to induce the necessary adjustments in supply.

On the consumption side, major revisions in past policies of consumer assistance are taking place. Gradual public disengagement from price-fixing and/or subsidizing is being implemented. This means more reliance on market behavior. Old policies resulted in heavy public budget deficits and perhaps in over-consumption of products. Potential consumer reactions to these adjustments and their nutritional consequences have yet to be researched. The extent of direct and cross-price effects and the resulting changes in consumption patterns need to be further investigated.

Since social considerations will likely continue to prevail and affect the economic management of both agricultural and food economies, research aimed at developing economic tools will be needed to simulate and evaluate the relative effectiveness of alternative policy measures designed to guide the agricultural economy in one social direction or another. Given the inter-dependencies between the various components of this economy (such as production, consumption, trade and public interventions) investment in the development of simulative multi-market models probably has a high priority. Partial equilibrium analyses leading to the determination of particular economic response parameters to policy changes will also need to be continued. Such parameters are directly useful to policy-makers. They are also necessary for the development and/or adaptation of multi-market policy analysis tools.

The structural economic adjustment package introduced in 1986 seems to have targeted real weaknesses in the economy. Yet, getting the economic system to function more smoothly and according to efficiency criteria will need serious investigation into real constraints on agricultural development: appropriate technologies, appropriate infrastructure, removal of real market distortions such as monopolies, change in public rhetoric toward producers and consumers and, above all, better economic discipline on the part of international trading partners.

All this is neither easy to accomplish nor is it under the total control of national public policy makers. Furthermore, social considerations that may be costly for governments to overlook will force real economic adjustment to take place only slowly.

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~ Appendix ~

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Abbreviations

APIP: Agricultural Policy Implementation Project

DG/PDIA: Direction Générale de la Planification, du Développement et des Investissements Agricoles

DPCE: Direction des Prix et du Commerce Extérieur

IEQ: Institut d'Economie Quantitative

INS: Institut National de la Statistique

Table 1-1. Tunisian Population Growth, 1911-1990.

	1911	1931	1956	1966	1975	1984	1989	1990
Total (1,000s)	1,938.0	2,411.0	3,783.0	4,533.0	5,588.0	6,975.0	7,909.0	8,084.0
Growth (%)	.5	1.5	1.8	1.8	2.3	2.5	2.4	2.21

Source: Compiled from INS publications and Chevalier & Kessler.

Table 1-2. Age Structure and Participation Rate (p.r.) for the Labor Force, 1989.

Age (years)	Men		Women		Total	
	Share %	p.r. %	Share %	p.r. %	Share %	p.r. %
15-17	5.7	40.3	10.3	20.3	6.6	30.6
18-59	87.6	86.1	87.0	22.5	87.5	54.2
60 or more	6.7	40.0	2.7	4.9	5.9	23.6
Total	100.0	75.4	100.0	20.3	100.0	48.0
Total labor force (1,000)		1,866.3		494.3		2,360.6

Source: Enquête formation emploi, Ministry of Planning, 1990.

Table 1-3. Share of Urban and Rural Population.

Year	Total Population	Urban	% Share	Rural	% Share
1966	4,533	1,820	40.1	2,713	59.85
1975	5,588	2,654	47.5	2,934	52.50
1984	6,966	3,734	53.9	3,232	46.10
1989	7,909	4,685	59.2	3,224	40.80

Source: INS census, various years.

Table 1-4. Real GDP Growth (1980 Prices).

	GDP (Mil.TD)	Per capital GDP (TD)
1964-1970	1,278	306
1971-1980	2,711	470
1981-1989	4,221	579

Source: IEQ, Ministry of Planning.

Table 1-5. Macroeconomic Balance, 1961-1989 (Million Constant TD 1980).

Year	GDP	Imports	Expenditures		Exports	Investment
			Private	Public		
1961	1,130	381	631	178	300	285
1965	1,408	450	805	191	333	380
1975	2,604	933	1,519	373	870	744
1985	4,347	1,656	2,733	696	1,422	1,134
1989	4,733	1,971	2,904	722	2,171	952

Source: IEQ, Ministry of Planning.

Table 1-6. Saving and Foreign Debt,1961-1989 (Current Million TD).

Item	1961	1967	1975	1986	1989
GDP	352	570	1,741	7,026	9,630
Net foreign transfer	2	-15	-2	-50	40
GNP	354	555	1,740	6,976	9,590
Global consumption	312	481	1,337	5,885	7,880
Global saving	42	74	433	1,091	1,710
Saving rate	12	13	23	16	19
Investment rate	20	24	26	24	21
Current deficit	33	70	85	560	285
Current deficit/Current receipts (%)	39	53	14	23	6
External debt	79	243	501	4,150	5,475
Debt/GNP (%)	22	44	29	60	56
Debt servicing:					
% of GNP	0	6	3	10	10
% of current receipts	2	24	9	28	24
% of exports	2	26	10	32	28

Source: IEQ, Ministry of Planning.

Table 2-1. Food Trade Balance, 1960-1989 (Current Million TD).

	Imports	Exports	Balance
Annual average for the 1960s	21.1	27.3	6.2
Annual Average for the 1970s	77.2	61.7	-15.5
Annual Average for the 1980s	299.5	153.9	-144.6

Source: *Statistiques du Commerce Exterieur.*

Table 2-2. Share of Agricultural Land, 1987 (in 1000 ha).

	Agricultural Land	Grazing Land	Forest Land	Non-Agricultural Land	Total
Area	4,811	3,351	1,016	7,051	16,229
Share (%)	30	21	6	43	100

Source: *Enquête Agricole de Base, 1987*, DG/PDIA.

Table 2-3. Cultivated Land by Major Crops, 1987 (1000 ha).

	Grains	Legumes	Forages	Vegetables	Trees	Others
Area	1,824	115.0	292	137	1,896	27.0
Share (%)	43	2.5	7	3	44	0.5

Source: *Enquête Agricole de Base, 1987*, DG/PDIA.

Table 2-4. Distribution of Agricultural Labor, 1975-1980.

	1975		1980	
	1,000	%	1,000	%
Males	440	86	439	79
Females	69	14	113	21
Total	509	100	552	100

Table 3-1. Global and Sectorial GDP in Real Terms, 1961-1989 (Million TD 1980).

Year	GDP	Agriculture and Fishing	Industries	Manufacturing	Oil	Services
1961	1,130	253	262	84	71	314
1965	1,408	303	357	101	97	399
1970	1,739	283	513	143	199	521
1975	2,604	480	727	240	257	799
1980	3,540	500	1,101	417	377	1,093
1985	4,347	649	1,328	584	365	1,273
1989	4,818	580	1,423	723	317	1,661

Source: *Budget Economique*, Ministry of Agriculture.

Table 3-2. Balance of Payments Structure, 1961-1988 (Current Million TD).

	1961	1970	1980	1988
Export Goods and Services	73.2	166.2	1,424.6	3,409.1
Imports Goods and Services	108.3	200.2	1,615.5	3,620.1
Deficit	-35.1	-34.0	-189.9	-210.7
Net Income Transfers	2.3	-15.2	22.2	10.1
Current Deficit	-32.8	-49.2	-167.7	-200.6
Net Capital Flow	24.9	59.3	194	450.1

Source: *Budget Economique*, Ministry of Agriculture.

Table 3-3. Exports, 1961-1988 (Current Million TD).

Exports	1961	1970	1980	1988
GOODS	46.3	98.8	970.0	1,918.1
Food	28.1	29.1	68.9	245.0
Phosphate and Chemical Products	10.1	21.9	141.8	433.0
Energy	0.0	26.1	545.6	433.0
Textile	0.5	2.0	170.4	630.0
Other Goods	7.6	19.7	43.3	280.0
SERVICES	26.9	67.4	509.5	1,491.2
Tourism	1.6	31.6	259.6	980.0
Transport and Insurance	3.0	13.6	104.0	240.0
Gas/Pipeline	0.0	0.0	0.0	41.2
Other Services	22.3	67.4	91.0	230.0
TOTAL GOODS AND SERVICES	73.2	166.2	1,424.6	3,409.3

Source: *Budget Economique*, Ministry of Agriculture.

Table 3-4. Imports, 1961-1988 (Current Million TD).

Imports	1961	1970	1980	1988
GOODS				
Equipment	16.7	38.6	300.5	600.0
Inputs	19.9	59.3	445.0	1,320.0
Energy	6.4	6.9	323.7	251.0
Food	23.8	34.5	157.1	479.0
Other Consumption	26.0	28.6	240.8	955.0
Total Goods (cif)	92.8	167.7	1,467.1	3,605.0
Total Goods (fob)	86.8	154.5	1,398.6	3,167.0
SERVICES	21.5	45.7	215.9	453.0
Tourism and Travels	4.3	12.1	43.2	
Transport and Insurance	8.4	25.5	132.8	
Government Expenses	6.3	3.8	17.7	
Other Services	2.5	4.3	22.2	
TOTAL	108.3	200.2	1,614.5	3,657.0

Table 3-5. Effective Protection by Market, 1983-1986.

	1983	1986
Internal Market (%)	67	70
Exported Goods (%)	-15	-8

Source: IEQ.

Table 3-6. Effective Protection by Sector (%), 1983-1986.

	1983	1986
Agriculture	73	46
Industry	175	123
Manufactured Food Products	179	421
Other Manufactured Products	167	173
Intermediate Goods	107	52
Equipment	86	73

Source: IEQ.

Table 3-7. Inflation Indicators, 1970-1989.

	GDP Deflator	CPI	Food Prices	Cereal Prices
1970	100.0	100.0	100.0	100.0
1975	153.0	129.0	133.0	113.0
1980	230.0	180.0	198.0	153.0
1985	365.0	288.0	323.0	180.0
1989	460.0	374.0	426.0	218.0
Average growth (%)	8.5	7.5	8.0	4.6

Source: *Annuaire Statistique de la Tunisie*.

Table 3-8. Budget Deficit, 1970-1989 (Million TD 1980).

Year	Public Expenditures	Budget Deficit Government Level	Budget Deficit Financial Account Growth Rate (%)	Banks share in Government Financing Level	Banks share in Government Financing Growth Rate (%)
1970	127	58		84	
1975	254	104	12	69	4
1980	512	281	22	219	78
1985	1,142	631	18	554	20
1989	1,600	1,135	12	721	5

Source: Central Bank, Tunisia.

Table 3-9. Money Supply, 1971-1989 (Million TD).

	1971	1975	1981	1985	1989
Liquidity (M3)	304	667	1,725	3,090	4,735
Growth Rate (%)		17	21	12	9

Source: *Budget Economique*, Ministry of Agriculture.

Table 3-10. Household Expenditures.

Category	Food	Housing	Clothing	Health & Hygiene	Transport & Telecom.	Education & Recreation	Other
Budget Share (%)	39	27.7	6	7	9	8.9	2.4

Source: 1985 INS Survey.

Table 3-11. Food Expenditures.

Product Group	Cereal	Legumes	Dry Fruits	Meats	Fish	Milk & Eggs	Sugar	Oils	Other
Budget Share (%)	15.8	20.7	5.7	22.2	3.1	9.9	2.7	5.9	14

Source: 1985 INS Survey.

Table 3-12. Cereals Consumption.

Product	Durum Wheat	Bread Wheat	Barley
Total Consumption (Kg/Head/Year)	104.7	76.1	6.9

Source: 1985 INS Survey.

Table 3-13. Food Consumption by Milieu.

	Durum Wheat	Bread Wheat	Barley	Mutton	Beef	Poultry	Liquid Milk	Sugar	Olive Oil	Vegetable Oil
Food Group Kg/H/Year	55.2	105.1	1.4	8.5	18.5	8.1	58.3	16.7	5.9	14.1
Urban	163.8	41.0	13.4	5.0	2.1	5.1	48.6	13.4	5.3	14.7

Source: 1985 INS Survey.

Table 3-14. Food Consumption by Income and Milieu.

Income Group Dinars/Year/Person	100	100-150	150-250	250-350	350-500	500-800	800+
Food Expenditures in Urban Areas 96 (%)	34.7	31.3	27.8	24.8	21.6	18.7	10.6
Food Expenditures in Rural Areas 96 (%)	37.0	34.5	32.0	27.9	26.4	20.1	11.3

Source: 1985 INS Survey.

Table 3-15. Food Consumption, 1975-1985.

Total Consumption Kg/Head/Year	1975	1980	1985
Durum Wheat	107.82	107.5	104.7
Bread Wheat	61.27	72.7	76.1
Barley	9.10	4.3	6.9
Mutton	6.80	5.8	6.9
Beef	3.30	4.5	5.6
Poultry	2.20	5.7	6.7
Liquid Milk	35.60	40.6	53.9
Sugar	14.46	14.5	16.8
Olive Oil	6.00	4.5	5.5
Vegetable Oil	12.50	11.2	14.5

Source: 1985 INS Survey.

Table 3-16. Government Support for Food Consumption.

Food Group	CGC Budget (MD)	CGC Budget Share (%)
Cereals	521	68.68
Oils	100	13.13
Sugar	77	10.10
Milk	62	8.11

Source: *Etude de la Caisse Générale de Compensation, Phase 1*, Ministry of Agriculture.

Table 4-1. Agricultural Input Subsidies, 1986-1989.

Year	1986	1987	1988	1989
Amount (MD)	25.15	13.98	43.55	58.83
% Total Subsidies	12.60	7.60	16.70	15.90

Source: *Etude de la Caisse Générale de Compensation, Phase 1*, Ministry of Agriculture.

Table 4-2. Ammonium Nitrate and Herbicide Use on Cereal Fields in Northern Tunisia.

	Annual Average 1974-1978	Annual Average 1985-1990
Ammonium Nitrate (kg/hectare)	38	87
Area Treated with Herbicides (ha)	147,000	203,000

Source: *Budget Economique*, Ministry of Agriculture.

Table 4-3. Agricultural Value Added Evolution under Various Marketing Schemes, 1961-1989 (Constant Million TD 1980).

	Products Under State Monopoly	Products Under Price Control	Products Under Free Marketing	Total Agricultural GDP
Annual Average				
1960-1964	59.4	62.6	133.8	255.8
1965-1969	51.7	80.6	138.7	271.0
1970-1974	99.7	94.1	190.8	384.6
1975-1979	109.7	119.4	257.3	486.4
1980-1984	107.9	111.5	290.4	509.8
1985-1989	101.4	134.1	353.7	589.2
Average Growth				
1965/1989 (%)	+58.4	+72.4	84.0	+75.2

Table 4-4. Rain-fed Agricultural Value Added under Various Marketing Schemes, 1960-1989 (Constant Million TD 1980).

	Products Under State Monopoly	Products Under Price Control	Products Under Free Marketing	Dry Farming Agricultural GDP
Annual Average				
1960-1964	59.4	43.4	74.6	177.4
1965-1969	51.7	58.4	75.8	185.9
1970-1974	99.7	71.5	94.3	265.5
1975-1979	109.7	87.7	132.1	329.5
1980-1984	107.9	78.9	158.1	344.9
1985-1989	101.4	94.2	203.0	399.6
Average Growth				
1965/1989 (%)	+58.4	+80.0	77.9	+71.9

Source: Compiled from *Budget Economique*, Ministry of Agriculture.

Table 4-5. Agricultural Investment, 1976-1990.

	Public	Private	Total
Average of the Period (%):			
1976-1980	61	39	100
1981-1985	66	34	100
1986-1990	63	37	100

Source: Compiled from *Budget Economique*, Ministry of Agriculture.

Table 4-6. Agricultural Investment Financing Scheme, 1976-1990.

Average of the Period (%)	Government Budget	Bank Credit and Farmers Equity	Total
1976-1980	76	24	100
1981-1985	76	24	100
1986-1990	74	26	100

Source: Compiled from *Budget Economique*, Ministry of Agriculture.

Table 4-7. Agricultural Investment Distribution by Major Sub-sector (%), 1971-1990.

	1971-1975	1976-1980	1986-1990
Hydraulics	21	41	42
Livestock	11	12	11
Fisheries	8	8	11
Machinery	22	21	8
Forestry	11	6	6
Others	27	12	22

Source: Compiled from *Budget Economique*, Ministry of Agriculture.

Table 4-8. Agricultural and Economy-wide ICORs, 1971-1987.

	1971-1979	1980-1987
Agricultural Investment (in Constant 1980 Prices. MD)	634.30	1,173.00
Agriculture Production Increase (in Constant 1980 Prices. MD)	209.00	192.00
Agricultural ICOR	3.03	6.11
Total Investment (in Constant 1980 Prices. MD)	5,436.90	8,940.00
GDP Increase (in Constant 1980 Prices. MD)	1,942.20	1,280.80
Economy-wide ICOR	2.80	6.98

Table 4-9. Agricultural ICORs by Sub-sector, 1970-1987.

	1970-1979	1980-1987	% Increase
Irrigated Crops	3.08	11.42	+271
Rain-fed Crops	3.01	4.41	+47
Livestock	2.10	3.61	+72
Fisheries	3.23	5.53	+71
Rain-fed Tree Crops	1.68	8.40	+400
Cereals and Legumes	2.86	2.05	-28
Total Agriculture	3.04	6.11	+101

Table 4-10. Investment in Hydraulics (1000 TD).

	Total Agricultural Investment	Investment In Hydraulics	Share of Hydraulics (%)
1971-75	182	35	19
1976-80	594	200	34
1981-85	1226	529	43
1986-90	1616	670	41

Table 4-11. Return on Investment for Land Managed by the State Land Authority, 1980-1988.

	Land Managed by State Land Authority	National Average
Total Investment (1980-1988)	85.0 MD	2180 MD
Average Annual Investment	9.4 MD	242 MD
Average Annual Investment Per hectare of Cultivable Land	71.0 MD	50 D
Average Annual Production	35.0 MD	1048 MD
Average Annual Production Per Hectare of Cultivable Land	263.0 MD	218 D
Production Investment	3.7	4
Cumulative Financial Results	1.9 MD	
Average Annual Financial Results	213,600.0 D	
Average Annual Financial Results Per Hectare of Cultivable Land	1.6 D	

Source: Balance Sheets of *Office des Terres Domaniales* and *Budget Economique*, Ministry of Planning.

Table 4-12. Return on Investment for Cooperative Farms, 1980-1988.

	Cooperative Farms	National Average
Total Investment (1980-1988)	41.0 MD	2180 MD
Average Annual Investment	4.6 MD	242 MD
Average Annual Investment Per hectare of Cultivable Land	23.0 D	50 D
Average Annual Production	23.0 MD	1048 MD
Average Annual Production Per Hectare of Cultivable Land	128.0 D	218 D
Production Investment	5.6	4
Cumulative Financial Results	22.6 MD	
Average Annual Financial Results	2.5 MD	
Average Annual Financial Results Per Hectare of Cultivable Land	12.6 D	

Source: Balance Sheets of Cooperative Farms and *Budget Economique*, Ministry of Planning.

Table 4-13. Supply Elasticities of Cereal Products with respect to Prices.

Product	Durum		Bread Wheat		Barley	
Price of:	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
Output	2.05	2.07	3.20	4.10	2.30	3.46
Index of Inputs	-2.03	-2.03	-1.40	-1.72	0.26	0.39

Source: *Déterminants Economiques de l'Offre Céréalière*, Hachicha K., 1990.

Table 4-14. Food Subsidies, 1986-1989.

Year	1986	1987	1988	1989
Amount (MD)	163.0	160.0	204.0	301.0
Percent of Total Subsidies	81.8	87.3	78.6	81.7

Source: APIP-Project, Ministry of Agriculture.

Table 4-15. Prices and Subsidies for Bread Wheat, 1981-1989 (TD/Quintal).

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Net Producer Price	8.70	10.00	11.70	14.00	14.50	16.00	17.00	19.00	19.00
Handling Costs	1.17	1.58	1.84	2.00	2.11	2.20	2.72	2.91	2.84
Total Cost Per Quintal	9.87	11.58	13.54	16.00	16.61	18.20	19.72	21.91	21.84
Resale Price to Millers	7.25	7.25	7.25	7.25	7.38	7.37	7.37	7.25	7.25
Subsidy per Quintal	2.62	4.33	6.29	8.75	8.44	9.05	12.35	10.75	14.59
% of Subsidy Relative to Unit Cost	26.52	37.42	46.44	54.68	50.83	49.73	62.63	49.12	66.80

Source: DPCE, Ministry of Economy.

Table 4-16. Food Imports, 1980-1986.

Year	1980	198 1	1982	1983	1984	1985	1986
Food Imports (Current MD)	157	211	210	287	337	278	287
Public Subsidies on Domestic Food Consumption (Current MD)	15	4	10	24	115	19	12

Source: INS.

Table 4-17. Distribution of Subsidies.

Income Bracket	First Quartile	Second Quartile	Third Quartile	Fourth Quartile
Percentage of Allocated Subsidies	12.5	20.8	29.2	37.5

Source: *Etude de la Caisse Générale de Compensation Phase I*, Ministry of Agriculture.

Table 4-18. Producer Cereal Price, 1986-1991 (TD/Ton).

Year	1986	1987	1988	1989	1990	1991
Durum	160	185	210	225	245	260
Bread Wheat	160	170	190	199	209	230
Barley	110	120	140	145	150	150

Figure 3.1. Nominal Cereal Prices, 1970-1990

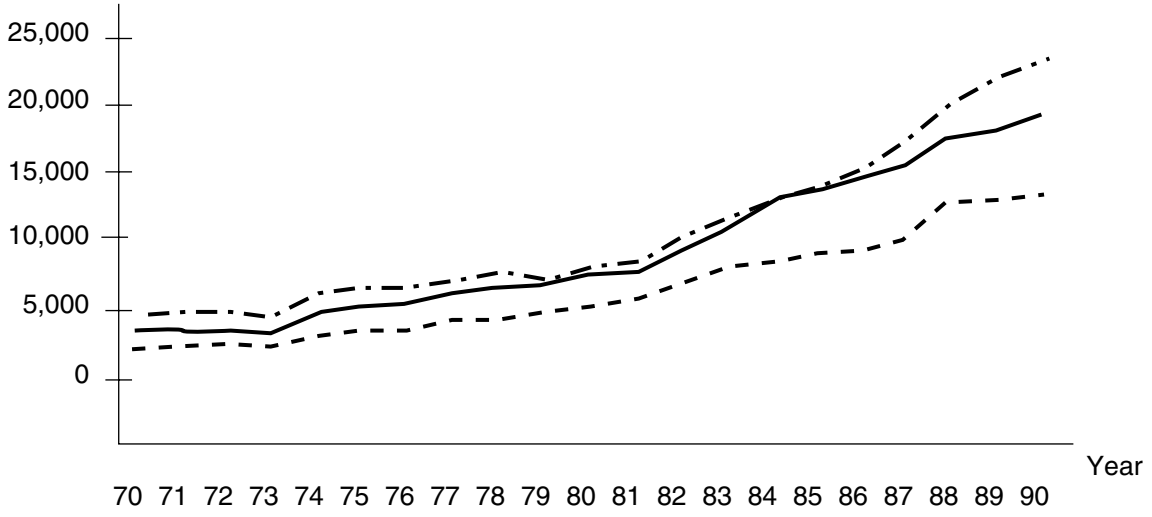

Figure 3.2. Real Cereals Prices, 1970-1987

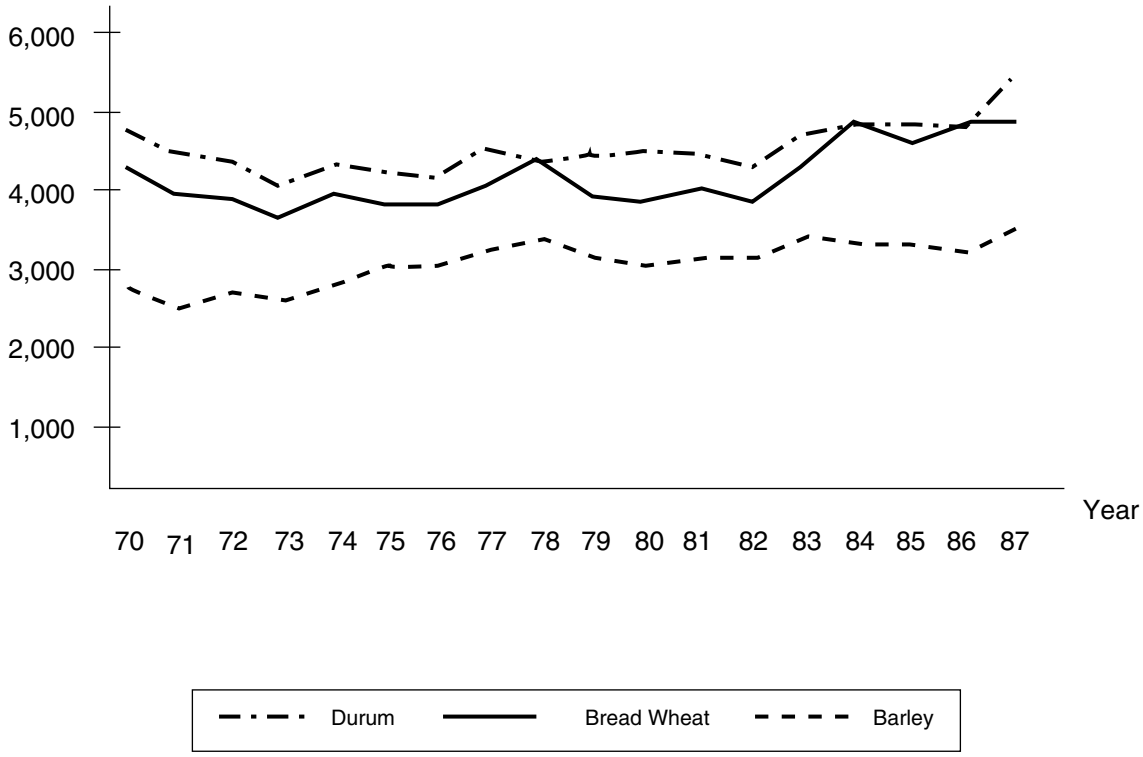

Figure 3.3. Export Prices for Olive Oil, 1970-1987

Figure 3.4. Import Prices for Milk Products, 1970-1987