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Characteristics of the Fruit and Vegetable Sector of the Tunisian Economy

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Introduction

The production and marketing of fruits and vegetables is a major economic activity in Tunisia. These products are an important part of the Tunisian diet and a major component of total agricultural exports. The Agricultural Development Plan, 1969-72, allocates considerable resources to projects which will increase the production of fruits and vegetables. However, available data indicate that neither production nor exports are increasing as planned. There have also been sharp increases in domestic retail prices of fruits and vegetables during the last year, while comparable increases in per capita income have not been achieved.

This report has three objectives. The first is to describe the importance of the sector and the marketing channels for fruits and vegetables. The second is to summarize some of the major findings of previous economic studies. Finally, it is hoped to better define future research priorities for planning and development in this sector.

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* Internal working paper for development of research program on University of Minnesota -- AID Project in Tunisia

Industry Structure

Production and Distribution

Vegetable production in Tunisia is concentrated in three regions, the Cap Bon, the Sahel and Gabès. (They are produced in other areas but much less intensively than in these areas.) Much of the production is carried on under irrigation. In 1968 51,000 hectares were in vegetable production.[1] If one includes broad beans, peas, chick peas, and lentils in the category of fruits and vegetables the total land area amounts to 127,000 hectares or about 3.8 percent of the tillable land.

All tree crops accounted for an estimated further 1.3 million (1,307,600) hectares in 1968. However, excluding olives and vineyards, there were 191,600 hectares of other tree crops or 5.7 percent of the tillable land. Citrus account for 7 percent of this total. In terms of surface, almond plantings are most important, accounting for 120,000 hectares.

The value of production per hectare for these crops is high relative to other agricultural enterprises. In 1968, the product value (at wholesale market prices) for fruits, excluding wine and olives was 13,650,000 dinars or 10.7 percent of the value of total agricultural production. Vegetables plus pulses (broad beans, peas, and chick peas) were 16,450,000 dinars or 12.8 percent of total agricultural value.

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1 Secrétariat d'Etat au Plan et à l'Economie, "Plan de Développement Economique et Social, 1969-72, Agriculture et Pêche. Tunis, Tunisia, and Bronzi, Pierro, "Mission for the Analysis of the Project for the Organization and Development of Truck Farming in Tunisia," Ford Foundation, Tunis, Tunisia, August 1969.

Thus, fruits, vegetable and pulses account for 23.8 percent of total value of agricultural output.[1]

In the export picture, these products are equally important. In 1968, they accounted for 28.6 percent of agricultural exports. Fruits make up the largest share of fruit and vegetable exports with citrus being most significant.

To meet rising domestic demand and to increase foreign exchange earnings from these products, substantial annual production increases were recommended in the 1969-72 agricultural plan. Recommended increases were 10 percent for pulses, 6 percent for vegetables and 10 percent for fruit. The outlook for achieving these growth rates is not good. Production figures for the first two years of this period have not exhibited average growth rates of these magnitudes. Either the price levels have been insufficient to generate these levels of supply response or infusion of new capital and techniques to shift the supply functions have not been forthcoming. Furthermore, for fruit, establishment of production orchards is a long term process. New plantings can then play only a minor role in 1972 fruit production goals. Increased use of fertilizer and irrigation of orchards is the most feasible method of achieving production increases in the short run. Some work on fertilizer response in Tunisia indicates that these gains may be achieved,[2] but major programs in this area have not been undertaken.

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1 Ibid.

2 Capitaine, R. C., "Fertilization Résultats de l'Experimentation Réalisée des 1/9/65 et 30/6/67. Secrétariat d'Etat et Agriculture, Division de la Production Agricole Vegetale.

Market Channels and Institutions

Fruits and vegetables move from producers to consumers by several alternative routes. The channels for products sold in the fresh form and products sold in the processed form are somewhat different. The following description is based on interviews with members of the trade and governmental agencies charged with facilitating fruit and vegetable marketing.

Fresh Products

The diagram in Figure 1 illustrates the movement of fresh fruits and vegetables. The production units are of three types: the individual traditional producer who usually operates on a very small scale, the cooperative production units, and the public production units. The relative importance of each type in fruit and vegetable production is not known.

A producer has several sales options for fruits and vegetables: (1) Sale directly to consumers. (2) Sale of the crop in the field with the buyer normally performing the harvesting function. (3) Sale to a processing plant. (4) Sale through a 'cooperative de service'. The cooperative de service may be local or regional organizations. Since the cooperative is an agent for the producer, the cooperative does not take ownership of the product. (5) Sale directly to local retailers. In general these sales are made in the small rural villages which do not have wholesale markets. (6) Sale directly into one of several wholesale markets (marchés de gros).

For sales made through the wholesale markets, one of three options exist: sales through the cooperatives de service, sales through a

commission man, sales of his own produce if the producer has the authority to sell in the marchés de gros. These markets are not specialized wholesale markets but more a central market in which producers, producer representatives, or country buyers of fruits and vegetables assemble to sell their produce to retailers, the institutional buyers (restaurants, hospitals, and hotels) or to buyers who sell in other wholesale markets in the country.

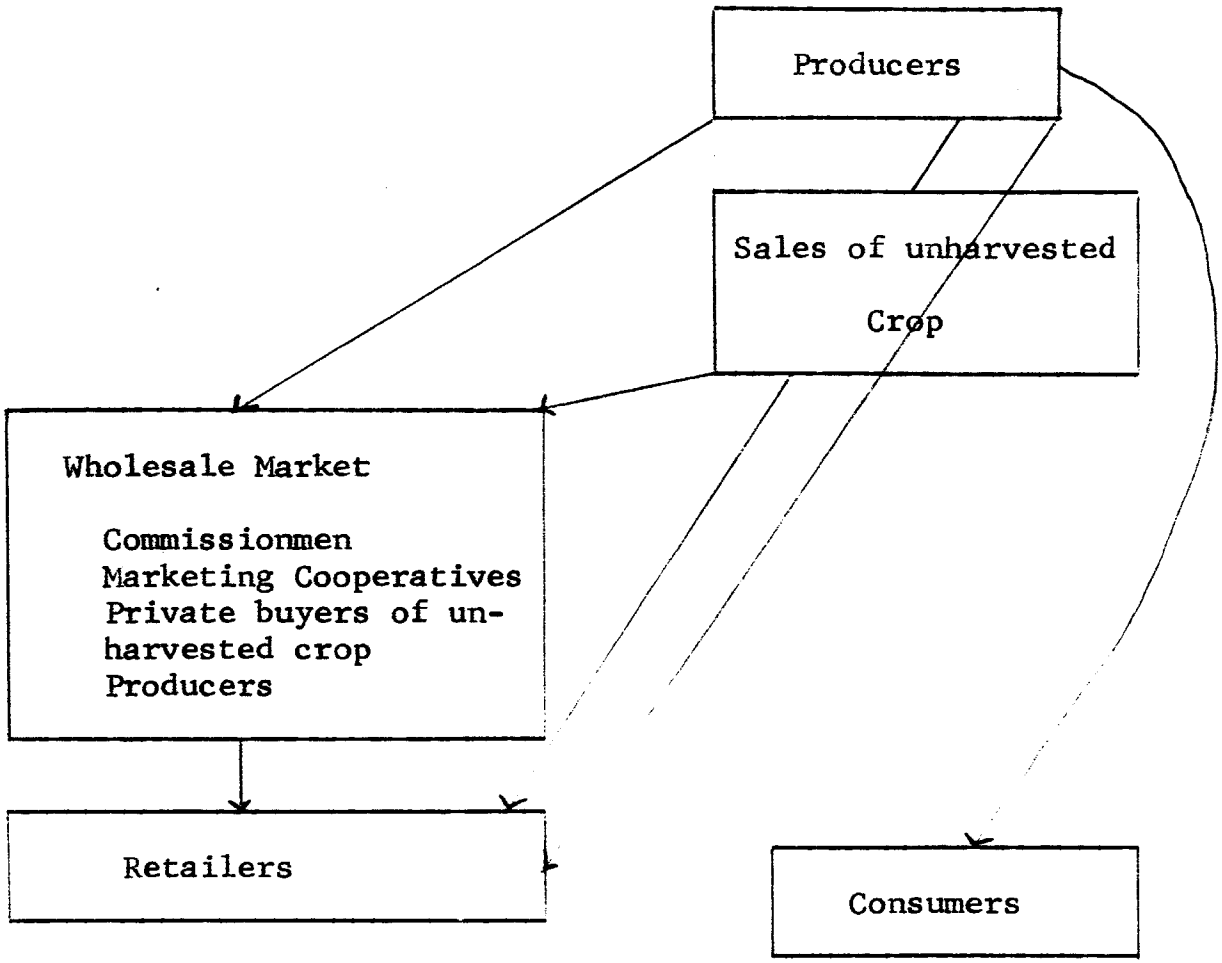
Not all cities have marchés de gros. They are located in the larger cities, Tunis, Bizerte, Sfax, etc. In the Tunis market, the space in the market is allocated according to gouvernorats. Sellers display their product in the space allocated to their gouvernorats.

Fees for use of the wholesale market and for services provided by the market are calculated as a percentage of the selling price. For the Tunis market, they include a fee of 4 percent of receipts for selling, a 2 percent municipal tax, and a 2.5 percent 'frais de factage' -- the charges for the porters who carry the products into the market or provide the necessary movement within the market.

In addition to the above charges the producer must pay an agricultural tax. For fruit this is 5.5 percent of the sales price and for vegetables it is 4.2 percent of the sales price.

Retailing of fruits and vegetables is located both in centralized public market facilities and in privately owned or rented facilities that are disbursed throughout the cities and towns. Thus, in numbers at least, it is a highly competitive market. For Tunis alone there are roughly 3,000 officially authorized retailers. In addition there are many street venders not included in this figure of authorized retailers.

Figure 1 Market Channels for Fresh Fruits and Vegetables in Domestic Market



Retailers also pay a fee to the wholesale market for product handling. This amounts to 2.5 percent of the purchase price. Also, the retailer, if he does not have his own transport, hires a transport agency to bring his product from the wholesale market to his retail outlet. In Tunis, the major transport firm is a municipal firm called the Societé de Transport Légère. The charge for this transport is 2 millimes per kilo (S .17 per cwt.) gross weight or about 3 millimes per kilo (S .27 per cwt.) on a net weight basis.

Fresh products move in export channels somewhat as depicted in Figure 2. For the past several years only three agencies have been allowed to export fruits and vegetables, the UCCFM, the STIL, and the CTEA. The Central Union of Fruit and Truck Crop Cooperatives (UCCFM) acts as the coordinating agency for its member firm. This cooperative is composed of 5 cooperatives and 5 private companies. It has an agent in Marseille who makes sales, assists in facilitating arrival of the products in Europe and performs some bookkeeping functions. When the representative makes a sale, he contacts UCCFM which coordinates the assembly, packing and shipment from Tunis.

The UCCFM pays the expenses associated with the exporting and it also acts as the clearinghouse for payment of other marketing services and payment of producers. It receives payment from the foreign buyer and approximately 80 percent of the anticipated producer price is paid immediately. The UCCFM after paying freight, packing, grading and other charges, distributes the balance to the producer.

The Tunisian Agency for Citrus Exports (CTEA) is an agency for the exportation of citrus fruit. Currently, there are 13 persons and private

firms who are members of CTEA. The members are engaged in the export of other products, but citrus exports must be made through the CTEA. This unit acts as a commission firm for citrus exports and charges are made on the basis of export volume.

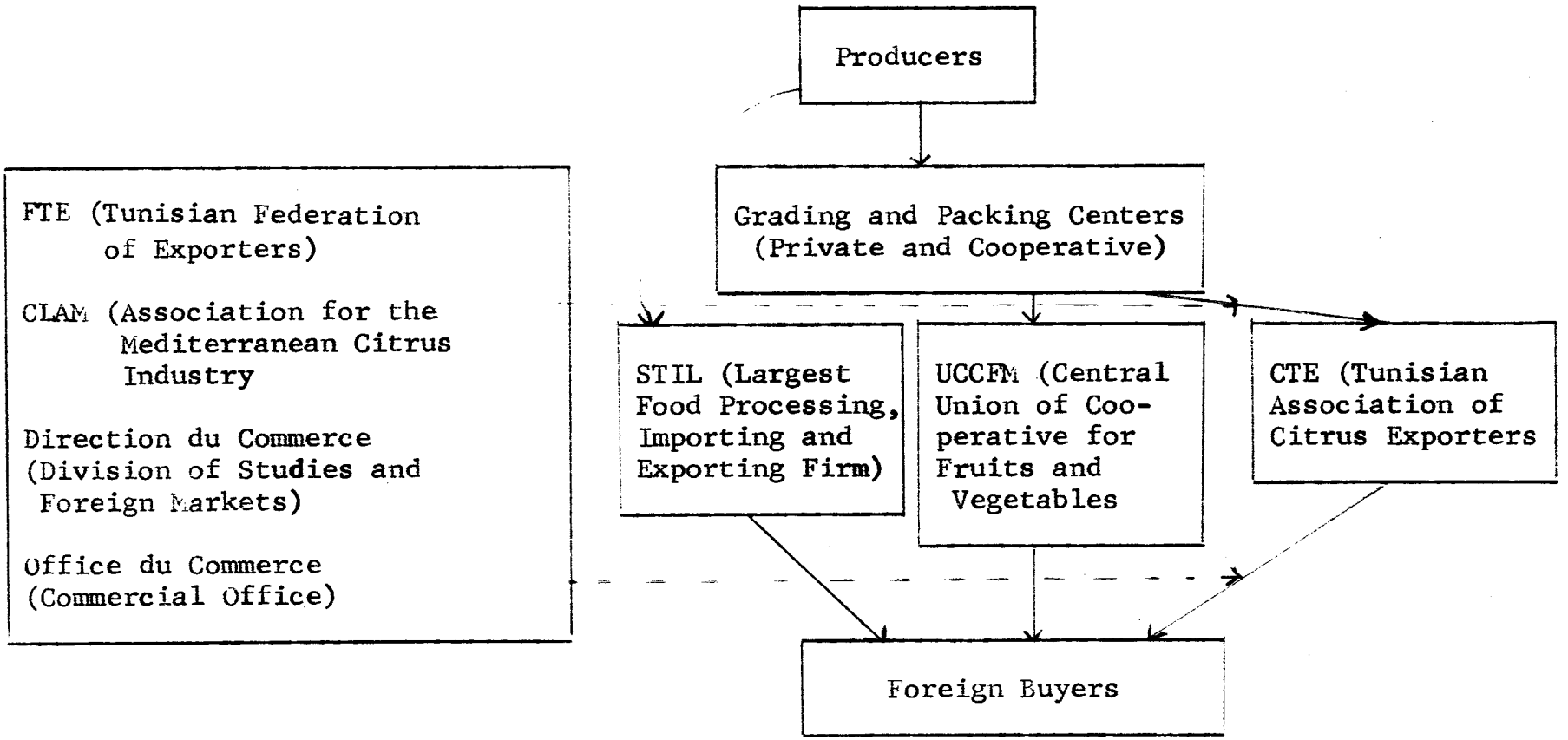
The other agency involved in export of fruits and vegetables is the Société Tunisienne des Industries Laitières (STIL). STIL is engaged in a wide variety of food processing and marketing activities in addition to exporting. During recent years, it was the only Tunisian firm which was authorized by the government to export dates. For other fruit and vegetables, both canned and fresh, it is the major exporter.

STIL is a fully integrated organization. Raw products are purchased directly from producers and for dates, some are produced on its own farms. It transports the product from the producing area to Tunis and performs any conditioning and packing for export or processes it. It has its own sales force which sells the product in foreign markets.

In addition to the agencies that make the sales, there are a number of other agencies that facilitate the movement of these products in export markets. For citrus there is the Liason Committee for Mediterranean Citrus Culture, CLAM. Members include the citrus producing countries of the Mediterranean area. Four services are provided: (1) Technical research on production techniques. (2) Advertizing of citrus fruits in European markets to expand total demand. (3) Industrial research to develop new and improved products from citrus fruit. (4) Economic studies of the market for member countries and organizations.

Another agency that is currently attempting to expand markets for all Tunisian products is the Tunisian Federation of Exporters, FTE. It has

Figure 2 Market Channels for Exported Fresh Fruits and Vegetables



several functions. It is an information service for exporting firms and producers of export products. It provides information on market trends in prices and product availability for the purpose of coordinating exports with foreign demands. The FTE carries on promotional activities such as showing Tunisian products at trade fairs, buying advertizing time on European television, and other promotional activities. Another function which may be in part informational and part developmental is that of organizing periodic meetings of producer representatives, exporters, and the Government to explore problems and barriers to expansion of exports. One such series of meetings were held in March 1970 to consider the problem of export for each of the major economic sectors. The results of the meetings are to be used as the basis for recommendations to the relevant governmental agencies.

The Office of Commerce has the responsibility for collecting statistics on exports and for assuring that exported products meet certain standards. It operates a unit in the port of Tunis which samples and analyzes all agricultural products, both fresh and processed, before they are allowed to leave the country.

The Direction of Commerce in the Ministry for the National Economy also plays a role in facilitating exports. It's primary function is to put into practice the commercial policy of the country. Specifically, it is an agency which makes commercial agreements with other countries. It was instrumental in the commercial accord reached with the European Economic Community. It sends representatives to the international trade conferences such as GATT. It also issues import and export licences.

The Direction also has a research function which is vested in the Division of Studies and Foreign Markets. Studies are made of trade patterns with specified countries or for products. The purpose is to chart the trends in trade. These studies are used as a basis for negotiating the commercial agreements. This Division also makes studies of the impacts of the various taxing policies on the level of exports. These studies are used as the basis of recommendations to the Finance Ministry to ease taxes which may be having an adverse effect on exports. The decision to eliminate the export tax on olive oil on January 1, 1970, was the result of this type of recommendation.

Processed Products

The market channel for processed fruits and vegetables is depicted by the diagram in Figure 3. Some raw products move directly to the processors such as STIL. Other raw product passes through the "Centres de Conditionnements" -- assembly centers. These centers assemble products from producers or other middlemen, and carry out grading, sorting and packaging.

In 1968, there were 38 canning plants in Tunisia (Table 1). By far the largest number of plants were located in the gouvernorat of Tunis (Table 2). They processed fruit, vegetables, or fish. Almost all are engaged in processing several products which enables them to more fully utilize both equipment, facilities and labor. Most plants were small units in terms of employment. Only three permanently employed more than 50 persons and almost half had fewer than 10 employees. Employment of seasonal

Figure 3 Market Channels for Processed Fruits and Vegetables

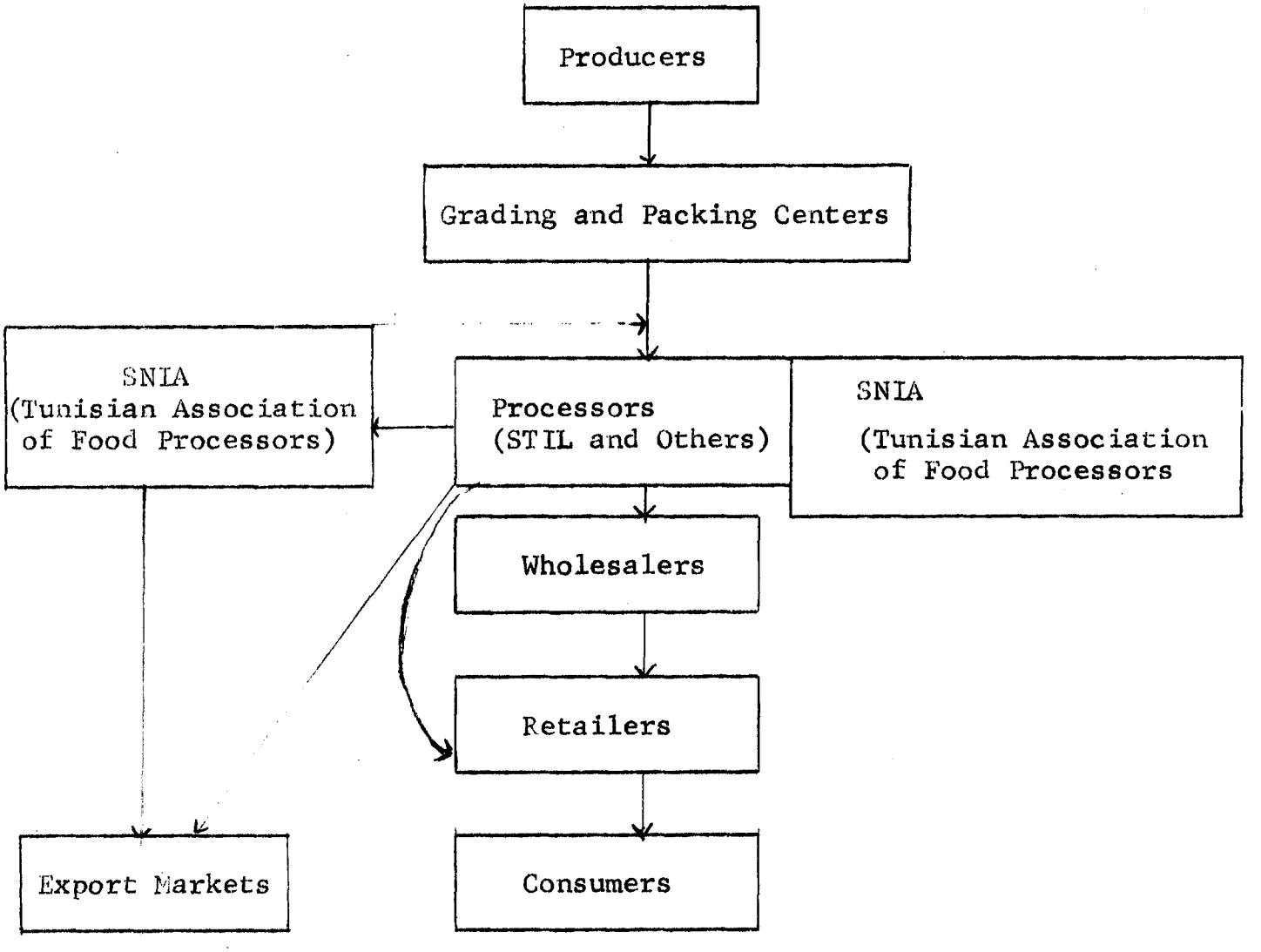


Table 1. Canning Factores in Tunisia in 1968

Fruits, Vegetables and Fish.

Item	Size Classification by Number of Salaried Employees					
	0-9	10-19	20-49	50-99	99 & Over	Total
Number of Establishments	16	13	6	1	2	38
Number of Employees	80	172	180	70	447	949
Number of Proprietors and Directors	4	1	-	-	-	5

Source: "Rencensement des Activités Industrielles, Résultat 1968," Institut National de la Statistique, Tunis, Aout 1970. p. 142.

Table 2. Number of Canning Factories and Employees by Location in Tunisia, 1968.

Gouvernorat	Number of Establishments	Number of Employees
Tunis and Suburbs	21	769
Bizerte	1	10
Béjà	1	6
Kef	1	14
Gabès	1	2
Kairouan	1	14
Sousse	5	56
Nabeul	7	83
Total	38	954

Source: "Récensement des Activités Industrielles, Résultat 1968," Institut National de la Statistique, Tunis, Aout 1970. p. 143.

laborers was rather high, 8474 laborers in 1968.[1]

Total fruit and vegetable sales for all plants in 1968 were 4,867,000 dinars or roughly 8.7 million dollars. Average 1968 plant sales, including fish, were 150,000 dinars or roughly 300,000 dollars. In terms of volume, average production per plant was 619 metric tons. The range of production per plant, if corresponding with employment, was very large.

For many of the processing plants other than STIL allocation of the product among the processing plants is coordinated by the National Association of Food Industries (SNIA). At present there are 21 processor members of this organization. Most of the processors are located in the north and central part of the country. They are usually multi-product plants handling several products. Regardless of this multi-product capacity, trade officials report that processing costs are high relative to those in Europe and other countries.

SNIA has several other functions in addition to the allocation of raw fruits and vegetables among plants. Based on studies made by its research personnel, it makes recommendations for the fixing of export prices for these products. It may engage in export of processed products that member processors cannot dispose of. Generally, however, exports are made by the processors themselves.

The return that processors receive for processing fruits and vegetables is based on recommendations made by SNIA to the Direction de l'Economie

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1 "Récensement des Activités Industrielles, Résultat 1968," Institut National de la Statistique, Tunis, Aout 1970. p. 142.

Nationale. It assembles data from processors on costs of operation and prepares summaries of processing costs. This is used as evidence to support their recommended price or margin.

Prices to be paid producers by processors for three of the major products were set by the government until last year. The 1970 prices were 30 millimes per kilo for apricots, 18 millimes for tomatoes and 35 millimes for red peppers. Producer prices for all other products were established in the market.

In general, Tunisian fruit and vegetable processors have a difficult time competing in world markets because of high costs of processing. Packaging and container costs are much higher than in countries with which Tunisia competes for exports. Estimates from trade people are that costs are 20 to 50 percent higher than in Europe. Electricity and water are very high costs. SNIA estimates the average water cost of 5 millimes per kilo of processed tomatoes.

Review of Research on the Fruit and Vegetable Sector

The following is an attempt to briefly describe the existing research and reports relevant to the Tunisian fruits and vegetables sector. No attempt has been made to integrate these studies in a systematic way.

The OECD published between 1966 and 1969 a series of reports on the existing situation and future prospects for fruits and vegetables in OECD countries. Several of the OECD countries are important customers for Tunisian exports. These studies included data on a product and country basis and described the situation in 1961-64 together with projections of production and consumption in 1970.

The report on trade in tomatoes probably has the most relevance for Tunisia.[1] The study projected a total net deficit for fresh tomatoes in European OECD countries of 20,000 tons in 1970 as compared to 161,000 tons net deficit in 1961-64. Although this is an aggregate figure and disguises many individual country needs it partly explains the inability of Tunisia to greatly expand its tomato exports. It is also in contradiction with another set of studies made for the Ministry of Agriculture which projected increasing Tunisian tomato markets to Europe.

For processed tomatoes in 1970, the OECD projected an expansion of 160,000 tons in import requirements of European OECD importing countries but export availabilities of processed tomatoes of OECD European exporting countries is expected to increase by 990,000 tons. Thus, Tunisia would likely find stiff competition in attempts to expand its exports in these markets. Based on preliminary data available for 1970, this is exactly what has happened.

The Institute for Applied Economic Science in Paris (ISEA) completed several studies in 1968 on the potential outlets in 1975 and 1980 for Tunisian agricultural products.[2] Similar studies had been completed by the same organization in 1965. The projections in that study were for

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1 "Tomatoes, Production, Consumption and Foreign Trade of Fruit and Vegetables in OECD Member Countries, Present Situations and 1970 Prospects," Organization for Economic Cooperation and Development, Paris, 1968.

2 "Perspectives pour 1975 et 1980 de Débouchés Extérieurs des Produits Agricoles Tunisiens" Parts I-VIII, by the Institut de Science Economique Appliquée for the Secrétariat d'Etat au Plan et à l'Economie National Sous-Secrétariat d'Etat à l'Agriculture, Tunis, 1968.

1971.[1] The technique of forecasting is essentially the same for both.

The reports appear to have some value for judging the market potentials for the Tunisian fruit and vegetable industry. They are rigorous attempts to project production, consumption and exports for Tunisia and all countries in which it competes or with which it competes. For the specified crops, they provide basic data for planning cropping programs to meet expected export market needs. Thus, the studies provide much information which can be used for agricultural planning.

In general the projections of these studies appear to be excessively optimistic. One of the 1965 studies projected 1968 production of artichokes at 28,000 tons and 1971 production at 40,000 tons. Actual production in 1968 was 10,990 tons. It further projected exports of fresh artichokes at 8,000 tons in 1968 and 15,500 in 1971. Actual 1968 exports were 3,335 tons. Similar relationships of actual production and export levels to ISEA estimates existed for other products in 1968.

In view of the 1965 to 1969 trends in production and exports, it appears that the projections for 1975 and 1980 may also be very high. For example the 1968 studies projected potato production at 123,100 tons in 1975 and 150,000 tons in 1980. After allowing for domestic consumption, they estimated 28,100 tons would be available for export in 1975 and 35,000 tons in 1980. The study stated that Tunisia would be able to sell about these amounts in European markets. Although current production

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1 "Provisions Concernant les Débouchés Extérieurs des Produits Agricoles Tunisiens" Parts I-V, by the Institut de Science Economique Appliquée for the Secrétariat au Plan et l'Economie National, Tunis, 1965.

experience is consistent with these production projections, exports never achieved anywhere near the projected level. In 1967 exports were 9,128 tons; the next year they fell to 808 tons.

In addition to the optimistic nature of the projections, the studies suffer from other shortcomings. One is that they fail to consider any of the changes that are and will be taking place in the marketing of fruits and vegetables. Coordination of production and marketing through contracts is a feature of the fruit and vegetable sector of many economies. Instead of letting production and distribution be guided by prices alone, planning becomes important in meeting consumer needs. For the most part Tunisia still relies on the market and its prices as guides to production and marketing in the export trade. The shift to coordinated and planned marketing will affect the competitive relation among producing countries. This is not at all considered or acknowledged in these studies.

Finally the studies are lacking in overall summarization of projections or in a conclusion as to how they might be used. As a result the studies have probably been used much less than they otherwise would have been.

The FAO completed a study in 1968 for horticultural crops in the Mediterranean area. The purpose of the study was to analyze the existing supply-demand conditions for horticultural crops of several Mediterranean countries and to make projections to 1970 and 1975.[1]

Though the study deals with almost all Mediterranean countries, the following comments are directed principally to the section on Tunisia.[2]

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1 Wolf, J. and G. Coda - Nunziante et al, "Horticulture in the Mediterranean Area, Outlook for Production and Trade," Commodity Bulletin Series 42, FAO, Rome, 1968.

2 Spain, France, and Israel are not included.

The situation (based on 1965-75 data) finds horticultural crops to be extremely important in the total export picture of these countries, including Tunisia. Fruits and vegetables accounted for roughly 10 percent of total Tunisian export earnings (12 million dollars out of 119 million dollars) in 1965. Fresh citrus was most important - 46 percent of all citrus were exported in 1965. Tunisia was also one of the four major producers of apricots. Turkey, Syria and Greece were the other major producers.

The three Maghreb countries have traditionally had a seasonal advantage in export markets for certain fruits and vegetables. This has been important for Tunisian apricots. For vegetables, particularly, this advantage is being eroded by new technologies being developed in France and other European countries.

The FAO also made projections of supply and demand for these crops. It projected large expansion in production and exports of apricots and citrus for 1975, but less than those of the Tunisian Four Year Plan. For 11 Mediterranean countries 1975 citrus production was projected to double that of 1965 (expansion will be characteristic of all the countries) and the competition for export markets will increase. Total citrus export availability in 1975 was projected at about 6.0 million metric tons. European import requirements were projected at 5.8 million metric tons. Because of high price elasticities of demand for both fresh and processed citrus, it concluded that disposal of all supplies may be made with relatively moderate price adjustments.

The FAO report also considered competitive factors that will influence any single country's export expansion for horticultural crops. Costs of

production are important. Low labor costs in North Africa may seem to give an advantage, but this can often be offset with application of capital intensive technology. And European countries have a long experience in the techniques of fruit and vegetable production. The ability to reduce production costs depends on the institutional setting, credit availability, tax structure, education systems, and other factors.

Proximity to markets is also important. For the West European market, North Africa has about a 10 dollar per ton advantage over the Near East. For many commodities, Tunisia compares favorably with most other countries of the Mediterranean. From Tunis to Rotterdam, actual costs for apricots and citrus are less than for Spain and Italy.

These and other comparative advantages will, however, continue to be moderated by market access and import policies. Access requirements to EFTA countries are generally liberal - the U.K. imposes a 10 percent ad valorem tax on most items. Several East European markets have been opened but are limited by quotas. Expansion of quotas may be expected, but supplies of foreign exchange will also be important. EEC has policy of preferences for community products. North African countries, nevertheless, have enjoyed special access to French markets.

Domestic demand for fruits, vegetables and pulses has been most recently analyzed in a study of consumption and expenses of Tunisian households for the period 1964-66.[1] Per capita and per family levels of consumption

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1 "La Consommation et les Dépenses des Ménages en Tunisie, 1965-1968" Secrétariat d'Etat au Plan et à l'Economie Nationale, Tunis, Tunisie, Dec. 1968.

were calculated on the basis of a consumer survey for fruits, vegetables and pulses as a group and for several subgroups and individual products. In addition, income elasticities of demand were calculated for each group. Income elasticities of demand were high, approaching or exceeding 1. This means that increases in real income are associated with proportionate increases in expenditures for these products.

A study by Mr. M. Sakouti in the "Revue Tunisienne des Sciences Sociales" in 1968 appears to be one of the few studies which deal with the Tunisian marketing system as such.[1] This study provided some ideas of 1959-65 trends in the fruit and vegetable processing industries and recommends specific marketing policies.

The study reported some growth in food processing industry output, but a decrease in food processing relative to total industrial output. If economic development did occur, this should have been expected. The food industry experienced a halving of the number of enterprises between 1959 and 1964, 494 to 239. But employment of the food industry doubled. Concentration was found to be moderate. Ten percent of the enterprises (24) in 1963-64 accounted for 66 percent of industry output and 48 percent of industry employment.

The study found that total finished product costs increased 38 percent from 1959-64. This caused competitive difficulties in both foreign and domestic markets. In order to sell the product net margins for the

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1 Sakouti, M. "Output of Capital in Food Industries in Tunisia," Revue Tunisienne des Sciences Sociales, No. 14, September 1968.

processors were reduced. Industry profits declined 75 percent for the period. The high costs of processing is one of the major criticisms currently made by representatives of the exporting agencies.

To expand the processing industry for fruit and vegetables and to make Tunisian products more competitive in world markets, several policies were recommended: (1) Modernization of processing facilities. (2) Greater coordination of decisions affecting production and marketing. The Societé Tunisienne des Industries Alimentaires now participates in the function by allocating supplies among processing plants. (3) Increased utilization of capacity by extension of the season and diversification into fruits and vegetables with different seasons. (4) The creation of a National Council of Exporters to better coordinate export marketings and to expand export markets through development of new products and promotion. The Tunisian Federation of Exporters now in existence is probably this type of organization.

Conclusions

The conclusions that follow are based on the studies previously reviewed as well as discussions with personnel of OECD in Paris, FAO in Rome and the U.S. Mission to EEC in Brussels in 1969, and recent interviews in the Tunisian government and business community. They are based on incomplete information in most cases, but nevertheless, they provide a basis for developing a more rigorous research program for the sector.

Demand Potential

First, the domestic market will continue to account for a large part of the demand. The Comité Sectoriel de la Nutrition of the Plan 1968-72

made many detailed estimates of 1972, 1975, and 1980 food consumption. Individual estimates were made for fruits and vegetables and these were used in the Tunisian Agricultural Plan 1969-72. A substantial increase was projected for 1972 for consumption of vegetables, pulses and fruits. The interior demands were projected to increase between 1966 and 1972 by 31 percent for pulses, 24 percent for vegetables and 29 percent for fruits.[1] These projections probably give a good estimate of aggregate consumption levels, but on an individual commodity basis they tend to be less reliable because of the substitution that can and does occur among products in the group.

The opportunities to expand sales in Europe appear rather bright. Presently, Tunisia supplies only a small fraction of total European fruit and vegetable needs. Thus considerable expansion of exports could occur without a large impact on prices.

The most obvious characteristic about the European market is the maze of regulations that affects imports. Each country is likely to have quotas, import calendars, duties, plus sanitary and quality standards that must be met by importers of fruits and vegetables. Additionally, there are several international organizations, e.g. EEC, which may establish duties, levies, reference prices and compensatory taxes. However, EEC has no variable levies on fresh fruits and vegetables. It only requires that third country products be sold in the community at or above a specified minimum reference price.

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1 Based on estimates presented in "Plan de Développement Economique et Social, 1969-72, Agriculture et Pêche."

This multitude of regulations, although a hindrance, could be overcome. The seasonal advantage possessed by several Tunisian crops, oranges and apricots for example, allows them to move into foreign markets before the import calendars become effective. Moreover, the seasonal advantages give the Tunisian products access to the high early market prices. Import duties and other charges can be covered by the price and still provide adequate returns to Tunisian producers.

Total future demands for fruits and vegetables in European markets may expand at the levels estimated in the ISEA studies. Both population growth and a positive income response contribute to this. However, becasue several EEC members are major fruit and vegetable producers, Tunisia cannot expect to take a large share of this growth in demand. Nevertheless, traditional relationship with France may give Tunisia some possibility for expanding in that market. The recent agreement providing for associate membership of Morocco and Tunisia in the EEC is also encouraging for agricultural exports.

The possibility of expanding fruit and vegetable imports to the EFTA countries is brighter. Several of these countries produce no citrus fruits and import considerable other fruits and vegetables. There is also a possibility for increasing trade with East European countries, including trade in fruits and vegetables.

However, there are a number of factors which make Tunisia's export prospects look less attractive. The competition for European markets will certainly become more difficult. France and Italy are currently expanding their own productive capacity for these products. They are also

growing vegetables under cover to supply the early market. A number of other African countries are invading European markets with out-of-season fresh fruit and vegetables - in which they may have more of seasonal advantage than Tunisia.

Structural Changes

The changing structure of the markets will inevitably bring about changes in the production systems and change the existing patterns of competition. The mass merchandising organizations, supermarkets, and associated institutions are expanding. These large firms require contractual arrangements for large supplies concentrated at assembly points or on single production units, with specified delivery schedules, and of specified quality. Competition will force all producing areas to adjust to these changes. It is also likely that areas which gear themselves to meet the demands of the evolving marketing system will be the most successful in enlarging their market shares. As of the present time, Tunisian exporters, to my knowledge, have no continuing supply contracts with foreign buyers for fruits and vegetables.

Another structural change that is likely to come into play by 1980 is a shift of consumption from fresh to processed fruits and vegetables.[1] The shift is already occurring in the developed countries and will begin to make itself felt in the Tunisian internal market. Such a shift, by making products available on a year around basis, decreases or eliminates the commercial advantage of early or late season production. Also, the shift implies the development of new marketing facilities and techniques.

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1 The FAO study developed some estimates of these shifts.

Research Needs

The purpose of the previous discussion has been to describe the Tunisian fruit and vegetable sector and to point out problems facing its development. The following would appear to be the research studies most urgently needed to solve these problems.

1) Analysis of production systems and supply response. These analyses have several uses. First they are a necessity for estimating producer response to price and other production incentive programs. The results are also basic inputs for programming models which are widely used in Tunisia. Much of the programming has, until now, made assumptions about production coefficients or used data from agronomic experimental trials. Neither of these approaches is very reliable. Thus research is needed on problems of production and supply response. What is the nature of supply function for fruits and vegetables? How responsive is output of a product to its own price, other agricultural product prices, and input prices?

Economic analysis of the production of winter vegetable production may have a particularly high payoff. These crops require somewhat different technology than in-season production and require more resources. Such a study should attempt to measure the impact of additional resources on costs. Results of this analysis should be tied in with studies of market potential to determine if such production is profitable.

The importance of these studies for economic planning is obvious. Knowledge of economic performance of the existing system is a necessity for the planning of improved resource use.

2) Study of assembly, processing and distribution efficiency. Whether in a publicly or privately controlled economy, such studies are

necessary guides to the organizational and administrative efficiency of the system. As we have seen, Tunisian market systems do not appear very efficient. Such an inquiry, which would involve the estimation of cost functions, both long-run and short-run for the marketing activites, would help solve these difficulties. Locational dimensions of marketing should also be considered.

Marketing efficiency studies should also include the measurement of overall marketing margins for fruits and vegetables. This would provide a basis for a continuing annual series which would serve as an indication of changes over time in the marketing sector.

3) Demand and market analyses for fruit and vegetables. More detailed analyses are badly needed on demand characteristics such as elasticities (price and income) and the impact of urbanization. The Consumption of 1965-1968 based on cross-sectional data has yielded aggregate income elasticities by urbanization group. More detailed data are available for some individual products and smaller product groups which would allow calculations of income elasticities. Unfortunately the cross-sectional data are inadequate to estimate price elasticities of demand. But annual and monthly series on prices and quantities are available which could be used for these estimations. Results of demand analyses are necessary for both evaluation of the impact of price and income policies on food consumption and for projecting of product demands.

These demand analyses should also include consideration of intra-seasonal price movements for fruits and vegetables, both domestic and foreign. From cursory observation, extreme price variability occurs within the season -- mainly the consequence of quantity variation. Since winter vegetable production

is a possibility in Tunisia, planners should be looking at the impact of more regular market supplies on producer returns and the allocation of product between fresh and processing uses.

Because fruit and vegetable exports are such an important part of Tunisia's total agricultural exports, an analysis of external markets and of institutional factors which influence export expansion may have a high pay-off. This study should address itself to such questions as: What is the nature of the producing sector -- the size and number of units, the ability of the product to meet export quality requirements, and the timing of production relation to competing areas? How does the marketing segment move the product into export channels? Is it capable of providing services for increased exports? How efficient are the existing firms in providing services? What is the role of the supporting agencies, government, trade organizations, and suppliers of necessary marketing inputs?

One additional point should be noted. This sector includes many different products. Detailed analysis of all products is impossible within the limits of available resources. Thus, the research studies will be made, in most cases, for selected key commodities.