Turkey

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in

Myrta A. (ed.), Di Terlizzi B. (ed.), Savino V. (ed.).
Production and exchange of virus-free plant propagating material in the Mediterranean region

Bari : CIHEAM
Options Méditerranéennes : Série B. Etudes et Recherches; n. 35

2001
pages 141-150

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Agriculture Position in the Overall Economy

Agriculture and food production have long been significant sectors in Turkish economy. Turkey has a great agricultural production potential arising from its ecological conditions, land property and rich crop pattern. The different agro-ecological conditions throughout the country provide the sector with a unique production diversity. These favorable factors have enabled Turkey to meet the demand for food and fiber since the beginning of its history. At present, Turkey is self-sufficient for almost all crop products and has important surpluses for some of them, but confronting with problems for animal products. Agricultural and food products had the major share in total export revenue until 1980s. This share has diminished over time as a result of the gradual transformation of the national economy into an industry and services-based one. Particularly after 1980, the percentage of agricultural products in export have decreased progressively; 75% in 1970, 57.4% in 1980, 15.4% in 1993 and finally about %10 in 1998 (US $ 2 .717 million /US $ 26. 974 million). Turkey could be considered as a net exporter in agricultural and agro-industry products. Although agriculture has become a less significant sector in the overall Turkish economy over the time, it still accounts for larger shares of total output (% 17) and employment (around % 40) than it does in any other OECD country, and in several developed regions in the world.

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Sector Policy

Turkish Agricultural Policy has been implemented on the basis of objectives laid down in the government's Five-Year Development Plans, the most recent of which currently being prepared, and will be effective between 2001-2005. These objectives are: to ensure adequate levels of nutrition and food supplies at reasonable prices to consumers; to raise production levels and yields without harming the natural resources, and reducing the vulnerability of production to adverse climatic conditions; to raise levels of self-sufficiency and competitiveness; to increase farm income and improve their stability; to increase exports and to develop rural areas. These are in many respects similar to those in other countries. However, given the pace of economic and demographic developments in Turkey, the emphasis has been primarily focused on increasing agricultural productivity and thus food supplies for a fast growing domestic food market.

The principal guiding and executive authority of the government in the field of agricultural policy is the Ministry of Agriculture and Rural Affairs (MARA). Many other government bodies are also involved. The actual execution of agricultural policies in Turkey involves a large number of state-owned and state-directed intervention bodies, particularly State Economic Enterprises and Agricultural Sales Cooperative Unions, state-owned banks and Directorates with separate budgets. These institutions have been pervasive throughout most of the agri-food economy, providing price support through commodity purchasing and stockpiling depending on their charter, disbursing subsidies, procuring and supplying inputs to the farmers, undertaking structural and infra-structural projects or importing and exporting agricultural commodities.

Within the framework of government program toward the liberalization of overall economy, direct public involvement in production and trade of agricultural commodities are being limited from year to year. It is planned to shift agricultural supports to direct payment for the small farmers instead of

price and input support for all farmers. This new policy is going to be implemented from this year in the pilot region and within three years it will be effective throughout the country.

Fruit tree industry: production, trade, flows and germplasm

Turkey, one of the Mediterranean countries, has suitable ecological conditions for most of the fruit species, and considered to be an important germplasm source for a lot of fruits. It is called a *Horticultural Paradise.* More than thirty different fruit tree species from Temperates to Citrus and the other subtropicals have been cultivated for centuries.

Turkey produces a wide range of fruits and nuts of which many are indigenous to the area, such as apple, pear, quince, cherry-sour cherry, plum, grape, hazelnut, pistachio, almond, walnut, chestnut fig, olive and pomegranate. Approximately, 1.8 million hectares are under major fruits /olives and 0.7 million ha are devoted to nuts. Some 60 % of fruit / olives are irrigated. The total annual fruit production is around 15 million tons (including grapes).

Horticultural production is markedly differentiated by region; intensive production of fruit is concentrated in the Mediterranean, Aegean and Marmara Regions; hazelnuts in the Black Sea Region, and pistachio in South eastern Anatolia.

The most important fruit crops in tonnage terms are, in decreasing order of importance: grapes, apples, oranges, pears, peaches-nectarines, apricots, mandarins, lemons, figs, plums, and cherries. For nuts; especially hazelnuts, with 450-600 000 tons annual production are among the most important crops in the sub- sector, and Turkey is the world leader with more than 70 percent share in hazelnut production and export.

Turkey is considered as one of the fruit centres of the world. North Anatolia (Black Sea Region) is one of the main genetic origins of several fruits

such as apple, pear, sweet cherry, hazelnut, walnut, chestnut etc. Apples are grown mainly in Marmara, Central Anatolia and its south and north transitions, with some local but mostly foreign released commercial varieties. Pear and quince are the other important pome fruits, generally grown in Marmara and Central Anatolia.

Almost all of the Prunus species have been grown in Anatolia, with extending popularity given to sweet cherries and apricots, recently. Peach is mainly grown in Marmara Region, but also extended to the Aegean and Mediterranean regions, with especially low chilling requiring cultivars. Very late peach cultivars, ripening in mid-October from the highlands of Marmara and Mediterranean Regions are being exported.

Malatya province in the East Anatolia is well known with the best quality of dry apricots. On the other hand, Mut area in the Eastern Mediterranean district has a great importance with the earliest and high quality table apricots marketed at very good prices. European plums are in Marmara, North and Central Anatolia and on the highlands of the Country. Japanese plums are in the Mediterranean and Aegean Regions.

Turkey is also famous with the highest juice quality of sour cherry. The best cultivar is named after the home province, Kütahya; Ankara and Afyon provinces are the other main sour cherry producers.

Citrus and the other subtropical fruits are cultivated, in decreasing order of importance, Mediterranean, Aegean, Black Sea and in some Micro climates of South East Anatolia. Çukurova district (Adana, İçel and Hatay provinces) is called Citrus area, but it grows all other subtropical species such as loquats, pomegranates, olives, figs, persimmons, carrobs and avocados, as well. Oranges and lemons are the main citrus fruits in the Mediterranean but mandarins (mainly satsumas) are more important in Aegean region.

Fruit Trees. 9 million tons of fruit crops have been produced in 1998. This figure represents ap-

proximately 4.5 percent of annual total fruit production of the world.

Grapevine. 3,667,000 tons of grapes were harvested in 1998, and Turkey supplied 6.3 percent of total world production.

Citrus. The Citrus production in 1998 was 1,943,000 tons which is around 1.9 percent of world total.

Olive. Turkey is among the most important olive-growing countries and the average annual production for 1997-98 season was 1,328,000 tons which accounts for about 14.9 percent of the world total produce.

Genetic resources

Apple, pear, quince, citrus, fig, pomegranate, persimmon, loquat, sweet and sour cherries, apricot, peach, hazelnut, pistachio, walnut, almond germplasms are collected by Atatürk Central Horticultural Research Institute-Yalova, Citrus and Greenhouse Crops Research Institute- Antalya, Alata Horticultural Research Institute-Içel, Aegean Agricultural Research Institute-Izmir, Fruit Research Institute-Malatya, Hazelnut Research Institute-Giresun, Pistachio Research Institute- Gaziantep, Olive Research Institute- Izmir, of Ministry of Agriculture, and by The University of Çukurova and several other Agricultural Faculties, to some extent. FAO and IPGRI are interested in and supporting to improve collection, conservation and utilisation of fruit genetic resources in Turkey.

Plant improvement

A great amount of work has been done on the variety, rootstock and interstock evaluations; pest and disease resistance; irrigation and fertilisation of Citrus in Mediterranean region. Apple scab, fusarium and nematode resistance in apple, pear, loquat, peach, strawberry and apricot; fire blight resistance of pear; rootstock and interstock evaluations for pome and stone fruits are being

continued. A special focus is devoted on the breeding of low chilling peach cultivars for subtropical areas and very late peach cultivars to grow on the highlands of the country. A strong emphasis is given to the usage of molecular markers for the identification of sweet cherry, lemon and kaki cultivars and early identification of mandarin mutants and peach and almond hybrids. Biotechnological tools are being used in, for instance, micropropagation of apple rootstocks and strawberries; protoplast fusion studies on Citrus rootstocks to develop somatic hybrids, and genotype characterisation in Citrus and its relatives in collaboration with INRA-CIRAD. Embryo rescue is achieved in early peach hybrids. A study on the resistance of the hybrids of local almond cultivars to *Pseudomonas syringae* is being carried out by Çukurova and Aegean Universities.

Integrated production systems

Studies in the integrated production field are mainly based on: the chilling requirements of Temperate Zone fruits in subtropical areas, ecophysiological works on deciduous and subtropical species; cold tolerance studies in Citrus, apple, peach, apricot, pistachio and almond; alternate bearing in apple, hazelnut, pistachio and olive; flower bud formation and fruit set in strawberries, pistachio, hazelnut, apricot; nutritional physiology studies in several temperate and subtropical fruits; dormancy breaking experiments in apricots and peaches; training, pruning and fruit thinning in various species; the applications of growth regulators for various purposes (retarding the vegetative development and promoting lateral branching; flower and fruit thinning; reducing the incidence of alternate bearing; inducing of rooting in hardly rooted cultivars' cuttings;) the utilisation of dwarfing rootstocks for high density plantings of large -canopy standard varieties; protected cultivation of peach, grape, loquat, strawberry, for earliness; new approaches to sour cherry, peach, apricot, citrus juice production techniques; dried apple slices; apricot, fig, and raisin drying methods.

Postharvest

Cold storage, controlled atmosphere and pre-cooling works in citrus and deciduous fruits are the main postharvest research. A special emphasis is being given on the pre-cooling of valuable fresh products, particularly for export. Improvement of harvest and handling procedures have been studied for apples, pears, citrus, almonds, olives, sour cherries, etc.

Viticulture

Turkey has a history-long viticultural practice and is quite rich in Vitis germplasm. Grape and wine has long been a very significant horticultural products in Anatolia. Currently it has about 400 local varieties, of which 50 are of economically important. Of the 32 commercially grown wine grapes, 22 are native to Turkey. Total vineyard area of Turkey is 549,000 hectares; the main regions are, in decreasing order; Aegean, Mediterranean, Central South, South Eastern Anatolia, Central North, and Central East (see Map).

The most widely used rootstocks are; 5 BB, 110 R, 99 R, 420 A, 41 B, Rupestris du Lot and 1613. New hybrids are being incorporated in the industry, as they have been proved to be useful for special conditions.

The average fresh grape production of the Country is around 3.67 million tons. Only 2-3 percent of total production is being processed for wine making. Public and private companies have been sharing 50:50 % of the total 45 - 50,000 litres of wine produced annually. A list showing percentages of fresh grape consuming ways is given below.

Must Production (including vine-gar)	36.9%
Table Grape	26.7%

Seedy Raisin	17.5%
Seedless Raisin	16.3%
Wine Production	2.6%
Total	100%

Among the native wine-grapes, Emir, Narince, Kalecikkarası Öküzgözü, Boazkere, Çalkarası, Papazkarası and Adakarası, and foreign cultivars, Semillon, Riesling, Cabernet Sauvignon and Gamay are being used for high quality wines.

Genetic resources

Grape germplasm has been collected throughout the country and a *National Collection Vineyard* consisting of more than 800 different local samples established in Tekirda Viticulture Research Institute in Thrace Region.

Plant improvement

Some very early, high quality table grapes have been released through combination breeding between local and foreign cultivars by Atatürk Central Horticultural Research Institute and Tekirda Viticulture Research Institute, and these are very popular especially in coastal areas; clonal selections in various important local varieties; embryo rescue studies by agricultural faculties for intra/interspesific hybridization; somaclonal variation for resistance to oidium (powdery mildew).

Integrated production systems

Planting vineyard systems on sloped terrains; training/pruning systems, thinning, pinching; stock/ scion relationships; irrigation and nutrition systems; regulation of production season (two crops a year); pre and postharvest physiology, and postharvest handling; earliness, quality and environment relations; protected cultivation of table grapes; solar drying systems for sound raisin preparation.

Sanitary status of crops with particular reference to quarantine agents and Plant Protection service and institutions

Plant protection and quarantine services

They are organized within the framework of the Ministry of Agriculture. Plant Quarantine Regulations of Turkey have been put into force through a special Law, "Plant Protection and Quarantine" (Law Nr. 6968); its latest amendment published in State Paper dated 08.03.1991, Nr. 20862.

Quarantine regulations are mainly implemented by four Quarantine Directorates which deal with protective measures against the introduction into the country of organisms harmful to plants and plant products. In addition, Plant Protection Departments of Horticultural Research Institutes and 4 Plant Protection Research Institutes spreaded throughout the country are responsible for solving quarantine problems. They supply laboratory services and facilities to Quarantine Directorates for diagnosis of harmful organisms.

Plant Protection Research Institutes which are located in six regions are scientific research institutes and carry out research programs on entomology, plant pathology, herbology, chemical analysis and biological control.

Pests and diseases of citrus

Dialeurodes citri and *Citrus tristeza closterovirus* are the main problems of citrus. However, *Radophulus citrophilus, Xanthomonas axonopodis* pv. *citri, Diaporte citri, Phoma citricarpa, Phytophthora citrophthora, Spiroplasma citri, Citrus leaf rugose ilarvirus, Citrus ringspot virus, Citrus leprosis rhabdovirus, Citrus variegation ilarvirus, Exocortis, Xyloporosis* are listed as important pests in quarantine report.

Pests and diseases of grapevines

Virus diseases are important problems including *Grapevine leafroll associated closterovirus, Grapevine fanleaf nepovirus, Grapevine corky bark associated closterovirus,* in vineyards, in Turkey.

Anarsia lineatella, *Lospeyresia molesta*, *Guignardia bidweli*, *Scaphoideus littoralis*, *Viteus vitifolii*, *Xiphinema americanum*, *Xylophilus ampelinus*, *Agrobacterium rhizogenes*, *A.vitis*, *Xylella fastidiosa* are also included in quarantine list as significant harmful organisms.

Pests and Diseases of Fruit Trees

Erwinia amylovora is the most destructive pathogen for some pome fruits including pear, quince in most part of Turkey. Plum pox potyvirus (PPV) is determined in the western part of Turkey. However, the main apricot production region (Malatya and eastern part of Turkey) has not yet been infected with PPV. Prune dwarf ilarvirus and Prunus necrotic ringspot ilarvirus are damaging problems for stone fruits in western part of Turkey. The following organisms are also listed in quarantine reports: *Aleurocanthus woglumi*, *Bactrocera dorsalis*, *Lymantria monacha*, *Conotrachelus nenupher*, *Popillia japonica*, *Epichoristodes acerbella*, *Laspeyresia molesta*; *Pseudaulecaspis pentogana*, *Cacoecimorpha*, *pronubana* , *Cydia molesta*, *Hyphantria cunea*, *Popillia japonica*, *Quadraspidiotus perniciosus*, *Pseudococcus comstocki*, *Rhagoletis cerasi*, *Rhagoletis pomonella*, *Rotylenchulus reniformis*, *Anarsia lineatella*, *Eurytoma amygdali*, *Monilia fructicola*, *Venturia naschicola*, *Xanthomonas arboricola* pv. *pruni*, *Agrobacterium tumefaciens*, *Agrobacterium rhizogenes*, *Pseudococcus comstocki*, *Pseudomonas syringae* pv. *persicae*, *Fusicoccum amygdali*, Cherry raspleaf nepovirus, Cherry leaf roll nepovirus, *Peach rosette mosaic nepovirus*, *Plum American line pattern ilarvirus*, *Plum pox potyvirus*, *Tomato ringspot nepovirus*, Little cherry pathogen, X-disease mycoplasm, Peach phony rickettsia, Peach rosette mycoplasm, Peach yellows mycoplasm, Apple chat fruit, Pear decline mycoplasm.

Pests and diseases of olives

Olive pests have not been extensively investigated in Turkey. However, *Quadraspidiotus perniciosus*, *Thrips olea*, *Pseudomonas syringae* pv. *Savastanoi*

are reported as considerable harmful organisms for olive.

Nursery sector

In Turkey, until 1992 almost all nursery sector had been in the hands of public research and propagation institutions. Since then both public and private sector institutions have been producing fruit and grapevine seedlings. Although the government has been implementing a policy to shift this production almost totally to the private companies, and applied some incentives to encourage it, this has not fully realised yet.

In vitro propagation of several fruit crops such as strawberry, banana, peach, fig, Citrus, apple, pear, etc. are being successfully performed by the universities, horticultural research institutes and some private companies. Micrografting of Citrus for purification from virus and virus-like diseases is transferred to the private sector nurseries. Rootstock and variety registration and certification in fruit industry have been a major concern, recently in Turkey.

As it is seen in the Annex 1, in 1996-98 term, 3,414,000 standard and 247,600 certified olives; 4,374,000 standard and 1,255,000 certified grapevines; 2,421,000 standard and 43,000 certified Citrus; 12,619,000 standard and 616,000 certified fruit tree propagating materials were produced yearly, and the private sector supplied 66.4 % of the total annual production.

Certification

In Turkey official seed certification efforts were first initiated by The Faculty of Agriculture, Ankara University in the early fifties. Later on in 1959, a separate organization named Seed Control and Certification Institute was established under the authority of the Ministry of Agriculture. Until 1960, there was not a separate and specialized institution for plant variety registration. In order to register and recommend crop varieties released

mainly by universities and public research organizations, Plant Variety Testing and Registration were also established. At the same time, 5 regional seed testing and certification laboratories were founded to extend this service throughout the country.

Legislation

For an effective Certification Program Implementation Turkey has a relevant "Legislation Base", and has been revising it as necessary. The basic law for certification of propagating material of Turkey was passed from the Parliament in 1963, Law Nr. 308. In the same year, Turkey became a member of the International Seed Testing Association (ISTA). Seed Control and Certification Institute and Plant Variety Registration Institute were merged to set up The Plant Variety Registration and Seed Certification Center in 1986. As a member of ISTA since 1963 the Center trying to carry out its propagating material certification and control activities in accordance with the rules and regulations of ISTA, OECD and EEC. It also trying to carry on within the framework of the National Legislation, plant variety registration, variety protection and plant Breeder's Rights works in accordance with UPOV rules.

As a result of these efforts, presently 827 cultivars belonging to 59 plant species are registered, and 346 cultivars belonging to 16 different species have been awarded authorization for temporarily multiplication.

Concerning the certification of fruit and vine variety and rootstocks an official initiative was first started in 1997 by issuing "The Circular on The General Principles of Certification of Fruit and Vine Propagation Materials" which was published in Official Paper (issue 22868) on 5th January 1997. In 1997 and 1998, annually 247,667 olive, 1,254,600 grapevine, 43,067 Citrus and 615 950 fruit seedlings were certified.

Facilities needed for the improvement of certification scheme

- Training of certification staff at the advanced laboratories accredited to other ISTA members;
- Equipment for adapting to ISO Guide 25 and EN-45001 standards of ISTA (requested items would be listed if the proposal is approved in principle);
- Scientific devices and supplies for molecular characterization of genotypes and varieties.