



Egypt

About the Potato Atlas Archives. *The first World Potato Atlas was developed at the International Potato Center (Centro Internacional de la Papa, or CIP) in the 1980s to provide country-specific information about potato production, constraints, and uses, with a focus on resource-poor farmers. An expanded version of the atlas, providing more detailed information of a limited selection of countries, was initiated in 2006 and slightly updated in 2020. The "archive chapters" included here, based on the original atlas, are those which so far have not been substantially updated. Although some of this information is clearly obsolete, some remains relevant, at least for historical background.*

History and Overview

Potato was introduced on a small scale to Egypt during the nineteenth century, probably by British colonial officials. Larger scale cultivation dates from World War I, when the British imported seed and encouraged production to feed their troops. The British government supplied free seed with the expectation that farmers would pay back twice the amount of the seed (Ramadan, 1981). After the war, expansion of potato area and production were hampered by the expense and poor quality of imported seed and general inexperience of farmers with the crop. In 1936 the Central Potato Co-op, later known as the Potato Growers' Cooperative (PGC), was established to promote production and marketing of potato (Ramadan, 1981).

The PGC represents most of Egypt's potato farmers and plays an active role in research and extension. In 1954, PGC built seven cold stores with a combined capacity of 24,000 tons (Abou-Basha 1978). In 1959 it received a monopoly on the import of seed potato, which it held until 1978 when the Union of Exporters was granted a 15 percent share. This rose to 25 percent in 1980 (Ramadan, 1981). PGC established a seed multiplication project in 1965 (Abou-Basha, 1978). Egypt is one of Africa's largest producers and exporters of potato, the second most important vegetable crop after tomato (El-Tobgy, 1974).

Geography and Areas of Cultivation

Commercial production of potato in Egypt is concentrated in the Nile Delta and Middle Egypt. In this desert environment significant diurnal temperature variations allow tuberization even when day temperatures are quite high (20° C). In the Nile region, average minimum temperatures range from 9° C in January to 23° C in August, and average maximum temperatures from 18.5° C in January to 30.6° C in August (Ramadan, 1981). The governorates of Behaira, Gharbia, Menofia, and Sharkia are the leading producers of potato in the Nile Delta, with significant production also occurring in Alexandria and Daghaliya (ARE, 1979). In 1980, Behaira receive 26.5 percent of imported seed, Monofia 21 percent, Garbia 15.5 percent and Giza 9.5 percent. The rest was distributed to other areas and research stations (Ramadan, 1981).

Production in Middle Egypt is concentrated in Giza and Minia (ARE, 1979). At Giza average minimum temperatures range from 6.4° C in January to 20.4° C in August with average maximums from 19.5° C in January to 34.4° C in August (Ramadan, 1981). Soils in both the Delta and Middle Egypt range in texture from sandy to clay. Production is entirely dependent on irrigation from the Nile or, less commonly, groundwater (Ramadan, 1981; Shabana, 1981; Ali, 1985).

Production Systems and Constraints

Cropping Calendar. Potato is cultivated continuously in Egypt from August to June.

Most authors distinguish between spring/summer and fall/winter crops. Geddes and Monninkhof (1984) note four major seasons:

- The early spring crop is planted in November/December and harvested in March/April, accounting for about 20 percent of annual production. Immature potato (90-100 day “scrapers”) supplies the export market, notably UK. Mature potato from this crop is stored as seed for the winter crop. Oversized potato supplies the local market;
- The main spring, or summer crop is planted from January to mid-March and harvested in May/June. Most of this crop, roughly 30 percent of annual production, is sold on the local market or kept as seed for the fall planting. A small portion is exported to Arab countries;
- The fall crop is planted from August to mid-October and harvested from December to mid-February. This crop represents about 40 percent of annual production. Most of this crop supplies the local ware market or is exported to Arab countries. In 1980 and 1984 immature potato from this crop was exported to UK;
- The winter crop, accounting for ten percent or less of annual production, is planted in October/November and harvested in February. The bulk of it is sold as 90-100 day scrapers on the UK market (Geddes and Monninkhof, 1984).

Cultivation Practices. Purchased inputs and technical assistance are generally far more accessible in Egypt than in most developing countries. Cropping patterns, fertilizer applications, and rotations are dictated for each farmer according to national and local production targets. Agricultural planning is a cooperative effort. The principle planning authority for potato production is the High Committee for potatoes which includes representatives of the Ministries of Agriculture, Supply, Economy, and Foreign Trade. Farmers are represented by the Potato Growers' Cooperative, which plays an active role in planning. Farmers are subject to fines if they deviate from the recommendations of the High Committee's representatives (Geddes & Monninkhof, 1984).

The quantity of seed planted per unit area varies according to seed size and condition and desired crop density. Attalah (1980) gives 750 kilograms per feddan (about 1,800 kilograms per hectare) as a roughly representative value. Cutting of seed tubers is common, although not recommended practice for some varieties. Many farmers who cut their seed take measures to prevent infection of planting material (Attalah, 1980).

Fertilizers are used extensively with rates determined by the Ministry of Agriculture (Attalah, 1980). Fertilizers are imported by the government and distributed at subsidized prices by the Agricultural Credit Bank (Geddes and Monninkhof, 1984). Insecticide use is less common, though most farmers apply some chemicals against tuber moth (Abou Basha, 1978). Rotation of crops is general, with potato generally being planted every three or four years in a given field. Crops rotated with potato include wheat, barley, alfalfa, soybeans, peas, clover, cotton, and maize, depending on local conditions, farmer preference, and national and local plans (Attalah, 1980; Ramadan, 1981).

Responsibility for extension passed from the Ministry of Agriculture to the Agricultural Research Centre in 1982. Extension agents typically cover two villages or 1,000 to 1,500 families. Due to a lack of transportation, emphasis is placed on demonstration plots, printed material, and annual meetings at the governorate level (Geddes and Monninkhof, 1984).

Disease and Pest Constraints. Viral diseases, particularly potato leaf roll virus (PLRV) and potato virus Y (PVY), are severe problems for Egyptian potato production. Control of viruses and their aphid vectors is a primary goal of the seed import and production programs and rotation practices.

Bacterial diseases, especially brown rot (*Pseudomonas solanacearum*) and blackleg and soft rot (*Erwinia* spp.) are major problems (Ali, 1985).

Fungal diseases are numerous and locally important. These include late blight (*Phytophthora infestans*), Early blight (*Alternaria solani*), fusarium wilt (*Fusarium* spp.), sclerotium scab, common scab, black scurf (*Rhizoctonia solani*), pink rot (*Phytophthora erythroseptica*), and fusarium dry rot (*Fusarium* spp.).

Tuber Moth (*Phthorimaea operculella*) is a major problem. Other insect pests include chiggers, cutworms, and aphids (Ali, 1985). The eggplant stem borer (*Euzophera osseatella*) was observed for the first time in 1980 (Rao, 1982).

Varieties and Seed Systems

Major sources and varieties of imported seed include:

- The Netherlands: Alpha, Spunta, Patrones, Mirka, Baraka, Desiree, Cardinal, Jaerla, Ajax, Sing, Ostara, and Draga;
- France: Claudia, Kerboni, and King Edward;
- Ireland: King Edward;
- Scotland: Arran Banner;
- Germany: Grata and Cosima.

The "formal" system refers to seed tubers produced and distributed by state-sponsored institutions (in some countries with some involvement of the private sector and/ non-government organizations, but not in Egypt). Seed from the formal sector has generally been grown under close controls and subject to an inspection process intended to assure that the seed is of the variety claimed, with little or no incidence of disease or pest infestation, and otherwise viable. Such seed is often referred to as "certified seed," although the precise definition of this term is locally variable.

Seed potato in Egypt fall into three broad categories: imported certified seed, locally multiplied certified seed, and locally produced uncertified seed. Certified seed represents only about 10 percent of Egyptian planting material (Geddes and Monninkhof, 1984). Distribution of imported seed is controlled by the Ministry of Agriculture, which maintains distribution centers and issues permits entitling farmers to buy specified quantities of seed (Ramadan, 1981).

Imported seed is generally used in the spring/summer crops (Geddes and Monninkhof, 1984). In addition to ware potatoes for local and foreign consumption, the spring/summer plantings of imported seed provide the bulk of seed potatoes for the fall/winter crops. Certified seed production in Egypt is organized by PGC and carried out by public sector companies, such as Nubaseed, and private companies such as National Seed Co. and the Nobaria Seed Production Company (Geddes and Monninkhof, 1984; Shabana, 1981). One multiplication is undertaken per year, although Geddes and Monninkhof (1984) report that the possibility of a second multiplication is being explored. Inspectors from the National Potato Program and the Vegetable Research Institute monitor multiplication, insuring that seed plots are at least four hectares and have been free of potato for at least two or three years. With some exceptions, ware and seed potatoes are not grown simultaneously in the same village. Roguing is supervised by PGC (Geddes and Monninkhof, 1984).

Information on the relative quality of imported certified seed, locally produced certified seed, and common seed is somewhat contradictory. Geddes and Monninkhof (1984) cite one informant as claiming 30-50 percent higher yields from locally produced certified seed compared with common seed, while others reported that local certified seed was heavily infested with virus in the 1983-84 winter crop. El Tobgy (1974) reports yields and sanitary conditions of local certified seed equal to imported Class A certified seed and superior to Class B imported seed.

Some authors regard the importation of seed tubers as a source of pathogens, particularly viruses (Anonymous, nd), while others regard seed importation as a necessary means of reducing viral contamination during the hot spring and summer months (Ali, 1985). Efforts are underway to produce virus free clones (basic seed) in Egypt, though at present there is no significant production (El Tobgy, 1974). For certified and especially for basic seed production new lands only recently irrigated and brought under cultivation have the advantage of relative isolation (for a while) from diseases and pests (Ali, 1985; Shabana, 1981).

Consumption, Storage and Marketing

Consumption

Potato is Egypt's most important export vegetable crop and the second most important (after tomato) vegetable crop in economic value (El Tobgy, 1974). Out of an annual production of about 1.2 million tons, over one million are retained for domestic consumption (Geddes and Monninkhof, 1984). Average annual per capita consumption of potato is about 20-25 kg (Geddes and Monninkhof, 1984; Anonymous, nd). White skinned potato is preferred for the domestic market (Geddes and Monninkhof, 1984).

Storage

Egypt has a cold storage capacity of approximately 60,000 tons, about 60 percent of which is controlled by PGC (Geddes and Monninkhof, 1984). The major potato storage requirement in Egypt is for seed tubers grown in the spring/summer season that must be stored 3-5 months before planting in the fall/winter season (Sharara, nd). Cold storage generally takes place at temperatures of about 4°C and RH of 80-90 percent (Sharara, nd; Geddes and Monninkhof, 1984). Since about 150,000 tons produced from imported certified seed and an additional 145,000 tons of non-improved, locally produced seed tubers must be preserved each year for the fall planting (Anonymous, nd), cold storage facilities are adequate only for a relatively small proportion of the fall/winter seed requirements.

The bulk of potato storage takes place in traditional structures or *nawallas* made of mud bricks. *Nawallas* (Egyptian Arabic for "heap") are usually privately owned and are concentrated in the northern governorates with lower average temperatures. Walls are typically from 2.5 to 3.5 meters high and 30 to 60 cm thick. Storage period is normally for five months, May to September. Roofs consist of bamboo matting, rice straw, and mud supported by wood or bamboo frames. Seed potatoes are dusted with Sevin and Captan (brand names) and arranged in piles 1.5 to 4 meters across and 0.8 to 1.0 meters high. The piles are sorted every two weeks, and infested, diseased, or damaged tubers discarded (Sharara, n.d.). Rats and tuber moths are major problems.

Within the *nawallas*, temperatures may be as much as 10°C lower than outside. Losses from tuber moth infestation, dehydration, excessive sprouting, and other causes average about 20-30 percent (Sharara, n.d.), although losses of up to 70 percent have been reported (Anonymous, nd). The need for improving storage facilities and practices for ware as well as seed potato has been noted by several authors (Geddes and Monninkhoff, 1984; Shabarra, nd; Anonymous, nd).

Marketing

Ware potato for the Arab and UK export markets is brought to collection centers operated by the Potato Growers' Cooperative, where they are inspected by representatives of the PGC, the Ministry of Agriculture, and the Ministry of Foreign Trade. The UK market is for immature scrapers, 35-67 millimeters in diameter, free of discoloration, disease, or insect damage. The Arab market is mainly for large (60-70 mm), white skinned potatoes, notably Spunta and Alpha. Potato that fails to meet the standards set for the different export markets may only be sold locally. The export of potato from Egypt is about evenly divided among the PGC, the Nile Exporting and Importing Company (a public company), and various private concerns. In 1983 about 80,000 tons were exported to UK and about 70,000 tons to Arab countries (Geddes and Monninkhof, 1984).

Domestic marketing of potato is typically through the major wholesale markets at Cairo and Alexandria. Farmers take responsibility for delivering potato to the markets and receive no payment upon delivery. Wholesalers act as commission agents, paying the farmer after the crop has been sold. The Ministry of Supply announces advisory prices on a weekly basis. However, a shortage of storage facilities for domestic ware potato hampers any attempts at price control, and actual prices are subject to annual fluctuations of up to 300 percent. Turnover of potato at the Alexandria wholesale market is reportedly as high as 150 tons per day (Geddes and Monninkhof, 1984).

In 1981, a potato chip factory, Chipsy Potato Crisps, was established near Cairo. In 1984 it was processing 8,000 tons of raw potato annually with two production lines and was about begin operation of a third line with an additional 8,000 ton annual capacity. The factory includes two ventilated but non-refrigerated stores with a combined capacity of 2,800 tons. Major costs in chip production include imported packing material, about 30 percent of total costs, and vegetable oil, about 25 percent. Chips production is entirely for the Egyptian market (Geddes and Monninkhof, 1984).

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