

# PRESENT STATUS OF AGRO-FOOD INDUSTRIES IN EGYPT

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**H**istorically Agro-Food processing has been known and practiced by ancient Egyptians thousands of years B.C. Milling of cereals & bread making, sun-drying of fruits & vegetables. Pickling of olives, onions, turnips...etc., fermentation of juices for wines and even beer production, pressing of olives leaves for olive oil production and even salting and pickling of some fish have long been practiced, no matter how primitive the method used for such processing might have been. Up till now some of such primitive practices are still being used for the production of some home-made or rural food industries amongst the rural areas. In spite of the fact that such products could suffice with some of the immediate simple needs of the rural housewives, yet these cannot be considered Agro-Food industries in the more scientific modern sense of the term.

Presently Agro-Food processing in Egypt plays a major role in the supply of the food needs of the Egyptian population (about 65 millions in 1990). When coupled with the yearly increase in population, improvement of the standard of living and consequently the improved food consumption, then the role of Agro-Food industries cannot be over-emphasized. The output of the Agro-Food industries in Egypt was estimated to exceed 20 billion L.E., being bigger than any other industrial sector and comprising almost 40% of the industrial activities in the country and achieving from 10-18% annual increase in output (both quantity and value-wise). A wide range of Agro-Food industries are now being active in Egypt, where both public and private sectors are involved, and the private and investment sectors are playing a progressively important role. The now available Agro-Food industries ranges between very developed industries, such as the cane sugar industry and newly introduced and developing ones such as flavors, aromatic and food additives industries. At this point, a quick review of some of the presently active Agro-Food industries in Egypt, their role and size, their prospects and some of the obstacles facing them, might be appropriate. These Agro-Food industries in Egypt include:

## Sugar industry

One of the oldest and major food industries

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### Abstract

Processing of agriculture produce has long been practiced in Egypt, even thousands of years B.C. no matter how primitive these practices might have been. However, during the present and last centuries many agro-food industries have been either introduced or developed, concerning all aspects of food processing able to satisfy the needs of an increasing population. This, when coupled with the rise of the standard of living, the role of Agro-Food processing in Egypt cannot be under-estimated.

The output of Agro-Food industries in Egypt amounts to over 20 billion LE/year (1990); such an output varies among the different food industries such as sugar, oils & fats, milling & bakeries, dairying, canning, dehydration, sweets & confectionery, industrial fermentations up to tobacco and flavorings & aromatics.

In spite of the active status, yet development and research in the aspects of packaging, quality, raw materials and processing lines are needed.

In this context interaction and cooperation between food processors and agro-industrial people of the Mediterranean countries could play an important role in developing and facilitating inter-trade between them.

### Résumé

*Il y a des milliers d'années avant J.C., en Egypte on transformait les produits agricoles et peu importe si les pratiques utilisées étaient primitives. Pendant les deux derniers siècles on a toutefois mis en place, ou développé, nombreuses industries agro-alimentaires, concernant presque tous les secteurs de transformation, capables de satisfaire les besoins d'une population croissante. Lorsqu'on considère l'amélioration de la qualité de vie, le rôle de la transformation agro-alimentaire ne peut plus être sous-évalué.*

*La production des industries agro-alimentaires égyptiennes dépasse les 20 milliards de LE/an (1990), distribués parmi les différentes industries: sucre, huiles et graisses, minoterie, produits laitiers, conserves, dessiccation, pâtisserie, fermentations industrielles, tabac, épices.*

*Bien que la situation soit positive, on a encore besoin de recherche et développement pour: emballage, qualité, matières premières et chaînes de transformation.*

*A ce propos, l'interaction et la coopération entre les transformateurs et ceux qui travaillent dans l'agro-industrie des pays méditerranéens pourraient jouer un rôle crucial pour le développement du commerce à leur intérieur.*

in Egypt, where sugar-cane is processed and minor quantities of sugar beets are processed into sugar. One major big company (engulfing seven cane-sugar centrals and one refinery) mainly in upper Egypt processes cane sugar, with an annual production of 900 thousand tons, and one company, in the Delta, processes sugar-beets with an annual production of about 100 thousand tons, composing the annual production of sugar to about one billion tons. Yet the annual needs of sugar in Egypt amounts to about 1.3-1.5 billion tons, and the deficit between the annual production and the annual consumption is made up through importation.

As by-products of sugar-cane (and sugar beets) processing sizable amounts of molasses are produced which are either used up in industrial fermentations, in feed production or being exported. Besides, sizable amounts of bagasse are produced which are either partially processed into paper-pulp, artificial wood or used up as a source of energy in the same plants.

In addition to sugar production, reasonable amounts of sugar-cane syrup is annually produced for edible purposes, amounting to about 225 thousand tons, mainly by pri-

vate and small scale producers, and which price-wise could complete with channeling sugar-cane into sugar.

Besides, two other beet-sugar plants are under way in the northern part of the delta, 100 thousand tons each, to reduce the gap between the annual production of sugar and the annual requirements, especially that the per capita consumption is increasing (to about 20 kgs/cap./year).

## Oils & fat industry

In spite of the many sources of raw materials, from which fats and oils, for edible purposes or even inedible ones, are known world wide, yet the major source of edible fat and oils in Egypt, in addition to milk fat, is cotton-seeds which constitute the major source of edible oils in the country.

Therefore, the different sources of edible fats & oils in Egypt are:

Cotton-seed oil of annual production of about 300 thousand tons, depending on the area of cotton planted and the yield/unit area.

Soy-bean oil: where soybeans have been re-

cently raised in Egypt and are processed to give an annual produce of about 36 thousand tons, and there is no big chance of any increase in this respect in spite of the need for soy-bean meal for poultry production. Linseed oil: where about 2000 tons of linseed oil are produced mainly for non-edible purposes (paints). Linseeds are raised mainly for their fibers (linen). In spite of the fact that minor quantities could be used for edible purposes.

Sunflower-oil: where very small amounts have been recently (experimentally) produced and have proved very promising in the newly reclaimed areas. Yet sunflower is one of the two major oils being imported (i.e. cottonseed oil and sunflower oil) and is well appreciated by the Egyptian consumer.

Corn-gram oil: where about 2-3 thousand tons are being annually produced as a by-product of processing yellow-corn into starch and glucose. It is a good cooking and frying oil and is very well accepted by consumers suffering from artery problems.

Olive-oil: where very minor quantities of this oil are produced, due to lack of olive plantations, with the exception of some few orchards in the oasis and in the northern coast especially in Sanai. Expansion in olives production (for pickling and olive oil production) should very soon take place, especially in the newly developed areas.

Rice-germ oil: with an annual production of about five hundred tons, usually inedible, as a by-product of rice polishing.

Rice-bran-oil: also a by-product of rice polishing and usually directed to soap manufacture (because of its rapid deterioration and high acidity). The annual production is about 5000 tons (depending on annual rice crop). Castor-oil: which is not an edible oil (rather a medicinal one), yet about 3.5 hundred tons are annually produced and bigger areas are now being planked for many reasons one of which is the seeds and their oil.

From the above figures it could be noticed that only about one third of the annual needs of oils are locally produced (depending on many factors of which availability of oil seed and processing capacities) and the rest (two thirds amounting to about 800 thousand tons) are imported. In addition both extraction and refining capacities are available and measures to raise the countries production of such essential food items are undertaken.

As auxiliary activities of the oil & fat industries, shortening, margarine, soap, detergents and glycerine are produced to cover most of the countries needs and to improve the economics of the whole industry.

## Cereals milling & bread production

Which is the processing activity responsible for milling of all the cereals to flour which is needed for bread production (and

other cereal products such as semolina and pastry products) needed for local consumption. The per capita consumption of cereals in Egypt amounts to about 200 kgs/year (which is rather high) and the major cereals involved are wheat, maize, sorghum and barley in this order, yet the annual production of cereal crops in Egypt constitute only about 35% of the local annual needs and the rest is being imported (mainly in the form of whole grains). Milling process is carried out in the rural areas in stone mills, and the bulk needed for urban consumers is milled in modern milling plants. The kinds of bread produced and consumed in Egypt is quite many and varies with location and/or consumer needs. A major part of bread offered to the consumers is still partially subsidized by the government, yet studies to eliminate such subsidization is being carried out. Surely extension and information concerning production, baking and consumption of cereals in general and bread in particular, in addition to improving quality of produced bread, would cut down the per capita consumption and consequently the annual needs.

## Dairy industry

Which is the processing activity responsible for the collection, cooling and processing of all kinds of dairy products starting with fresh milk and up to pasteurized, sterile, UHT milks, yoghurt, soft & dry cheeses, processed cheese, cream & butter oil and other by-products. The annual production of milk in Egypt ranges around two million tons, and is a rather stable figure because of limited numbers of dairy herds, poor productivity of the Egyptian animals, lack of ranging areas and cattle feed (especially during the summer), lack of collecting centers and distribution of the animals (in small numbers) all over the country. This is probably why the per capita consumption of milk and dairy products in Egypt is rather low, i.e. about 160 gm/day compared to other levels in other countries. Also this is why sizable amounts of dairy products (mainly in the form of dehydrated skim milk) are being imported to make up for the deficit, the per capita consumption would consequently decrease (with every increase in population) unless measures to raise the numbers of dairy animals (both cows and buffaloes), improve their genetical productivity and raise the nutritional status. However dehydrated or concentrated milks needed for infant feeding is not produced in Egypt and is completely important under the jurisdiction of the health authorities.

## Carbonated beverages & soft drinks industry

Which is the activity (in both public and private sectors) involved in the production of all bottled carbonated and non-carbonated

soft drinks highly appreciated during the hot days of the summer in Egypt, yet they are consumed all the year around. Practically all world-wide known brands and drinks are produced (under-license) in the country, and consequently the majority of the needed concentrates is being furnished by mother international companies, and a few concentrates, especially those of citrus are locally produced.

Other ingredients including the gas, the acid, the bottle and caps are locally produced. The amount of annual production of bottles carbonated beverages fluctuates and is affected by touristic activities, standard of income and the taxes collected on such production.

## Fruit syrups & preserves industry

Where certain fruits and some vegetables are processed into juices, then raising the total sugars content of the latter to about 55:60 % and adding a permissible preservative (mostly benzoates) and bottling them to be consumed later, after dilution to the proper taste, and consumed as a soft drink, especially when the cost of a carbonated beverage seems high or when the facilities and skill at the home level allows for that. Or some times such fruits and vegetables are prepared (peeled then dissected or even crushed or stained) then cooked with equal amounts of sugar to a T.S.S. of 68% at least then packed (either in glass jars or in cans when available), and no preservatives allowed in this case, to be either locally consumed or exported. All public, private and even home sectors are involved in such an activity and the produced items are well appreciated because of the high quality (flavor and color wise) of the used fruits and/or vegetables, especially when the crop is good and the price is reasonable, which allows for good selection and quality grading. Crops involved in such an activity involves citrus (oranges & mandarins), mangoes, guavas, strawberries, pears, apple, carrots... etc. The total annual production is good and the prospect of expansion is promising.

## Rice polishing industry

Egypt annually plants around one million feddans, depending on the amount of water available for irrigation, yielding a good crop of about 3 million metric tons, which are totally, polished locally. This takes place either on a small scale level, carried out by rural producers for their own consumption using simple polishing equipment, or on large scale level using quite modern lines which allows for good control of the whole process and giving well processed and clearly graded polished rice. This allows for the exportation of a good amount of polished rice (60 thousand tone in 1991 season). The by-products, whether the hulls, the grem or

the bran are also processed into feed. Lately some parboiled rice are being produced for both local consumption and exportation.

## Pastry industry

Which is the processing activity responsible for formulation and production of all kinds of pastry (macaroni) products including noodles, shorts, spaghetti... etc which are produced and consumed (from certain hard - wheat flours or from semolina) as substitutes for bread, rice and/or carbohydrates in general in the meal. Usually imported (72% extraction) flour or semolina, and lately some locally produced (same extraction), has been used.

Both public and private sectors are involved in this activity (more than 400 plants mostly private owned of capacities ranging between 10-40 tons/day) and the produce is enough for local consumption and even allows for some minor exports. Legally no pastry products should be sold in bulk, but rather should be properly packed to keep its moisture content, and consequently their quality, throughout their shelf life. Annual production is around 400 thousand tons.

## Canning industry

By the term canning I mean the packing of a food item in a hermetically sealed container (mostly cans and possibly, however very minor, glass jars) and then treating these with a heat treatment that render the item preservable for a certain period of time. In this context this activity is being carried out by big food companies, i.e. two belonging to the public sector and another belonging to the private sector. Since, canning renders itself suitable for practically any food item, then actually fruits (whole or cut), vegetables all kinds alone or in mixtures, and again in brine or in tomato sauce, alone or with meats (for ration needs) are packed, in addition to juices, jams, fruit cocktails, tomato paste, legumes (e.g. beans, peas, lentils... etc) and even fish is being canned. In the later case only two plants are engaged in canning of imported frozen sardines and sardine like fish. The annual produce of such canned products amounts to about 50-60 thousand tons and this could be very easily increased if the needed raw material is rendered more available at reasonable costs, the needed cans is furnished more readily at reasonable prices and co-operations between farmers and processors to raise the proper varieties, in the proper amounts at the most appropriate processing seasons.

## Sundrying & dehydration industries

Where energy, whether solar is case of sundrying (especially in Egypt where sunny

days prevail all over the year and even hot during the summer) or fuel energy in case of industrial or mechanical dehydration, cuts down the moisture content of the food items to preserving moisture levels.

In Egypt sundrying has long been adopted for fruit and vegetable drying, where okra, jewsmellow, beans, «Feriek» (wheat grains at the milky stage) and «Kishk» (a fermented sundried milk product) and grapes are sundried to raisins, even olives are partially sundried (in Siwa Oasis) to be rehydrated and pickled later on. Yet the main activities in this industry involving good quantities of onions, grapes, carrot, beans, potatoes, ... etc are being dehydrated (mainly for exportation) in very modern controlled dehydration plants. When the raw material are available at reasonable costs and amounts the dehydration business is quite profitable and the annual produce ranges about 6-8 thousand tons of dehydrated vegetables, in addition to about 5000 tons of raisins. However, it should be noted that there is no dehydrated meats, fish, milks or others which are actually dehydrated in many other places of the world.

## Refrigeration & freezing industries

Preservation of foods under reduced temperatures has long been known, yet with the advent of mechanical refrigeration this method is now more and more used, not only in the urban areas but also in the rural areas, which are more and more urbanized. This is why home refrigerators and even home freezers are widely used home utilities and consequently refrigerated and frozen food items are widely produced, distributed and consumed. Therefore, a complete chain of central freezing facilities to frozen distribution centers cover practically all the governorates of the country, to cope up with refrigeration or freezing of all preserved food items, whether imported or locally produced. Different refrigeration facilities are now available, both public and private sectors, and are being efficiently used for refrigeration purpose. Not only frozen fish, frozen meats (mostly imported), frozen poultry are found, but also sizable amounts of frozen fruits and vegetables (okra, jewsmellow, squash, potatoes, peas, carrots, string beans, etc and pears, strawberries, mangoes, guavas...etc. are being produced for local markets and exportation. Sizable areas of refrigeration is engaged in storage of potatoes (for activation of the germination process) bulbs, cheeses (for ripening), pears, bananas, oranges, grapes, dates, limes, grapefruits, so as to extend their marketing season.

However, close continuous control of temperature and relative humidity in addition to sanitation has to be followed, as this highly affects both the quality of the refrigerated food item and the environment.

## Confectionery, sweets & biscuits industries

Which are a big group of industries producing quite a good variety of sweet foods including the oriental sweets (Halava), chocolates, confectionery and biscuits, which are either consumed as part of the meal, as sweets, in occasions (such as feasts & ceremonies) or by certain groups of consumers (children) and consumes about 17% of the annual sugar consumption of the country. Such industries include:

### Halawa tahinia or halava

Which is the product of cooking a mixture of sugar, tahina (finely ground decorticated sesame seeds) and an emulsifier to certain temperature, cooling it partially then kneading the cooked mixture to give a certain consistency & color. The amount of halawa annually produced varies around 30-35 thousand tons, mostly locally consumed and sometimes exported, and quality here plays a role in the channel of marketing.

### Confectionery & sweets

Produced by both public and private, big plants and small shops, producing a very wide range of sweets including caramels, toffi, chewing gum, marsmellow, peppermint, nougate, locome... etc, differing only with the composition of sugar or sugars being used, additives, emulsifiers, cooking temperature, cooling process, colors and flavors added and packaging. Being a very profitable food business, and being consumed mostly by children calls for close sanitation, packaging and quality control. The produce of such sweets amounted to about 70 thousand tons in 1990.

### Chocolate & cocoa

As known chocolate is the outcome of a blend of cocoa butter (or substitute), sugar, milk on emulsifier and save times other additives, as cooked, formulated, cooled then packed. In this respect both public and private sectors are involved in this industry producing around nine thousand tons in 1990. The cocoa beans needed for the industry are totally imported.

### Biscuits

Which is the favorite food item for children and consequently has to be under close control, both quality and nutrition-wise, by the health authorities. Mainly flour (72% extraction) plus other additives i.e. milk, sugar, flavorings, coloring substances... etc are used the product well packed to assure freshness throughout shelf life because this makes the difference between one product and the other and consequently marketing possibilities. Both public and private sectors



are actively engaged in such production, and producing about 50-60 thousands tons/year as in year 1990..

## Industrial fermentation & distilleries

Which is the group of industries utilizing the biological activities of a group of organisms to change some of the fermentable materials or waste byproducts into more valuable or utilizable or even edible products. In Egypt this group of industries include:

### Alcoholic drinks & distilled liquors

Where only one public sector company is engaged in such an activity utilizing grapes and grape juice (specifically grown for the purpose) into wines and other alcoholic drinks. In some cases (in the same company) other sugar products (molasses, other juices, waste jams...etc) are fermented into alcohol solutions which are then distilled into either strong drinks or used for supplementing other drinks with certain concentrations of ethyl alcohol.

### Malt & beer

Where barley (mostly two rowed cultivars grown specifically) is sprouted, malted and extracted then fermented under certain specific conditions after boiling with hops to produce the carbonated alcoholic drink known as beer.

One public sector company is involved in this activity whose output in 1990 amounted to 50 million liters. Sometimes the process ends at production of malt and malt extract for other non-fermentation uses.

### Alcohol & vinegar production

Where molasses, the byproduct of sugar processing and refining, is fermented into ethyl alcohol, mainly for fuel and other industrial uses. Besides, in the same public

sector plant, ethyl alcohol is further biologically oxidized into vinegar (40% acetic acid solution) for edible purposes or further processed to glacial acetic acid for industrial purposes. The output of ethyl alcohol and vinegar in the year 1990 amounted to about 7 million, and 14 million liters respectively. All the above mentioned fermentation activities is carried out only by public sector companies and is run under very close control by the health, production and tax authorities.

### Yeast production

Highly needed as active living yeast cells for fermenting the doughs of bakery products especially bread. Only fresh yeast used to be available, yet now in addition to the fresh (wet) yeasts (which usually deteriorate fast even under refrigeration) instant dry yeast is now being produced by a modern newly erected plant. However, the yeast production in the country amounted to about 22 thousand tone in 1990.

### Pickling & pickled production

In spite of the fact that pickling is mainly a salting process, yet fermentation under favorable conditions is needed if high quality pickles are sought. Many fruits & vegetables including olives, onions, limes, peppers, carrots, cabbage, cawiflower, mangos, bitter-oranges ... etc are produced mainly by private sector, even at the house level, but not at the large scale public sector level.

### Starch & glucose production

Which is the industry engaged in the production of starch, whether for edible or industrial purposes. Two public sector companies do produce both kinds of starch from yellow corn (all imported) and one company used to produce starch from broken rice, yet this does not table place any more. The output of both companies amounted in

1990 to about 30 thousand tons. However, in addition to starch, sometimes even seems to be more major, is the hydrolysis of the starch to corn syrup, which is a sugar substitute of about 60% T.S.S. and of lower sweetness. The later amounting to about 60 thousand tons in 1990 is totally consumed locally for sweet & confectionery. Rather recently one plant has been erected for starch production (from maize also) then converting the later completely into high fructose syrups used completely in carbonated beverage production.

## Tobacco & cigarettes production

Where tobacco leaves (totally imported as it is illegal to raise tobacco in Egypt) are prepared, blended and processed into all kinds of cigarettes and other tobacco products. Only one public sector company is engaged in this activity and is being a good source of tax revinue to the country. In spite of the known and publicized hazards of smoking, yet smokers and tobacco production is increasing in Egypt.

## Aromatics & cosmetics & flavorings

Where a few companies is engaged in the production (only one public sector company), importation, formulation, bottling and packaging of some essential oils, vanilla, caramel, aromatics, preservatives, additives, food colors, emulsifiers, stabilizers...etc. It is quite a diverse, important, critical industry, yet there is a good lot to be done in the realm of such an activity.

## Conclusions

From the above brief discussion of the food industries sector in Egypt, it could be concluded that it is probably one of the largest, if not the largest, industrial activities in the country, it plays a very important role in furnishing the food needs of a big, ever increasing, population, making use of many major crops and processing whatever surplus is available, sometimes utilizing a few farm and processing plants wastes, gaining a reason. some of hard currency through exportation, and probably playing a role in improving the nutritional status of the people.

Yet there is a great deal to be done and a few obstacles to be tackled such as synchronization between agricultural production and processing, furnishing better packaging materials and equipment, better maintenance and securing proper spare parts, manufacturing a few processing lines, or parts therefrom, locally, assuring and dealing properly with quality and free market completion and finally cooperating more with research and development organizations of the country. ●