

# FLW M&E Unit Policy Brief No. 1

## Food Loss and Waste Across Food Value Chains in Egypt, Can Efficient Performance Be Achieved?



### Food Loss and Waste Reduction for Better Food Security, Exports and Sustainable Agricultural Development: What Can Be Done?

April 2019

## Fruit Crops

### Background

Oranges, grapes and dates are major fruit crops in Egypt, both for domestic consumption and exports. In 2016, total value of agricultural production in Egypt amounted to LE 364.845 billion, of which fruits account for 9.61%<sup>(1)</sup>.

Despite the significance fruit crops represent for Egypt's Economy, losses and waste along the different stages of their value chains are considered high, which poses negative impacts on resource use efficiency, food security and exports thus national income and socioeconomic development. Therefore, it is important to identify how much losses are encountered across different stages of fruits value chains, main causes and ways to minimize such losses in order to achieve better levels of food security, exports and agricultural development.

As a main partner in agricultural development efforts, FAO-Egypt conducted a "Systematic Review on Food Loss and Waste in Egypt" in 2018 to identify the magnitude of food loss and waste in Egypt, the results of which are used in this series of policy briefs issued by FLW M&E Unit.

### How Much Losses in Fruits and Why?

#### Oranges

In 2016, oranges accounted for 69% and 61% of the total quantity and value of citrus production, respectively, and 23.3% and 12% of the total quantity and value of fruit production, respectively. In terms of exports, orange crop is a foreign currency earner, where it accounted for 73% and 49% of the total quantity and value of fruit exports, respectively<sup>(2), (3)</sup>.



Numerous studies have been conducted to estimate the quantity and value of losses in citrus crops. Results indicate that average loss in oranges at the national level reached 11.1%. At the level of production governorates, loss at the farm level reached 0.91% in Sharkia and 2.81% in Behera, mainly due to infestation by insect and mechanical injuries. Loss during marketing reached 2.21%, mainly due to wrong harvesting practices (1.17%), sorting and grading (0.61%) and improper packaging (0.43%), summing up to 5.03% worth 1221.1 LE/acre. At the level of wholesale market, loss ranged between 0.53% and 2.38%, while ranged between 4.33% and 7.13% at the level of retail market. Total loss during marketing reached 3.84%, of which 63.01% is due to wrong harvesting and packaging, 20.29% is lost during transportation and 16.70% is lost at wholesale market. In Assiut governorate, total loss in oranges has been estimated at 6360 tons. Equivalent losses in resources have been estimated at 439 acres of farmland (10.64% of the cultivated area) and 1764 thousand cubic meters of irrigation water. Losses in production cost and farmers' income reached LE 3.016 million and LE 4.312 million, respectively.

#### Grapes

In 2016, grapes it accounted for 13.4% and 17% of total quantity and value of fruit production, and 7.3% and 21.3% of the total quantity and value of fruit exports, respectively<sup>(4)</sup>.



Studies conducted to estimate losses in grapes revealed that national-level losses during production and handling stages until reaching retail markets over the period 2000 to 2014 averaged 13.1%. Loss during marketing (sorting, packaging, transport, processing) has been estimated at 15.21% in 2015.

In Fayoum, different studies estimated average loss in grapes at 8.99%. Post-harvest loss in grapes over the period 2007-2014 averaged 8.77%. It was also found that equivalent loss in resources is 116 acres of farmland, 0.7 million cubic meters of irrigation water and 23 tons of fertilizers. Main factors include over-ripe cluster that lead to shattering, lack of skilled labor to perform harvesting, and wrong handling practices (sorting and grading), beside other stages.

<sup>1</sup>CAPMAS; Annual Bulletin of Estimates of Income from the Agricultural Sector, 2015/2016

<sup>2</sup>CAPMAS; Annual Bulletin of Estimates of Income from the Agricultural Sector, 2015/2016

<sup>3</sup>CAPMAS; Annual Bulletin of Production, Foreign Trade, and Total Supply of Agricultural Commodities, 2016

<sup>4</sup> Refer to footnotes (3) and (4)

In Sharkia, post-harvest and handling losses at the farm level reached 7.32%, mainly due to insects and bruising. At the level of traders, loss during sorting and transport reached 7.59% and 8.87%, respectively, and ranged from 3.52 – 7.26% at retail markets based on type to package.

In Nubaria, losses in grapes were estimated using survey and sampling methods in 2016 and 2017. Results revealed that total loss using survey reached 39.72% compared to that estimated using sampling (28.70%). Magnitude of loss differed across different stages of value chain also. In case of survey, losses reached 18.6% at the farm level, 5.3% during wholesale marketing, while reached 10.3%, 16.41% in case of sampling method, respectively. Main causes include decay during harvesting (5.1%), and shattering that accounted for 9.64% during wholesale marketing and 13.82% during retail marketing. Loss at the packaging stage reached 25.98%, mainly represented in discoloration (13.59%), followed by shattering (4.35%), water berries (3.80%), decay (2.50%) and mechanical injuries (1.74%).

### **Palm Dates**<sup>(5)</sup>

Egypt possesses a vast untapped wealth of palm dates. In 2016, palm dates accounted for 12.3% and 13.7% of total quantity and value of fruit production, and 2.2% and 4% of the total quantity and value of fruit exports, respectively<sup>(6)</sup>.



Despite the fact that Egypt is the world top producer of palm dates, with total production estimated at 1.5 million tons or 19% of the world production of palm dates, Egypt ranks last in terms of palm date exports by top producing countries. In 2017, Egyptian palm date exports accounted for 0.01% of total volume of palm date production compared to Saudi Arabia that exports 4% of the total volume of palm dates production. In 2017, losses at the farm level and during processing reached 270 and 13 thousand tons, respectively, the sum of which represents 19% of the total volume of palm dates production, placing Egypt as the world top country in terms of loss in palm dates. Main causes of losses include traditional harvesting methods, lack of skilled labor and high labor wage rates and fragmentation of land holdings that makes it difficult to adopt modern harvest and post-harvest methods. On the other hand, main causes of post-harvest losses include poor practices like mixing varieties, improper packaging, injuries during handling and marketing, shortage in storage facilities, especially properly equipped cold stores in which dates can properly be stored until sold, in addition to insufficient number of certified packaging and processing plants. A study that was carried out in 2017 estimated losses during marketing at 22.49% of the palm dates' total supply during 2015, which is a high percent of loss that needs to be reduced.

### *Any Chances to Reduce Losses?*

Several experimental studies have been carried out to reduce losses in fruits during storage and to extend its shelf-life. For **oranges**, studies recommended pre-harvest treatments like spraying with jasmine oil and potassium Sulfate. Post-harvest fruit-coating treatments were also recommended including (1) salicylic acid, ascorbic acid, citric acid, paraffin oil, camphor oil, chitosan, bees' wax and Arabic gum; (2) sodium nitroprusside, oxalic acid and hydrogen Peroxide; (3) ethanol extracted propolis; Citral oil, sodium bicarbonate either single or combined treatment; and (4) kaolin.

In case of **grapes**, experimental studies conducted to reduce post-harvest loss in grapes suggested either applying pre-harvest treatments like (1) vine foliar application with chitsan + fulvic acid+ salicylic acid; (2) spraying clusters with GA3 + CaCl<sub>2</sub> (0.5%) and GA3+CPPU+CaCl<sub>2</sub>; or post-harvest treatments like dipping or coating treatment like (1) dipping grape clusters in ethanol extracted propolis; (2) treating clusters with yeast and apple vinegar; and (3) dipping clusters in salicylic acid, paraffin oil and wrapping with polyethylene plastic wrap. Such treatments proved efficient in reducing the occurrence of weight loss, decay and berry shatter under cold storage or room temperature conditions.

Post-harvest treatments found to be effective in extending storability of **palm dates** in cold stores include applying paraffin oil and lemon grass oil, in addition to keeping the cap and spikelet.

### *Implications and Recommendations for Decision-Makers*

- Establish an effective national-level pest management program, especially for combating fruit fly.
- Establish an entity responsible for direct transfer of results of experimental studies conducted to reduce losses along different stages of fruit value chains to stakeholders.
- Establish a national-level training program to all actors involved in the fruit value chains, starting from input producers until reaching retail markets.
- Organize periodic training programs for labors on proper pruning of grape plants and proper harvesting methods to minimize mechanical injuries, in addition to training on proper sorting, grading and packaging.
- Promote private sectors' investment in providing refrigerated trucks and proper cold storage facilities.
- Encouraging private sector and food trade companies' participation in converting traditional markets into more developed markets, like supermarkets and hyper markets, with a network of outlets to market food commodities based on contract farming.

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<sup>5</sup> <http://agri.ahram.org.eg/NewsContentQ/85569.aspx>

<sup>6</sup> Refer to footnotes (3) and (4)