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POSTHARVEST LOSSES OF FRUITS AND VEGETABLES IN TUNISIA

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BACKGROUND INFORMATION

Tunisia is located in the Mediterranean basin between North Africa, Europe and the Middle East. It is easily accessible by sea from the north and the east, and by land from the west and the south. Tunisia covers 163,610 square kilometers. The Mediterranean coastline extends about 1.300 km along the northern and eastern borders. The Tunisian climate critically affects the nation's economy, food supplies and general health of its population. There is a cool, rainy season lasting from December to March while the reminder of the year is warm and dry. Seasonal variations in temperature are not great. The mean annual precipitation range from 1500 mm in the north western coastal slopes to less than 100 mm in the southern desert regions. Due to lack of water and soils which are rocky, sandy or saline, less than one half of the country's land is naturally suitable for agriculture. Even in the wetter northern area, Tunisian's climate is irregular, causing great variations in agricultural production. Floods due to heavy rain may also prove hazardous at times.

The Government of Tunisia's concern in agriculture is how to obtain maximum production from its limited land and water resources. During the sixties, an experiment in forced cooperative farming under government supervision (an effort that was abandoned in 1969), resulted in catastrophic drop in the production of livestock, cereals, fruits and vegetables. Since that period, two agricultural structures have existed side by side, the organized sector (government owned or operated: "Office des Terres Domaniales" (O.T.D.) and the private sector. Each competes with the other for credit, technical assistance, subsidies and markets. In spite of preferential treatment and better land, the organized sector is performing far below its potentials, due to poor management.

During the last few years, the agricultural production in Tunisia has witnessed a significant increase thanks to good weather conditions Tables 1 and 2 show the trend for some fruits and vegetables production in Tunisia during the last five years (Unit = 1.000t).

Table 1. Trends for Fruit production during the last five years (unit = 1.000 t)

	1988	1989	1990	1991	1992
Olives	500	270	650	625	1325
Citrus	230	260	237	224	165
Apples	30	40	43	40	61
Pears	23	32	30	33	36
Peaches	21	30	35	4	56
Pomegranate	35	34	40	47	45
Watermelon	250	250	450	350	380

Source: Budget Economique, 1993

Table 2. Trends for Vegetable production during the last five years (unit = 1.000 t)

	1988	1989	1990	1991	1992
Potatoes	180	180	210	220	218
Tomatoes	400	440	530	590	550
Pimento	120	110	175	180	190
Onions	130	121	100	123	250
Others	385	400	420	430	-

Source: Budget Economique, 1993

The outlook is promising for further increase in agricultural production for the coming years, particularly in the case of cereals where higher yielding varieties and improved technology are continuing to pay dividends, and in fruits and vegetables where access to irrigation is made feasible by using water coming from the northern parts of the country.

However, there is an immediate and pressing need for more and improved storage and handling facilities and improved marketing structure on farm produce and more concern for the needs of the small and medium size farmer.

One of the first priorities for the Tunisian Government is to reach self-sufficiency for agricultural produce and improve the nutritional status of its population by providing at least the minimum nutritional requirements of each individual. Solutions for adequate feeding of the population can be achieved through a multi-disciplinary program involving several approaches such as:

Control of population growth

Many efforts have been made in Tunisia to lower the growth rate. Even though the present population growth rate is still high (2.1%) compared to developed countries, Tunisia has one of the lowest rate in developing countries.

Increased supply of food:

There is a need to increase food supply. This can normally be achieved by increasing the land used for food production and by increasing the yield per hectare through the use of improved crop varieties, soil conservation, use of fertilizers, pesticides and irrigation.

Decreasing food wastage:

The importance of food wastage as a factor affecting the world's supply of food is clearly indicated by the following statement from the food and Agricultural Organization of the United Nations:

> *"Nobody knows how much food men labor every year to produce, only to see it taken off by rats, insects or spoiled in a hundred different ways. The figures and estimates fly around 10% here, 50% there, 28% in the world as a whole, and almost every figure has its firm supporters and its equally resolute opponents. About the only thing that is generally agreed upon is that the losses are enormous and if modern storage and pest control techniques were available on a wider scale, we would have many millions of tons of extra food available for people to eat each year without planting an extra hectare".*

To our knowledge, no specific studies have been carried out on the estimation of the post-harvest losses of perishable commodities in Tunisia. Estimates vary from one source to another and for one commodity to the other. In order to identify problems related to post-harvest losses and develop solution to reduce these losses, one needs to describe and understand the food system and systematically determine whether significant losses are occurring in this system, and more importantly, whether there are realistic solutions for reducing these losses.

As we have mentioned, in Tunisia, since 1969, there are two particular food systems that exist side by side. The organized Governmental run system is summarized in the following chart (Figure 1).

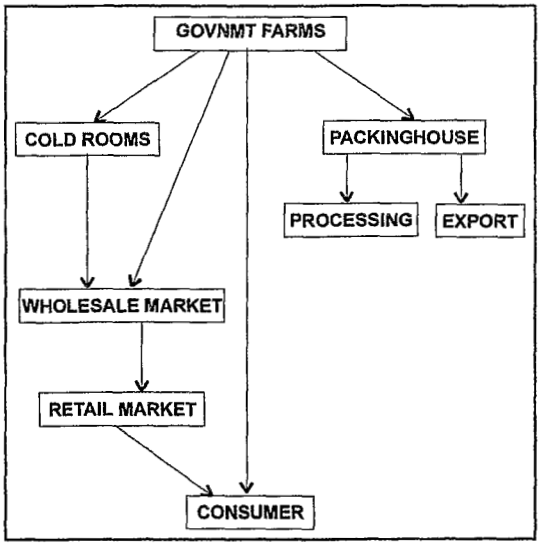

Fig 1. Food System for the Goverment Sector.

Agricultural products from Governmental farms can be directed either to packing-house, to wholesale markets or stored in cold room s for future marketing. This sector has not 30 farms spread all over the country, one processing unit used mainly for producing tomato paste, one packing house for handling exported products (tomato and citrus) and 30 cold rooms. The percent contribution of the Governmental sector to the national agriculture production is still very low. For

instance, in 1992, this sector produced about 14% of the total production of apples and only 4,2% and 2,4% respectively for citrus and pears.

Figure 2 summarizes the food distribution system used in the private sector.

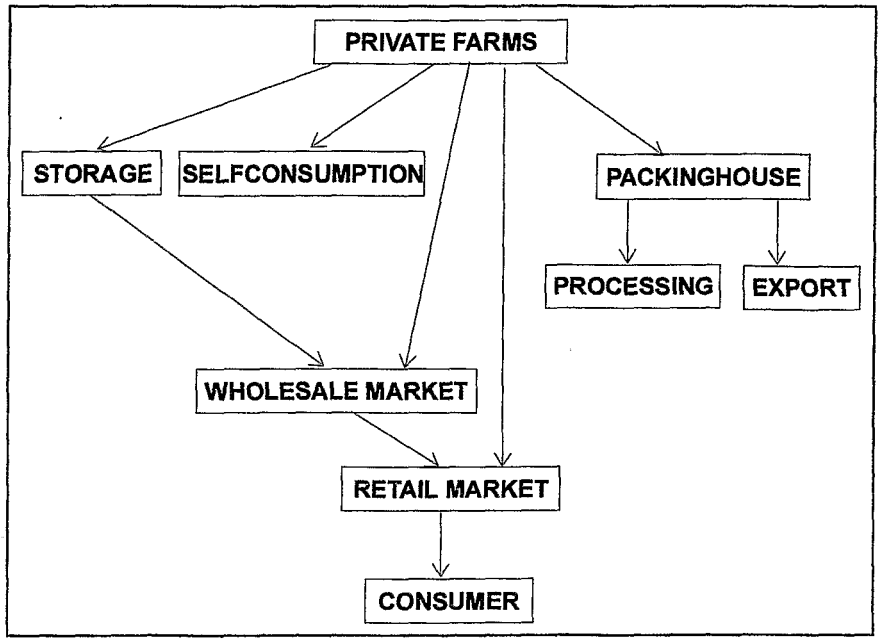

Fig 2. Food Distribution System for the Private Sector.

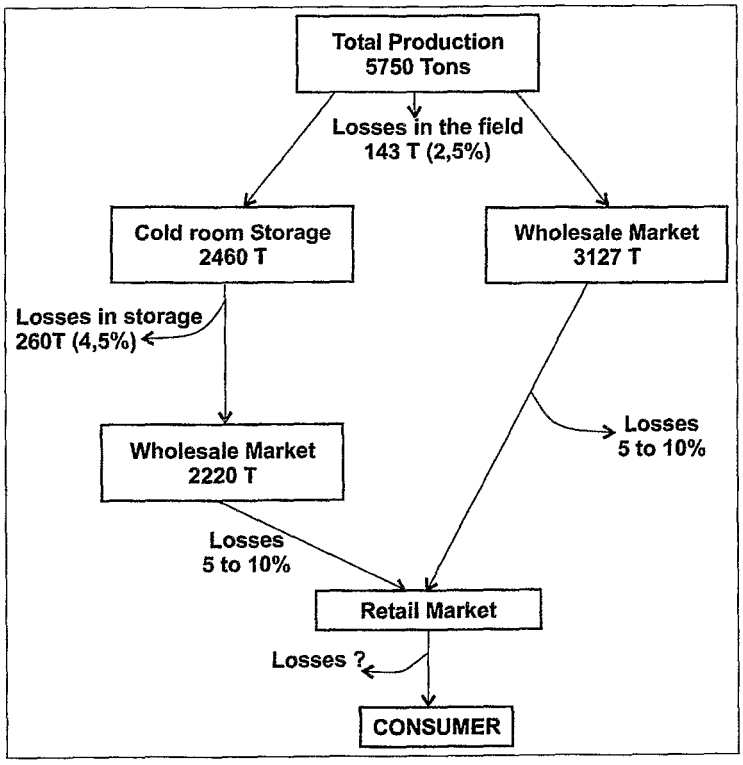

Fig 3. Percent Loss for Apples

There is no significant difference between Government and private sectors. The major difference is that the private sector is using mainly traditional storage in the field. Data shows only abort 20% of the farmers around the village of Chott-Mariem are using cold room facilities. The remaining 80% store their agricultural produce in their farms, using traditional ways. The storage period is reported to vary between 3 to 6 months and the % of loss is estimated to be around 30% for potatoes.

The examination of both food distribution systems shows that postharvest losses may occur at different levels from the production point to the consumer. Statistical data gathered by the Governmental Sector Central Office gave the following figures of apples and pears produced during the 1992 season.(See Fig. 3).

Figure 3 shows that the total production of apples by the Government sector during the season 1992 was 5750 metric tons, 2460 tons were stored in cold rooms and 3127 tons were sent to the wholesale market. This gives us a total loss in the field of 143 tons representing 2,5% of the total production. After the storage period, only 2220 tons were sent to the wholesale market and 260 tons were lost during the storage representing 4,5% of the total production. Therefore, the total loss from farm to the wholesale market is around 7% of the total production. Available data on the percent loss at the wholesale market are registered for the total amount of fruits and vegetables brought to the market and not for individual commodity. These percentages of losses are summarized in the following table (on a monthly base).

Table 3. Losses of fruits and vegetables at the wholesale market of Bir El Kassaa (Unit = tons)

		Amount brought to the W.S.M.	Seized	Not sold	Lost
February	Legumes	15.152	54	37	0,6
1992	Fruits	7.086	no	44	0,6
March	Legumes	16.426	45	38	0,5
1992	Fruits	6.437	9	50	0,9
August	Legumes	14.256	38	116	1,0
1992	Fruits	20.291	18	136	0,8
September	Legumes	14.180	12	114	0,9
1992	Fruits	14.139	13	53	0,5

Even though, the percent of total loss is less than % in most cases, the losses from the Government sector are reported to be much higher than those from the private sector. The average figure taken from several distributors fall between 10 to 15%. The higher losses reported for the Government sector may be explained by several factors such as the behavior of some workers towards the product, brutal handling, carelessness and lack of motivation.

Similar figures were found with pears as illustrated in the following chart.

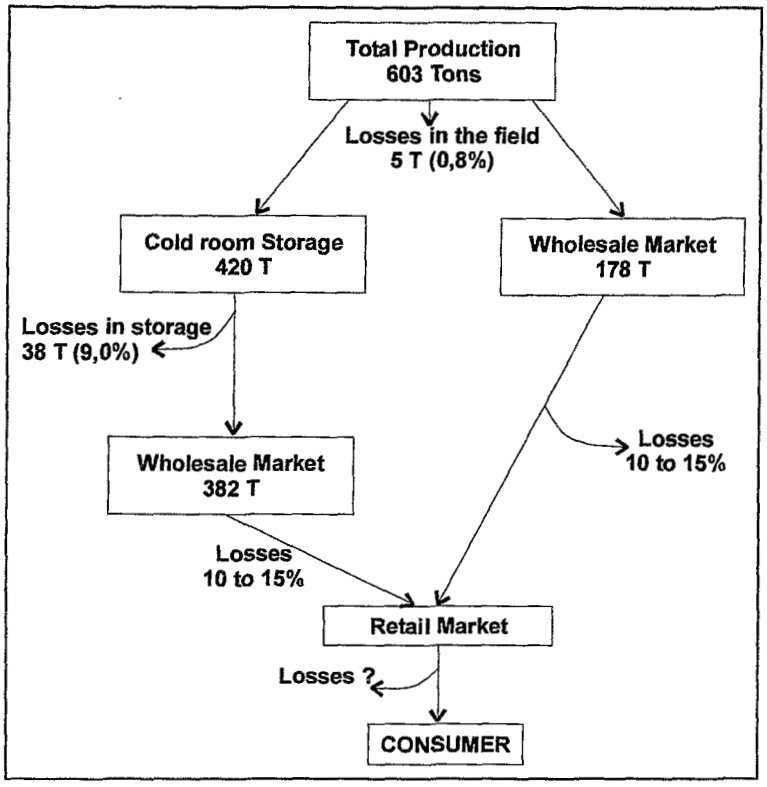

Fig 4. Percent Loss for Pears

The Tunisian Government is aware of the bad performance of its sector and is now modifying its policy towards it. That is why we see more and more farms are transferred to the private sector on a rental basis. The policy is that by the end of 1994, all farms should be in private hands.

The causes for the losses of fruits and vegetables are multiple. Besides the uncontrollable causes, mainly related to weather conditions such as flood, heat, wind, hailstorm etc., there are many other causes that can be prevented if proper measures ere taken at optimum time. On can mention a recent study conducted by Driouchi, in 1990, where he emphasized the importance of losses (in Dollars) caused by the Mediterranean fruit fly "Ceratite". The annual loss estimated is about 3,6 million dollars (Table 4).

Table 4. Economic losses caused by "Ceratite Fly"

Fruits	Loss at production level	Los at market level	Loss at export level	Total loss
Citrus	1.082	36	285	1.403
Peach	856	32	3	888
Pear	355	20	0	375
Apple	261	30	0	291
Apricot	201	6	0	207
Plum	156	6	0	162
Fig	104	2	0	106
Others				192

CONCLUSIONS

As conclusion it can be said that postharvest losses of fruits and vegetables are significantly high in Tunisia. Even though there are no specific studies on the estimation and the extent of the loss, there are significant amount of data available that needs to be analyzed and further explored. These data may indicate a better estimation of loss.

Significant losses occur in the field and during storage. Cold rooms though available, are not used at their maximum capacity. Some wholesale markets have cold rooms that are rarely used for storing agricultural products. High rental cost and lack of trust made private farmers prefer the traditional ways of storage. These has led to significant losses.

The loss is more important in the Government sector. This may be explained by lack of motivation, low salary, brutal handling of produce, ignorance etc.

Transportation in non-refrigerated open trucks, bags instead of boxes are also some of the actors contributing to the high loss between farms and wholesale markets.

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