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Post Harvest and Cold Storage Losses in Apple of Balochistan

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Abstract: The apple of the province is famous for its distant and quality. Where as the significant quantity of apple produced traded to other provinces mainly Punjab and Sindh. Balochistan is the largest province of the country but have the poorest communication and infrastructure development which results in higher post harvest storage and transportation losses. To increase the shelf-life and maintain the quality of perishable produce cool temperature can play an important role. In Balochistan there are two cold stores with the capacity of 700 tones. On an average in cold storage 17 percent damaged apples were found in a crate, the basic reason for this damage was uneven grading and tight package in wooden crates, as mostly the farmer put, the bold apples on top, while the immature and infected apples at the bottom. Out of these 12 percent were not consumed. Furthermore, in a wooden crates there is an additional cost on waste product of apple in the form of packing, transportation, labor, commission, storage, etc. During March 70% of apple were "Shin Kulu" and the rest were other varieties i.e. Tore kulu, Kashmiri, Mashadi, and Gaja. in Quetta market. The grade wise distribution of apple in a crate of 'Tor Kulu' were 10 and 4 kgs with price tag of Rs. 30/ and 16 for A and B grade. It accounts for almost 35 percent of apples produced in Balochistan. Almost, similar trend were reported in 'Shin Kulu' the apple texture is firm which gives it longer shelf life compared to other varieties. The grade wise distribution of apple in 'Shin Kulu' were 8,5 and 2 kgs. with a price tag of Rs. 24, 12 and 8 for A, B and C grade within the crate, respectively. In other apple varieties i.e., 'Amri' and 'Mashadi' grade wise distribution were 5,7,3 and 7,5,1 kgs. Balochistan marketing channel constitute of producers, contractors, commission agents, ladanwala, whole salers and retailers

Key words: Post harvest, Apple, cold storage, losses

Introduction

Balochistan is the largest producer of deciduous fruits in Pakistan an area of 125,257 hectares produces 14,16,174 tones of fruits annually (GOB, 1996-97). During the last decade 1984-85 to 1994-95 a significant increase in the production of deciduous fruit was recorded. Wasim and Raisani (1996) and Iqbal (1996) reported that the production of fruit increased from 216,220 tones in 1984-85 to 841,770 tones in 1994-95 which is 289.3 % increase in the past one decade. Nisar *et al*. (2001) stated that a remarkable increase during the last decade both in the area and production of major deciduous fruits i.e., 161 and 281 % respectively.

Apple is one of the major deciduous fruit of Balochistan. The fruit is grown in highlands of Balochistan. It is grown over 35,009 hectares producing 480,169 tones annually (GOB, 1996-97). Because of good storability at 32 ^{0}F and relative humidity 90 percent, apple is available year-round (UNDP/FAO/GOB Project PAK/89/014). Apple contributing more than 80% of the country's produce Bashir *et al*. (2001).

Balochistan has been the poorest communication and infrastructure development which results in higher post harvest and transportation losses. Lack of technical "Know how" with the farming community and trading agencies about 30% of the produce wasted from farm-gate till it reach to the consumers. This loss turns to billion of rupees annually (Sheikh, 1996). Iqbal (1996) again reported that poor farm-to-market roads is a common problem. Such roads are often unusable during rainy season and in some cases during chilly winter. If the produce is to be transported from country side, higher costs reduce profits. The major post harvest losses in apple reported by the shopkeeper and pushcarts were during off season mainly by rough handling, poor packing, grading, lack of storage and transportation etc. This results in considerable post-harvest losses. Abdul (1994) reported that due to *Kacha* roads in Balochistan, small and medium farmers feel great difficulties in approaching big markets like Quetta, Lahore and Karachi. So high transportation charges are added to the overall and overhead costs.

In Balochistan there are only two commercial cold stores situated at Quetta. These were built with the storage capacity of 700 tones. Wasim (1996). As the quantity is huge and the capacity of the cold store is less thus all the farmers are compelled to sell their produce at low rates to some marketing intermediaries. But inappropriate cold storage registers the highest loss among the different handling operations (Iqbal, 1996). In marketing activity intermediaries, such as preharvest contractors, commission agents, wholesalers, retailers and "Ladanwala" are also present, ladanwala act as an intermediary and purchase the produce and sells that for higher profit to an other distant market (Mustafa, 1996). He further reported that in Balochistan 50 % of apple produce directly and 25% through Ladanwala imported to other distant markets mainly Lahore, Karachi and Islamabad etc.

This study was initiated with the following objectives: To asses total post harvest losses of apple from cold storage to the consumes, to compare and contrast the price losses by rough handling, to asses the price losses of apple in post harvest stage and investigated the expenditure occurred on storage of fruits and its effects on the income of farmers.

Materials and Methods

The study was conducted in late March 1998 in Quetta district. Direct observation techniques were used to collect the required information pertaining to post harvest handling and losses in the cold storage of apple in Balochistan. Overall distance from fruit market to sale point was found 6 Km. During the survey the average age of the retailers was found 35 years. Majority of the respondents were illiterate but on aggregate 9 % of the respondents were found educated and the education level was found upto 3 years. The Lotus 24 computer software was used to compile data for descriptive analysis. The major post harvest losses were found mainly due to poor packing, handling and cold storage practices. During March the stored apple started for marketing. The method of grading by farmers was checked on fields. It was found that the person hired for packing has higher salary than other laborers. The producers paid him Rs. 4000 per month. He used papers and paddy straw for packing and placed different lots one after the other. The crates were so tightly packed that certainly damage occurred was significant. Some infected apples were also placed in between the lots without any care and these effects on the whole quantity.

The cold stores were checked, some of the crates were opened, and than repacked accordingly. It was estimated that 17 % of the apple were found damaged.

The different categories of grading was made by the farmers themselves

only on the basis of Boldness and Color. Which he called A, B and C grades, respectively. Mostly the temperature of the cold stores were kept constant i.e., 2 °F.

Grading of Apple:

A Grade Apple: A grade was allotted to those crates having good quality, size of apple.

B Grade Apple: B grade crate contained medium size and quality apple.

C Grade Apple: C grade apple were small sized, damaged and inferior quality.

Results and Discussion

The survey results revealed that in Quetta market 70% apple were "Shin Kulu" and the rest were other varieties i.e. Tore kulu, Kashmiri, Mashadi, and Kaja. The grade wise distribution of apple in a crate of 'Tor Kulu' were 10 and 4 kgs with price tag of Rs. 30/ and 16 for A and B grade within the crate (Table 1). This apple, which account for almost 35% of apples were produced in Balochistan. These all are fragrant, juicy and crispy UNDP /FAO/GOB Project PAK/89/014, 1990).

Table 1: Average grade wise weight and grade wise prices /crates of storage apple in Quetta, Balochistan

Apple Variety	Grade wise) weight/crate(Kg					Grade wise price/crate (Rs)		
	A	B	C	Damage	Total	A	B	C
Tor Kulu (Red delicious)	10	4	0	3	17	30	16	0
Shin Kulu (Golden delicious)	8	5	2	2	17	24	12	8
Amri	7	6	3	2	17	14	8	5
Mashadi	7	5	1	4	17	20	16	5

Table 2: Average damage apple quantity, price and %age post harvest losses of storage apple in Quetta

Apple Variety	Damage apple Quantity (kg)	Damage apple price (rc/kg)	Damage (%age)	Damage apple thrown (kg)	Damage apple thrown (%age)
Tor Kulu (Red delicious)	1	4	05.11	2	11.76
Shin Kulu (Golden delicious)	0	0	00.00	2	11.76
Amri	1	3	05.11	1	05.11
Mashadi	2	2	11.76	2	11.76

Table 3: Varietal benefit of apple in multiple and in "A"" grade crate (with same price).

Apple Variety	Price (A)	Net Revenue (B)	Difference (A-B)	"A" Grade Revenue (C)	Difference (C-A)
Tor Kulu (Red delicious)	350	384	34	510	160
Shin Kulu (Golden- delicious)	227	270	43	408	181
Amri	180	200	20	306	126
Mashadi	212	229	17	340	128

(Survey results, 1998)

Almost, similar trend were reported in 'Shin Kulu'. The grade wise distribution of apple in a crate of 'Shin Kulu' were 8,5 and 2 kgs. with a price tag of Rs. 24, 12 and 8 for A, B and C grade within the crate, respectively (Table 1). Other apple varieties i.e. 'Amri' and 'Mashadi' grade wise distribution were 7,6,3 and 7,5,1 kgs., with price tag of Rs. 14,8, 5 and 20, 16, 5, respectively (Table 1). There was almost 2 kg per crate of damage apple which were sold to poor person and school going children. Some fruit juice shopkeepers in the city also purchased these with nominal prices. About 2 kgs/crate (11.76 %) of apple were found damage during the survey and not able for sale (Table 2). The retailers reported that they throw these damage apple for feeding them to ruminants. The percentage of damage fruit thrown were 11.76% in 'Tor Kulu', 'Shin Kulu' and 'Mashadi' while in 'Amri' it was found only 5.11%, this apple is hard in texture and storage life and that is why it had less damage fruit. The large share of losses were beard by the consumers and retailers.

It is worth to mention that if in a crate there is only "A" grade apple, the retailer will get higher net revenue with the same price as of multiple poor grade crates. The net revenue was found maximum in 'Shin Kulu' i.e., Rs.181/- followed by 'Tor Kulu Rs. 160, whereas it was Rs. 126/- and Rs. 128/- in Amri and Mashadi, respectively (Table 3). The net revenue found in a crate having the same grade of apple was so many folds higher as of crates having multiple grades (Mustafa *et al*., 1996). According to survey results on an average a crate has 17 % damage apple and out of these quantity 12 % were not consumed and waste. If there was same grade of apple in a crate then the net revenue will be much higher. Furthermore, in a multiple grade crate there is an additional cost on waste product of apple. Storage process is very sensitive and the multiple and poor grade affect "A" grade apple.

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