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## Investigation of the Causes of Postharvest Losses of Apple in District Shopian, Kashmir

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### ABSTRACT:

Post-harvest losses refers to progressive deterioration in quality as well as in quantity of food production from harvest to consumption. Quality losses include those that affect nutrient composition, acceptability, and edibility of the product. Quantity losses refer to those that result in the loss of amount of product. Post-harvest losses of food products can be due to physical, physiological and mechanical conditions. Post-harvest loss is one of the big issue of food security and global hunger in many countries and to limit the post-harvest loss should be a major concern in growing economies.

Keywords: *Apple, post-harvest losses, shopian, kashmir*

### INTRODUCTION:

The Kashmir region is known for its horticulture industry. This industry plays a vital role in the J&K's economic development. The contribution of the horticulture sector in general and apple industry in particular in the state economy is very significant. Being major apple producing state, Kashmir accounts for 67.7% of the total apple production in the country alone (Malik and Choure, 2014; Bhat and Choure, 2014). About 50% of apple production comes from south Kashmir like Anantnag, Pulwama, Shopian and Kulgam. In Kashmir, after Baramulla, Shopian is the second largest producer of apples and is also known for its quality apple (Source Department of Horticulture Jammu & Kashmir).

As the fruits are perishable, so their chances are more to get spoiled or degraded. Statistical analysis over past 40 years have been consistently reporting 40-50% of horticultural crops produced in developing countries are lost before they can be consumed, losses can be due to physical, physiological, mechanical and hygienic conditions (Kitinoja 2002; Ray and Ravi 2005). In order to ensure maximum safety of our vital resource a system is to be employed that should circumscribe the delivery of apples from their production localities to the places of their consumption with minimum loss, maximum efficiency and maximum return for all involved (Hodges et al., 2011). The Post-harvest technology covers more than one fields of study that can be used to minimize spoilage rate and ensures conservation of produce, process goods and value adding to make the material more readily usable and economically more remunerative (Wills et al., 2007).

**MATERIALS AND METHOD:**

The estimation of post-harvest losses of apple were undertaken on the basis of interviews with owners of garden, pre-harvest contractors, commission agents, wholesale agents and retailers. The research has qualitative and quantitative approach and based on desk study and field study. The desk study involved the review of books, journals, magazines and reports and visiting of some relevant websites to describe the literature review theoretical concept and also giving some general information about research topic. The field study was carried out by the survey and interview. Survey was conducted for 10 farmers from the selected villages of the Shopian district (six farmers from each district), as well as 10 retailers from the district, province. Local traders from local (district/provincial) and regional traders from market were interviewed. Interviewing of these stakeholders was very important for collection of both quantitative and qualitative data. Furthermore field observation was also conducted for collection of qualitative data. The primary data was collected through survey, interview and field observation as per the standard pre-structured questionnaire/schedule (see Annexure-I), framed according to Commodity Systems Assessment Methodology (CSAM) developed by La Gra (1991) and later modified by La Gra et al., (2016). CSAM is a systematic method for identifying and measuring factors affecting postharvest losses and identifying bottlenecks leading to quality problems for a specific commodity in a specific location

**Table 1:** Summary of survey and interview participant

No.	Actors in the Chain	Survey/Interview	Observation
1.	Farmers	14	4
2.	Local Traders	6	-
3.	Regional Traders	-	6 SHOPS/STORES
4.	Retailers	10	6 RETAIL STORES
	TOTAL	30	16

**Table 2** indicates the summary of the information sources that have been answering the questionnaire

Question	Information/Data	Source of Information
1.	Problems related to post-harvest practices with regards to quality and losses i.e. harvesting, sorting, grading, packaging, storing and transporting	Survey of farmers, field observation, local/regional traders, retailers as well as interview with horticulture officers and literature review.
2.	Apples harvesting, sorting, grading, packaging, transporting and storing methods	Survey of farmers, field observations, interview of local and regional traders.
3.	Kinds of packaging materials, Resorting, grading, packaging, storing and transporting of apples outside Kashmir and at retail level	Interview with regional traders and survey of the retailers.
4.	Problems of the farmers and traders in regards to post-harvest practices of apples	Survey of farmers and local/regional traders
5.	Role of the supporter in regards to postharvest handling of apples	Interview with officers of Horticulture Department and NGO's.

**DATA ANALYSIS:**

The data has been arranged according to questions and sub-questions. The data is presented in graphs/figures and tables

**RESULTS:**

In India, commercial cultivation of apple is largely confined to the state of Jammu and Kashmir, Himachal Pradesh and Uttarakhand which together accounts for about 2.5% of world production (Ahsan et al., 2008). The Jammu and Kashmir is major apple producing state, accounting for 67.7% of the total apple production in the country alone and 35.92% of country's total area under apple (Malik and Choure, 2014; Bhat and Choure, 2014). Horticulture occupies very important position in the predominantly agricultural economy of Western Himalaya. Horticulture is the mainstay of the economy in Kashmir with 2.3 million people associated with the sector and 237000 hectares of land in valley under fruit cultivation (Rajeshari and Ali, 2016; Islam and Shrivastava, 2017). Horticultural sector contributes around 5000 crores to the annual income of the state of Jammu and Kashmir (Rajeshari and Ali, 2016). Among all the fruits grown in Kashmir, apple is the most widely cultivated and is commercially the most important fruit crop. As per the horticulture census of J&K (1999-2000), about 55% of the horticultural area is covered under apple (Islam and Shrivastava, 2017).

Varieties of Apples in Kashmir Six important varieties of Apples presently grown on a commercial scale in Kashmir are as under:-

1. AMBRI KASHMIR (Amri)
2. AMERICAN TREL (American A pirogue)
3. DELICIOUS (Red Delicious)
4. MAHARAJI (White dotted red)
5. HAZARATBALI (Benoni )
6. KESRI (Cox orange pipin)

Table 4.1 State-wise Area, Production & Productivity of Apple during 2001-02

State	Area (‘000 Ha.)	Production (‘000 MT)	Productivity (MT/Ha.)
Jammu & Kashmir	90.1	909.6	10.1
Himachal Pradesh	92.8	180.6	1.9
Uttaranchal	51.8	59.3	1.1
Arunachal Pradesh	6.7	8.5	1.3
Nagaland	0.1	0.3	3.3
<b>All India</b>	<b>241.6</b>	<b>1158.3</b>	<b>4.8</b>

(Source: Database of National Horticulture Board, Ministry of Agriculture)

Table 4.3 Zone Wise Area under Apple Cultivation for the Year 2017-18 (District Shopian)

S No	Zone	Apple Cultivation Area (Hectares)
1	Shopian	5508
2	Keller	1755
3	Saidpora	1733
4	Kachi Dora	1943
5	Kapran	1547
6	Herman	1673
7	Imam Sahib	3281
8	Zainapora	2849
9	Keegam	1374
	<b>Total</b>	<b>21663</b>

(Source: Chief Horticulture Office Shopian, Tele/fax 01933-260280-8)

**PESTS AND DISEASE:**

This fruit is susceptible to a number of fungal and Bacteria diseases and pests. **Apple scab** is a common disease affecting the fruit in valley, apart from **Aphids** and **Mildew**. Treatment for any disease through chemical spraying is often systematic implying that the chemicals are absorbed by the tree and spread through the fruit. Now organic methods are also used for orchard management in Kashmir.

Some of the diseases caused by pests are given below (Source: Chief Horticulture Office Shopian Tele/Fax 260280-81):

1. Stem Borer
2. Stem Hole Borer
3. San José Scale
4. Red Mite
5. Chaffer Beetle

Diseases caused by fungi are:- 1.

Scabs (Fig. 5)

2. Alternation
3. Powdery Mildew
4. Canker
5. Root Rot
6. Collar Rot
7. Damping Off
8. Fly Speck

Some important pesticides used for the pre harvest treatment are as under:

Spray	Tree stage	Insectside/Acaricide/oils /per 100 lts water.	Fungicide per 100 lts water.
1	Delayed dormancy 1	Horticulture Mineral oil (2lit.)	None
2	Green Tip	None	Mancozeb 75WP (300g) or Captan 50WP (300g) <sup>2</sup>
3	Fruitlet (pea size)	Chlorpyrifos 20EC (100 ml) or Dimethoate 30EC (100ml)	Mancozeb 75WP (300g) or 70%+ Hexaconazole 5% 75WP (50g)
4	Fruit Development	Chlorpyrifos 20EC (100 ml) or Quinalphos 25EC 100ml	Dodine 65WP ( 60g) or kresoximmethyl 44.3 SC (40ml)
5	Fruit Development 2 <sup>nd</sup>	Dimethoate 30 EC (100ml) or summer spray oil (750ml)	Mancozeb 75WP (300g) or Ziram 27 SC ( 600ml) or chlorothalonil 75WP (150g)
6	Fruit development 3 <sup>rd</sup>	None	Metiram 55%+ pyraclostrobin 5% 60WG (100g) or captan 70% + Hexaconazole 5% 75WP ( 50g)
7	Pre harvest	None	Mancozeb 75WP(300g) or Ziram 27SC(600ml) or Zineb 75 WP ( 300g)

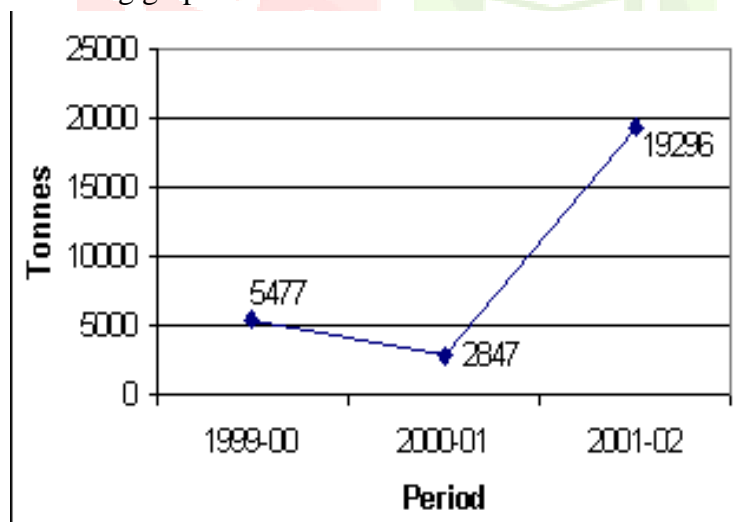
(Source: Chief Horticulture Office Shopian, Tele/fax 01933-260280-81) Pruning practices are performed in late autumn. Thinning is rarely done.

Cost sheet of apple production of an area of one hectare (20 kanals) with a plant population of 290 numbers.

S.No.	Particulars Of Activity	Amount (Rs.)
1	Cost of fertilizer (Manure).	60,000
2	Cost of fungicides/insecticides including horticulture mineral oil spray.	90,000
3	Labor cost on hoeing, application of fertilizers, manure etc.	20,000
4	Labor cost on application fungicides/insecticides.	30,000
5	Labor cost of harvesting.	80,000
6	Labor cost on storage, grading and packing.	91,000
7	Labor cost on pruning/ irrigation.	40,000
8	Cost of shook's and other packaging material etc.	2,50,000
9	Machinery/tool depreciation.	20,500
10	Watch and ward for 6 months active period @6000/month	36,000
11	Miscellaneous expenses including maintenance of irrigation, infrastructure, tree support etc.	46,500
	<b>Sub total (1-11)</b>	<b>7,64,000</b>
12	<b>Substance consumption cost</b>	<b>2,50,000</b>
	<b>Total (1-12)</b>	<b>10,14,000</b>
13	<b>Estimated income from produce.</b>	<b>20,00,000</b>

➤ Source: Chief Horticulture Officer Shopian

**Export trends:** The trend in export of apple from India during the period 1999-2000 to 2001-02 is given in following graph.



#### Export of Apples During 1999-2000 to 2001-02

#### CONCLUSION:

Most damages are imparted by the picking, screening, transferring devices or induced by the fall of the detached fruit on lower branches of tree. Cut and puncture injuries to fruits result from the sharp edges on handling equipments, presence of nails and rough edges on packages resulting in the rupturing of producer skin. This is predominant during harvesting and field transportation. Farmers are unaware about schemes which have been launched by the government for the good production of apple. The facilitating services and guidelines from the relevant institutions are not used/followed by the farmers. Improper cultivation



practices are used by the farmers. Excessive use of pesticides. No knowledge of post-harvest treatment like (hot water dips). Over loading of apples in the boxes cause damage to the fruits. Harvesting techniques used by the farmers, were based on their poor local knowledge. Improper sorting, grading, and packing (over-packing) and packaging materials especially plastic, reused crates were also contributing to the losses. Use of unskilled labors during harvesting, loading and unloading.

To deal with these current challenges the following recommendations are suggested: Importance of appropriate harvesting time especially for local variety apples (beginning of August) that can contribute to improve the color, flavor and size. Besides appropriate harvesting time can avoid from bitter rot and internal breakdown. Importance of proper picking/harvesting methods of apples: Avoid from removing of pedicle (stem attached to apple) that can help to reduce the losses (quality and quantity) by maintaining the freshness and reducing water losses. Besides, cutting of nails can reduce bruising not only during harvest but also during sorting, grading and packaging which is very important to prolong shelf-life of the produce. Importance of cleaning and washing methods by chlorinated water after harvesting will contribute to enhance shelf-life due to prevention of disease transmission from diseased apple to healthy ones. Importance of proper sorting, grading and packaging methods of apples: Avoidance of mix packing can prevent dissemination of disease from diseased fruits to healthy ones. Importance of ventilation of their local storage rooms: air circulation by opening the windows for removing of heat helps the apples to be kept longer in the temporary storage rooms.

#### REFERENCES:

- Ahsan, H., Waheed-ur-Rehman Wani, S.M., Dar, B.N., Dalal, M.R. and Malik, A.R. 2008. *Influence of potassium metabisulphite pretreatment, osmotic dip and packaging materials on dehydration and chemical properties of apple rings*. *Appl. Biolog. Res.* 10: 31–35.
- Hodges, R.J., Buzby, J.C. and Bennett, B. (2011). "Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use." *Journal of Agricultural Science* 149:37-45,
- Islam, R.T and Shrivastava, S. 2017. *A Study on Area, Production and Productivity of Apples in J&K from 2006-07 to 2015-16*. *International Journal of Scientific Research and Management (IJSRM)* 5 (07): 6513-6519
- Kitinoja, L. (2002). *Making the link: Extension of postharvest technology*. In A. A. Kader (Ed.), *Postharvest technology of horticultural crops*. Publication 3311 (3rd ed., pp. 481– 509). Oakland, CA: University of California
- La Gra, J. 1990. *A Commodity System Assessment Methodology for Problem and Project Identification*. Postharvest Institute for Perishables, University of Idaho, Moscow, Idaho.
- La Gra, J., Kitinoja, L. and Alpízar, K. 2016. *Commodity Systems Assessment Methodology for Value Chain Problem and Project Identification: A First Step in Food Loss Reduction*. Inter-American Institute for Cooperation on Agriculture (IICA), San Jose, Costa Rica
- Malik, Z.A. and Choure, T. 2014. *Economics of Apple Cultivation "With Special Reference to South Kashmir- India"*. *Journal of Economics and Sustainable Development* 5: 125:129
- Rajesheri, D. and Ali, S.S. 2016. *A Study about Role of Horticulture in the Development of Economy of Jammu and Kashmir*. *International Journal for Research in Business, Management and Accounting* 2: 157-159.
- Yaqoob suhail 2020 *relationship of participation in physical activity with depression and mental health of muslim women:special reference to geriatric population DOI: 10.13140/RG.2.2.12596.68487*.
- Wills, R.B.H.; McGlasson, W.B.; Graham, D.; and Joyce, D.C, 2007. *Post-harvest. An introduction to the physiology and handling of fruit, vegetables and ornamentals*, 5th ed. UNSW press Wills, R.B.H.; McGlasson, W.B.; Graham, D.; and Joyce, D.C, 2007. *Post-harvest. An introduction to the physiology and handling of fruit, vegetables and ornamentals*, 5th ed. UNSW press.