

A CASE STUDY

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Estimation of post-harvest losses of major fruits in Karnataka- A management appraisal

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SUMMARY :

Agriculture occupies the central place in rural life. The contribution of agriculture towards national income is about 15.5 per cent in 2010-2011 (GOI 2007). Horticultural crops include large varieties of fruits and vegetables, flowers, plantation spice crops, medicinal and aromatic plants, roots and tuber crops. In Karnataka, the total area under fruit crops has increased from 1.41 lakh hectares in 1978-79 to 3.14 lakh hectares in 1998-99 registering a growth of 1.7 to 2.7 per cent. The production of fruit crops has also gone up from 23.41 lakh tonnes during 1978-79 to 54.50 lakh tonnes in 1998-99 showing an increase of 132.64 per cent. The present study conducted in Karnataka state and aims at estimation of post-harvest losses in major vegetables. The results of the study revealed that the overall loss at different stages was around 60.08 kg (13.09 %) in mango. The maximum loss was found to occur at the field level. The overall loss at different stages was around 392.66 kg (11.80 %) in banana. The maximum loss was found to occur at the retail level. The overall loss at different stages was around 31.97 kg (9.06 %) in citrus. The maximum loss was found to occur at the field level. The overall loss at different stages was around 37.30 kg (12.64 %) in guava. The maximum loss was found to occur at the retail level. The overall loss at different stages was around 55.37 kg (14.60 %) in sapota. The maximum loss was found to occur at the retail level.

KEY WORDS : Farmers, Fruits, Market functionaries, Post-harvest losses

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Agriculture occupies the central place in rural life. The contribution of agriculture towards national income is about 15.5 per cent in 2010-2011 (GOI 2007). Therefore, it is rightly said that agriculture is the back bone of Indian economy. Horticulture is an important industry among the land based agricultural systems.

Horticultural crops include large varieties of fruits and vegetables, flowers, plantation spice crops, medicinal and aromatic plants, roots and tuber crops. With its diverse agro-climatic conditions and biodiversity, fertile soil, large cultivable

area and above all a long history of crop husbandry, India can boast of being one of the few countries in the world which can grow large varieties of fruits round the year.

Fruits and vegetables have been shown to earn 20-30 times more foreign exchange per unit area than cereals due to higher yields and higher price available in the international market (Anonymous, 2003). Karnataka is one of the progressive states of India with great potential development for fruit crops. The state is blessed with ten agro-climatic regions suitable for growing variety of fruits all round the year. In Karnataka, the

total area under fruit crops has increased from 1.41 lakh hectares in 1978-79 to 3.14 lakh hectares in 1998-99 registering a growth of 1.7 to 2.7 per cent. The production of fruit crops has also gone up from 23.41 lakh tonnes during 1978-79 to 54.50 lakh tonnes in 1998-99 showing an increase of 132.64 per cent. The major districts growing fruit crops in the state are Kolar, Belgaum, Coorg, Bangalore, Shimoga, Hassan, Bijapur, Dharwad, Dakshina Kannada, Mysore, Tumkur, Bagalkot and Chitradurga. The major fruits crops grown in these districts are mango, banana, citrus, grapes, guava, sapota, papaya, pomegranate, Jack, ber, amla, etc. Thus with this background present study has been undertaken with the objectives to measure the extent of post harvest losses in major fruits in the state and to analyse the technology for post harvest management of the fruits crops.

EXPERIMENTAL METHODS

The present study conducted in Karnataka state and aims at estimation of post-harvest losses in major fruits. The state of Karnataka is blessed with varied agro-climatic conditions making it possible to grow a good number of fruits and vegetables. Based on the triennium average (2007-08 to 2009-

10) area under fruits crops grown in Karnataka, five major fruits viz., mango, banana, citrus, guava and sapota, have been selected for the study.

Keeping in view the objectives of the study, a multi-stage random sampling procedure has been adopted in the selection of the districts, taluks, villages and farmers. In the fourth and final stage, five vegetable growing farmers in each village were randomly selected. In all 150 farmers for each crop were selected at the rate of 30 farmers from each district. From each district six wholesaler cum commission agents, three retailers dealing these crops were also interviewed. Thus, the number of wholesaler cum commission agents, retailers for each crop was nine for each crop.

Tabular presentation was used to present the data. Statistical averages, ratios, percentages were used to estimate socio-economic profile, cropping pattern, post-harvest losses, purchases, sales etc. separately for producer-seller and for different market functionaries.

EXPERIMENTAL FINDINGS AND ANALYSIS

The post-harvest losses of major fruits at different levels were shown in Table 1 to 5. The overall loss at different stages

Table 1 : Total post-harvest losses in mango during different levels

Sr. No.	Different levels	Quantity (kg)	Percentage (%)
1.	Farm level	24.41	5.42
2.	Commission agent-cum-wholesaler level	31.36	3.29
3.	Retail level	4.31	4.38
	Total	60.08	13.09

Table 2 : Total post-harvest losses in banana during different levels

Sr. No.	Different levels	Quantity (kg)	Percentage (%)
1.	Farm level	353.16	3.6
2.	Commission agent-cum-wholesaler level	34.47	3.33
3.	Retail level	5.03	4.87
	Total	392.66	11.80

Table 3 : Total post-harvest losses in citrus during different levels

Sr. No.	Different levels	Quantity (kg)	Percentage (%)
1.	Farm level	13.04	5.2
2.	Commission agent-cum-wholesaler level	17.48	1.77
3.	Retail level	1.45	2.09
	Total	31.97	9.06

Table 4 : Total post-harvest losses in guava during different levels

Sr. No.	Different levels	Quantity (kg)	Percentage (%)
1.	Farm level	15.65	4.38
2.	Commission agent-cum-wholesaler level	19.07	2.48
3.	Retail level	2.58	5.78
	Total	37.30	12.64

was around 60.08 kg (13.09 %) in mango. The maximum loss was found to occur at the field level. The tender texture and high moisture content of fruits led to deterioration of quality and in turn quantity loss occurred at different post-harvest

practices like drying, storage, packing and transportation at field level. Further, at commission agent-cum-wholesaler and retailer level a considerable post-harvest loss occurred due to inadequate storage, transportation facilities and improper

Table 5 : Total post-harvest losses in sapota during different levels

Sr. No.	Different levels	Quantity (kg)	Percentage (%)
1.	Farm level	21.83	4.56
2.	Commission agent-cum-wholesaler level	29.56	3.37
3.	Retail level	3.98	6.67
	Total	55.37	14.60

Table 6 : Technologies available for post-harvest management for fruits and their adoption by farmer (in percentage) (n=150)

Sr. No.	Technology	Adoption												Number of responses		% of Yes or No	
		Mango		Banana		Citrus		Guava		Sapota							
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
1.	Harvesting	30	Nil	30	Nil	30	Nil	30	Nil	30	Nil	150	Nil	100	0		
2.	Precooling	18	12	22	8	23	7	Nil	30	20	2	83	67	55.33	44.66		
3.	Sorting	26	4	30	Nil	30	Nil	30	Nil	30	Nil	146	4	97.33	2.79		
4.	Washing	Nil	30	Nil	30	22	8	Nil	30	Nil	30	128	8	85.33	5.33		
5.	Waxing/Chemical treatment	Nil	30	Nil	30	16	14	Nil	30	Nil	30	16	134	10.66	89.34		
6.	Sizing	30	Nil	30	Nil	30	Nil	30	Nil	30	Nil	150	Nil	100	0		
7.	Packaging	30	Nil	Nil	30	30	Nil	30	Nil	30	Nil	150	Nil	100	0		
8.	Storage	18	12	22	8	23	7	Nil	30	20	2	83	67	55.33	44.66		
9.	Transportation	30	Nil	30	Nil	30	Nil	30	Nil	30	Nil	150	Nil	100	0		
10.	Wholesaler	30	Nil	30	Nil	30	Nil	30	Nil	30	Nil	150	Nil	100	0		

Table 7: Technologies available for post-harvest management for fruits and their adoption by market functionaries (n=45)

Sr. No.	Technology	Adoption										Number of responses		% of Yes or No	
		Mango		Banana		Citrus		Guava		Sapota					
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1.	Precooling	Nil	9	Nil	9	9	Nil	Nil	9	Nil	9	9	36	20	80
2.	Sorting	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	Nil	100	0
3.	Washing	Nil	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	0	100
4.	Waxing/Chemical treatment	9	Nil	9	Nil	9	Nil	Nil	9	Nil	9	27	18	60	40
5.	Sizing	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	Nil	100	0
6.	Packaging	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	Nil	100	0
7.	Storage	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	Nil	100	0
8.	Transportation	9	Nil	9	Nil	9	Nil	9	Nil	9	Nil	45	Nil	100	0

Table 8: Opinion of sample farmers regarding problems with respect to post-harvest losses of fruits (n=150)

Sr. No.	Particulars	No. of respondents	Per cent to total
1.	Lack of knowledge about post-harvest technologies	25	16.67
2.	Adverse weather condition	115	76.67
3.	Shortage of labour	103	68.33
4.	Inadequate storage facilities	117	78.33
5.	Inadequate transportation facilities	120	80.00

handling activities. The results are in line with Madan and Ullasa (1991).

The overall loss at different stages was around 392.66 kg (11.80 %) in banana. The maximum loss was found to occur at the retail level. The tender texture and high moisture content of fruits led to deterioration of quality and in turn quantity loss occurred at different post-harvest practices like drying, storage, packing and transportation at field level. Further, at commission agent-cum-wholesaler and retailer level a considerable post-harvest loss occurred due to inadequate storage, transportation facilities and improper handling activities. The results are in line with Roy and Pal (1991)

The overall loss at different stages was around 31.97 kg (9.06 %) in citrus. The maximum loss was found to occur at the field level. The tender texture and high moisture content of fruits led to deterioration of quality and in turn quantity loss occurred at different post-harvest practices like drying, storage, packing and transportation at field level. Further, at commission agent-cum-wholesaler and retailer level a considerable post-harvest loss occurred due to inadequate storage, transportation facilities and improper handling activities. The results are in line with Roy and Pal (1991).

The overall loss at different stages was around 37.30 kg (12.64 %) in guava. The maximum loss was found to occur at the retail level. The tender texture and high moisture content of fruits led to deterioration of quality and in turn quantity loss occurred at different post-harvest practices like drying, storage, packing and transportation at field level. Further, at commission agent-cum-wholesaler and retailer level a considerable post-harvest loss occurred due to inadequate storage, transportation facilities and improper handling activities. The results are in line with Rao and Manohar (1995).

The overall loss at different stages was around 55.37 kg (14.60 %) in sapota. The maximum loss was found to occur at the retail level. The tender texture and high moisture content of fruits led to deterioration of quality and in turn quantity loss occurred at different post-harvest practices like drying, storage, packing and transportation at field level. Further, at commission agent-cum-wholesaler and retailer level a considerable post-harvest loss occurred due to inadequate storage, transportation facilities and improper handling activities. The results are in

line with Rao and Manohar (1995).

The result from the Table 6 and 7 revealed that the 100% respondents expressed that the existing technologies of harvesting, sizing, packing, transportation and selling of fruits was done by the farmers. Next in the order of importance was washing, precooling, storage and waxing/chemical treatment was about 85, 55, 55 and 10 per cent, respectively and other hand about 89 per cent of the respondents opinioned that waxing/chemical treatment was done by the farmers because of lack of knowledge regarding advantages and method waxing/chemical treatment. This was followed by precooling, storage, washing and sorting at the rate of about 44, 44, 5 and 3 per cent, respectively. In case of market functionaries the 100 per cent of the respondents of the market functionaries expressed that they were not harvest the crop, sorting is done by the farmers only; they took the functions of the sizing, packaging, storage and transportation. 20 per cent of the market functionaries' took the precooling activities and 60% of market functionaries took to waxing/ activities.

Table 8 shows the problems of the respondents with respect to post-harvest losses management of fruits. Inadequate transportation facilities were viewed as one of the major post harvest problem by 80 per cent of fruit growers. About 78.33 per cent of farmers considered inadequate storage facilities as a problem. About 76.67 per cent growers viewed adverse weather condition as a major problem. About 60.33 per cent growers expressed the problem of inadequate labour facilities and about 16.67 per cent of farmer did not have full knowledge of fruits post-harvest management.

It is observed from the analysis that the post harvest losses in fruits accounted from mechanical handling, packaging, storage and transportation (Gajanana, 2002). The policy measures need to be directed towards creating infrastructure conducive to transport of delicate fruits appropriate transport protocols adaptable for Indian fruits, develop inter-modal transportation system with complementary roles between road and railways network. Similar work related to the present topic was also done by Krishna (1976); Madan and Ullasa (1993); Mrema and Rolle (2002) and Sreenivasa *et al.* (2002 a and b).

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