

Marketing Efficiency and Post Harvest Loss of Flower in Bangladesh

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Abstract: The present study was conducted to estimate the post harvest losses of flower and its impact on farmer's net profit, marketing margin and marketing efficiency and also estimate producer's share in consumer's price at different level of marketing such as producer, local trader, wholesaler and retailer. Primary data were randomly collected from 110 respondents from Jessore and Dhaka city. The study covered four kinds of flower such a rose (White), marigold, Jasmine (Yellow) and Tulip (Purple). Post harvest losses was highest at retail level (39.82%) followed by wholesaler (27.52%), producer (18.87%) and local trader (13.78%) per hundred of all flowers. Due to post harvest losses the marketing margin of the local traders, wholesaler and retailers decreased by 6.14, 8.88 and 7.65 per cent respectively. Total marketing margin was reduced due to post harvest loss for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) by 12.16, 62.55, 3.83 and 17 per cent respectively. Tulip (Purple) market was more efficient than other flowers market in both with and without post harvest loss. Producer's share in consumer's taka in the present study was comparatively lower. Lack of storage facilities, inadequate and under developed transportation and communication system, absence of scientific and modern harvesting technology, lack of infrastructural facilities and standardized packing method are the main reason which deteriorate the quality of flower and enhance the post harvest losses of flower. Some measures are suggested for reducing post harvest losses of flower.

Keywords: Marketing Margin, Marketing Efficiency, Post Harvest Loss, Producer's Share.

I. Introduction

The flower farming is an important and profitable enterprise in the Agriculture sector of Bangladesh. The area under floriculture is increasing day by day, particularly in the area adjacent to big cities. In fact flower farming is labor intensive as compared to other Horticulture crops particularly vegetables rather, it lies in between the two ends with the skilled labor force and modern techniques, it has been proved that the investment in this sector yields high returns for the growers. It is evident from the increase number of nurseries, green houses, flower markets and flower auction centers and the production of flowers turn out to be about 8000 to 10,000 tons per annum (BBS, 2008, Govt. of Bangladesh). In ornamental plants, especially those that have scented flowers or leaves have essential oil; few are used commercially in perfumes, flavor or cosmetic industries. In all the perfumes used in the world today, oil of rose and jasmine are the most delicate perfumes used since the beginning of human civilization. Although it is very difficult to give exact figures of rose oil production, it is estimated that about ten tones of rose oil produced the world today, of which Bulgaria produces more than five tones followed by Turkey and Morocco (K.L. Chadha et al June, 1992). In Bangladesh, rose water is prepared from roses. Rose water is extensively used in flavoring foods, confectionery and funeral ceremonies. While the word Jasmine comes from Arabic word, "Yasmine". Although there are several species of Jasmine that have scented flowers and which are used for making garlands and Attars. Flowers have become symbol of sentiments and an essential part of religious and social ceremonies. Commercial production of flower in Bangladesh started from mid 1980S at Jessore district. Now around 10,000 hectares are under flower cultivation (Siddika, 2004). The major production is concentrated at Godkhali in Jessore which covered about 60 per cent of total flower production. At present approximately 8000 farmers are engaged in floriculture (Mou, 2006). Due to the varied agro-climatic conditions and relatively low cost of production, Bangladesh has immense opportunities not only to meet the local demands of both traditional and cut flowers but also a high potential for export. Lack of enterprise, technical know-how, standardized methods of growing and harvesting of ornamental flowers of internationally acceptable quality, problem of packing and transportation has been a major impediment in realizing this goal. Farmers involve highly in floriculture practice as it is more profitable than other crop and the demand for flower has been increasing day by day. As a result, there exists a

competition of high quality flower production. Production areas are concentrated in the rural environments, but the consumption is concentrated in the cities. There is no organization or association for marketing and distribution of flowers. The flowers, being highly perishable, require special post harvest management. But improved post harvest handling has not yet been initiated in Bangladesh. Inefficient postharvest management deteriorates the quality of flower and as a result farmers are deprived of getting expected price of flower. So the quality management of flower is of utmost important of getting higher returns. Lack of modern harvesting technology, improper storage, transportation, handling and packing causes both qualitative and quantitative loss of flower.

Post Harvest Loss

Post harvest loss is the loss that occurs from the point of harvest of flower in the field till it reaches to the hands of ultimate users. Post harvest loss (PHL) of flower occurs at different levels due to different reasons. Flowers are damaged at different levels due to various causes such as over-maturing due to delay in harvesting, plucking and assembling, packing, press due to wholesaling process, loading and unloading, cleaning and sorting, multiple handling and transportation, making flower vase and unsold stock. At retail level post harvest loss is also occurred due to sun and rain because most of the retailer's shop is not well furnished and for this sun and rain deteriorate the quality of flower and as result price of flower becomes low. Keeping in view the abovementioned fact, present study was conducted with the following specific objectives:

- ✦ To estimate the post harvest loss of selected flower at different stages of handling of the produce
- ✦ To analysis the impact of post harvest losses of flower on farmer's net price, marketing margin and marketing efficiency
- ✦ To estimate the producer share in consumer's price
- ✦ To identify the major constraints and suggest measures for reducing post harvest loss of flower.

II. Materials and Methods

Sampling and Data Collection

Jessore district is considered as one of the leading flower producing zones in Bangladesh. Two unions, namely Godkhali and Panisara under Keshabpur Upazila of Jessore district were selected as the flower growing area while Dhaka city was selected as the consuming centre because it would provide maximum information about flower marketing in Bangladesh. The sample size was 110 of which five were input suppliers, 30 flower growers, and 35 traders 'at local, district and Dhaka city, and another 40 retailers in Dhaka city. Thus the total sample size was 110 which were selected randomly. The primary data were collected by the personal interview method with the help of well-designed and pre-tested schedules. The survey was conducted during January to February in the year of 2009. The study included four kinds of flowers such as Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) which are commercially produced by the farmers in the study area.

Analytical Procedure

Net price received by farmer is expressed by the following formula

Where,

$$NPF = GPF - CF - (LF \times GPF)$$

NPF = Net price received by farmers (Tk per 100 flowers), GPF = Gross price or price received by farmers (Tk per 100 flowers), CF = Marketing cost of farmers (Tk per 100 flowers) and LF = Physical loss of flower (number)

Total Marketing Cost

Total marketing cost (MC) incurred by producer and by intermediaries was calculated by using the following formula:

Where,

$$MC = CF + CL + CW + CR$$

CF = Marketing cost of farmer (Tk per 100 flowers), CL = Marketing cost of local trader (Tk per 100 flowers), CW = Marketing cost of wholesaler (Tk per 100 flowers) and CR = Marketing cost of retailer (Tk per 100 flowers)

Measurement of Marketing Efficiency

To examine the marketing efficiency Acharya's method was used (Acharya and Agarwal, 1999). Acharya has modified the formula of estimating marketing efficiency, which is worked out as:

$$ME = FP / (MC + MM) \text{ (before post harvest loss)}$$

$$ME = FP / (MC + MM + ML) \text{ (after post harvest loss)}$$

Where,

ME = marketing efficiency, FP = Net price received by the farmer, MC = Total marketing cost ,MM = Total net margins of intermediaries ,ML = Total marketing loss

Gross margin

Gross Margin = Sale price – Purchase price

Net marketing margin

Net marketing margin = Gross margin – Marketing cost

Producer’s Share in Consumer’s Price

This was the percentage of the net price received by the producer to the price paid by the consumer or selling price of retailer. It may be expressed as follows: Post Harvest Loss of Flower and its Impacts on Flower Marketing in Bangladesh

$$Ps = (Pf \div Pc) \times 100$$

Where, Ps = Producer’s share, Pf = Net price received by producer and

Pc = Price paid by consumer

III. Results and Discussion

Estimation of Post Harvest Losses at Different Levels for Different Flowers

The post harvest loss at different stages of marketing for different flowers was estimated and it was presented in Table 1. The result revealed that the total post harvest loss at producer level for per hundred of all flowers was 18.87 per cent, of which highest percentage was due to over maturing followed by due to delay in harvesting (8.13%) followed by losses due to plucking and assembling (5.72%), losses due to transportation, loading and unloading (4.94%). The major cause of post harvest loss at local trader level was due to press due to wholesaling process (5.77%) followed by poor packing (3.64%) and transportation (2.35%) and cleaning and sorting (2.13%). Thus 13.78 per cent of total post harvest loss on value basis was occurred at local trader level. Total post harvest losses were 27.52 percent at wholesale level. The causes of loss were transportation (9.2%), loading and unloading (7.23%), packing (5.82%) and unsold stock (5.27%). The maximum loss was occurred at retail level which accounted 39.82 per cent of total post harvest loss. The causal factors were identified as unsold stock (17.4%), during making flower vase (9.86%), and multiple handling and transportation (6.86%) and processing for sale (5.81%). In addition, most of the retailer’s flower shop is not well shaded and retailer retains the flowers for a longer period than others, so sun and rain easily deteriorate the unsold flowers and retailer also perform more processing activities than other functionaries such as making flower vase, cleaning, sorting, some time change the form of the flower.

Table 1: Post harvest loss at different levels for different flowers

Particulars	Rose (White)	Marigold	Tulip (Purple)	Jasmine (Yellow)	Total
1. Local traders					
a. Sales price (GPT)	165	9.2	439	97	710
b. Purchase price (GPF)	100	6.8	269	65	440.8
c. Marketing cost (CT)	11.75	1.34	17.91	17.25	48.25
d. Marketing margin (before)	53.25	1.06	152.09	14.75	221.15
e. Loss of flower in value (-LT×GPT)	4.9	0.82	5.52	2.32	13.57
f. Net marketing margin (after)	48.34	0.24	146.57	12.56	207.71
2. Wholesaler 0.00					
a. Sales price (GPW)	255	9.95	645	111.02	1020.97
b. Purchase price (GPT)	160	7.6	438	88	693.6
c. Marketing cost (CW)	6.07	0.56	6.48	3.15	16.26
d. Net marketing margin (before)	81.93	1.71	201.52	19.87	305.03
e. Loss of flower in value (LW × GPW)	15.23	0.68	6.94	4.25	27.1
f. Net marketing margin (after)	73.7	1.11	193.58	15.62	284.01
3. Retailer 0.00					
a. Sales price (GPW)	428	20.7	915	155	1518.7
b. Purchase price (GPR)	248	9.35	535.5	95.5	888.35
c. Marketing cost (CR)	36.52	4.44	47.2	28.76	116.92
d. Net marketing margin (before)	143.48	5.91	332.3	30.74	512.43

e. Loss of flower in value (LR.×GPR)	20.75	4.01	9.75	4.7	39.21
f. Net marketing margin (after)	122.73	1.9	322.55	26.04	473.22
4. Total marketing margin of intermediaries (before)	278.66	8.68	685.91	65.36	1038.61
5. Total marketing margin of intermediaries (after)	244.77	3.25	662.7	54.22	964.94
6. Per cent change	12.16	62.55	3.83	17.04	95.58

Impact of Post Harvest Loss on Farmer’s Net Price, Marketing Margin and Marketing Efficiency

Net price received by farmer was estimated as the difference in gross price received by farmer and sum of the marketing cost and value loss during harvesting, loading and unloading and marketing of flower. Per hectare net price received by farmer is presented in Table 2. The result revealed that the flower production was more profitable for farmer than other flowers. The farmer received highest net price per hectare from Jasmine (Yellow) (Tk. 663601.29) followed by Rose (White) (Tk. 544452.6), Tulip (Purple) (Tk. 308245.4) and marigold (Tk. 18364.5) before excluding post harvest loss.

Table 2: Per hectare net price received by farmers

Particulars	Rose (White)	Marigold	Jasmine (Yellow)	Tulip (Purple)
Gross price (GPF) (Tk)	586000	217940	691733.5	334490
Marketing cost (CF) (Tk)	41547.4	34293.5	28132.21	26244.6
Net price (Tk) (before)	544452.6	183646.5	663601.3	308245.4
Loss of flower in value (LF×GPF) (Tk)	33870.8	70830.5	18489.08	17033.26
Net price (Tk) (after)	510581	112816	645112.2	291212.1
Percentage change	6.22	38.57	2.79	5.53

It is apparent from Table 2 that net price received by farmer after deducting post harvest loss for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) were reduced by 6.22 %, 39.56%, 2.79 % and 5.53 % respectively.

Marketing Margin

The intermediaries net marketing margin were worked out with and without taking into account the post harvest loss and results are presented in Table 3. It is seen from the table that marketing margin was reduced due to post harvest loss for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) by 12.16, 62.55, 3.83 and 17.04 per cent respectively.

Table 3: Net marketing margin of intermediaries before and after excluding post harvest loss Tk. per 100 flowers

Particulars	Rose (White)		Marigold		Tulip (Purple)		Jasmine (Yellow)		% of Total Value
	Quantity (No.)	Value (Tk)	Quantity (No.)	Value (Tk)	Quantity (No.)	Value (Tk)	Quantity (No.)	Value (Tk)	
1. Farm level (Total flower)	100	100	100	6.8	100	269	100	65	447.7
Damaged flower due to:									
Plucking and assembling	2.01	2.01	4.56	0.31	0.69	1.86	2.23	1.45	5.72
Transportation, loading and unloading	1.83	1.83	20.88	1.42	0.27	0.74	1.33	0.87	4.94
Over-maturing due to delay in harvesting	1.94	1.94	7.05	0.48	1.71	4.59	1.53	0.99	8.13
Total damaged flowers (%)	5.87	5.87	32.5	2.21	2.67	7.19	5.09	3.31	18.87
2. Local trader (Total flower)	100	160	100	7.6	100	438	100	88	704.5
Damaged flower due to:									
Press due to wholesaling process	1.65	1.65	3.15	0.24	1.05	2.82	1.5	0.97	5.77
Packing	1.59	1.59	1.84	0.14	0.53	1.42	0.67	0.43	3.64
Cleaning and sorting	0.79	0.79	3.02	0.23	0.23	0.61	0.73	0.47	2.13
Transportation	0.98	0.98	2.76	0.21	0.25	0.67	0.7	0.45	2.35
Total damaged flowers (%)	4.91	4.91	1.76	0.82	2.06	5.52	3.6	2.32	13.78
3. wholesaler (Total flower)	100	160	100	7.6	100	438	100	88	704.5
Damaged flower due to:									
Transportation	2.86	4.59	2.89	0.22	0.57	2.5	1.98	1.75	9.2

Loading and unloading	2.71	4.35	2.36	0.18	0.45	2	0.67	0.59	7.23
Packing	2.26	3.63	2.63	0.2	0.23	1.05	0.96	0.85	5.82
Unsold stock	1.66	2.66	1.05	0.08	0.31	1.39	1.2	1.06	5.27
Total damaged flowers (%)	9.49	15.23	8.97	0.68	1.56	6.94	4.81	4.25	27.52
4. Retailer (Total flower)	100	248	100	9.35	100	535.5	100	95.5	902.2
Damaged flower due to:									
Multiple handling and transportation	1.74	4.32	2.99	0.28	0.45	1.9	0.26	0.25	6.86
Making flower vase	2.67	6.63	16.04	1.5	0.24	1.08	0.52	0.5	9.86
Processing for sale	0.78	1.95	13.15	1.23	0.28	1.09	1.52	1.45	5.81
Unsold losses	3.16	7.85	11.76	1.1	1.25	5.68	2.63	2.5	17.4
Total damaged flowers (%)	8.35	20.75	42.88	4.01	2.22	9.75	4.93	4.73	9.82
Total value of post-harvest loss	28.62	46.76	95.08	7.72	8.51	29.4	18.43	14.58	100

Post Harvest Loss of Flower and its Impacts on Flower Marketing in Bangladesh Table 4 shows that the retailers captured the highest marketing margins both in before and after deducting post harvest loss followed by wholesalers and local traders. The highest change of marketing margins in per cent was found for wholesalers (8.88%) followed by retailer (7.65%) and local traders (6.14%).

Table 4: Change in marketing margin of different intermediaries

Particulars	Before excluding post harvest loss	After excluding post harvest loss	change in Percent (Decreased)
Local traders total margin Tk./100 flowers	221.15	207.71	6.14
Wholesaler's total margin Tk./100 flowers	305.03	284.01	8.88
Retailer's total margin Tk./100	512.43	473.22	7.65

Marketing Efficiency

Marketing efficiency is essentially the degree of market performance. The term marketing efficiency may be broadly defined as the effectiveness or competence with which a market structure performs its designated function (Jasdanwalla, 1996). Kohls and Uhl (2005, p. 35) defined marketing efficiency as the maximization of input output ratio. An efficient marketing system is an effective means of change and an important way of raising the income levels of the farmer and the levels of satisfaction of the consumers. Efficient marketing system plays an important role not only in stimulating production but also in accelerating the pace of economic development. The marketing efficiency before excluding post harvest loss for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) was 0.25, 0.29, 0.32 and 0.46 respectively. The marketing efficiency after excluding post harvest loss for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) was 0.22, 0.20, 0.31 and 0.41 respectively (Table 5). Theoretically it is revealed from Table 5 that Tulip (Purple) flower market was more efficient than other flowers market.

Table 5: Marketing efficiency of market intermediaries before and after excluding post harvest loss

Particulars	Rose (White)	Marigold	Jasmine (Yellow)	Tulip (Purple)
Farmers net price NP (Tk/100 flowers)	85.82	4.66	247.12	54.8
Total marketing margin MM (Tk/100 flowers)	278.66	8.68	685.91	65.36
Total marketing cost MC (Tk/100 flowers)	61.43	7.41	82.53	54.26
Total marketing loss ML(Tk/100 flowers)	46.67	7.72	29.4	14.58
Marketing efficiency (before)	0.25	0.29	0.32	0.46
Marketing efficiency (after)	0.22	0.2	0.31	0.41

Producer's Share in Consumer's Price

Table 6 represented that the price paid by consumer for per hundred of Rose (White) was calculated Tk. 428 which was Tk. 20.70 for marigold and Tk. 815 for Jasmine (Yellow) and Tk. 155 for Tulip (Purple). Table 6 shows that the producer's share in consumer's price for Rose (White), marigold, Jasmine (Yellow) and Tulip (Purple) was 20.05%, 22.51%, 30.32% and 35.35% per hundred flowers respectively before excluding post harvest loss, while after excluding post harvest loss the corresponding shares reduced to 18.7%, 11.84%, 29.44% and 33.22%.

Table 6: Producer's share in consumer's price

Particulars	Rose (White)	Marigold	Jasmine (Yellow)	Tulip (Purple)
A. Before excluding post harvest loss				
Net price received by farmers(Tk/100 flowers)	85.82	4.66	247.12	54.8
Price paid by consumer (Tk/100flowers)	428	20.7	815	155
Producer's share in consumer price (Tk/100flowers)	20.05	22.51	30.32	35.35
Price spread	342.18	16.04	567.88	100.2
B. After excluding post harvest loss				
Net price received by farmers(Tk/100 flowers)	80	2.45	239.93	51.49
Price paid by consumer (Tk/100flowers)	428	20.7	815	155
Producer's share in consumer price (Tk/100flowers)	18.7	11.84	29.44	33.22
Price spread	347.96	18.25	575.07	103.51

Price spread for per hundred of Rose (White), marigold, Jasmine (Yellow)and Tulip (Purple)was Tk. 342.18, Tk. 16.04, Tk. 567.88 and Tk. 100.2 before excluding post harvest loss, which was Tk. 347.96, Tk. 18.25, Tk.575.07 and Tk. 103.51 after excluding post harvest loss. It is apparent from the table that producer's share in consumer's taka was comparatively lower which ranged from 20 % to 35% before excluding post harvest loss. After deducting post harvest loss, the producer's share in consumer's taka varied from about 12 % to33%.

Major Problems Relating to Post Harvest Loss (PHL)

The flower grower in the study area faced number of problems in post harvest management, which are required to be addressed to ensure their economic prosperity. Major problems relating to postharvest loss of different flowers are described below:

Scientific Storage Methods

Being perishable in nature, flowers have to be harvested as soon as they get matured, otherwise their quality get deteriorated. There are no storage facilities for flower in Bangladesh. Though processing center is established in Godkhali, but it is not working properly and it is very expensive for trader to use it. Due to lack of storage facility in majority of the wholesale market, farmers were forced to sell their produce on the same day even if the prices wereruling very low.

Inadequate and Under Developed Transportation and Communication system

Farmers in the study area are still using the age old means of transportation like hand cart and cycle van which were being pulled by human beings. Flower produced in the study area is mostly marketed to Dhaka which is so far from there. Wholesaler used the bus service for transporting flower from Godkhali to Dhaka. There is no special vehicle for transporting flower. The existing transportation system deteriorates the quality of flower. So inadequate and under developed transportation and communication system is an important reason for post harvest losses of flower.

Inadequate Infrastructure Facilities

There is no well-shed to protect farmer and flower from rain or sun. Most of the time farmers had to sell their flower standing in the open place. So lack of infrastructure such as puce floor, tin shed, drainage, water supply etc. was the problems which increase the post harvest loss.

Packing Method

The traditional packing method with rope and plastic was considered inadequate for long transportation. But this type of packing method is followed in the study area. It also reduces the quality of flower.

Modern Harvesting Technologies

Flower is highly perishable and requires special kind of postharvest handling. Commercial flower farming is a new practice in Bangladesh. Farmers use the traditional method of harvesting. It deteriorates the quality of flower. It causes the loss at post harvest. There is a shortage of trained manpower to handle commercial floriculture activities such as production, post harvest handling and biotechnology.

IV. Conclusion and Recommendations

With the increased demand for flower, there is ample opportunity for increasing the profit from flower production. But post harvest losses affected the profit of flower grower Income from floriculture has a remarkable contribution to increase total household income. The share of floriculture to household income increased from zero to 24.47 per cent which have a positive impact on increasing total household income. For small, medium and large farmers, income from different sources was also increased than before situation of

practicing commercial floricultural. Hence, commercial floriculture has a remarkable positive impact on increasing total household income (Yeasmin, 2009). Therefore, the following measures are required to be undertaken for ensuring the economic prosperity for the flower grower:

- Flower storage facilities should be established by the government initiative. Government may take measure to provide loan to the private sector so that they would come to establish the storage facilities.
- Training on scientific production practices, harvesting technology of flowers along with other post harvest activities should be imparted to the flower growers and the marketing intermediaries.
- Floriculture research should be given more importance and Government assistance in research and development is to be needed.
- Government should help in providing air-conditioned freezer van for the transportation of flower from production area to market places of different districts.
- The infrastructure facilities of the flower market should be developed.
- For the development of post harvest infrastructure and other facilities attempts should be undertaken through public, private and also public-private partnership basis.
- Flower growers should be organized into group which will enhance their bargaining power and also improve their productivity. Post harvest loss will also be reduced due to better handling of flower.

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