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Marketing Losses and Their Impact on Marketing Margins: A Case Study of Banana in Karnataka

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Abstract

The explicit evaluation of the post-harvest losses at different stages of marketing and their impact on farmers' net price, marketing costs, margins and efficiency have been presented. It has been found that the existing methods tend to overstate the farmers' net price and marketing margins of intermediaries. In fact, the margin of the retailers' after taking into account the physical loss during retailing has been found to be negative (loss), which otherwise, was positive (profit) in the conventional estimation. Similarly, the producers' net share and wholesalers' margins also decrease substantially. It has been shown that marketing efficiency is inversely proportional to the marketing losses. The co-operative marketing has been found to be a more efficient system in terms of both operations and price. Marketing cost has been identified as the major constraint in the wholesale marketing channel and bringing down the costs, particularly the commission charges as demonstrated in the co-operative channel, will help in reducing the price-spread and increasing the producers' margin. The need for specialized transport vehicles for perishable commodities has been highlighted.

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1. Introduction

Post-harvest losses during handling, transport, storage and distribution are the major problems in agrarian economy, especially in perishable fruits and vegetables. Besides resulting in low per capita availability and huge monetary losses, these increase transport and marketing costs also (Subrahmanyam, 1986). Many studies have attempted to estimate the post-harvest losses at various stages of marketing of fruits and vegetables (Anon, 1982; Anon, 1985, Atibudhi, 1987; Waheed *et al*., 1986; Aradya *et al*. 1990; Madan and Ullasa, 1993; Gauraha, 1997; Srinivas *et al*., 1997; Sreenivasa Murthy *et al.*, 2002; Sudha *et al*., 2002) and banana in particular (Gajanana *et al*., 2002; Sreenivasa Murthy *et al*., 2003). These studies have not separated the loss component explicitly during handling at different stages of marketing nor have included it as a separate item in the marketing margins, costs and price-spread. The need for an appropriate procedure for loss estimation was highlighted in a recent study on grapes, as these variations could significantly alter the profit margins and efficiency of marketing (Sreenivasa Murthy *et al*., 2004). In the present study, the methodology used for quantifying the post-harvest losses in both physical and value terms at various stages of marketing has been validated for banana. The results have been compared with conventional methods of estimation of marketing margins and efficiency. The impact of post-harvest losses on producers' net share, marketing margins and marketing efficiency due to separating out the marketing loss has also been quantified. The present paper has addressed these issues with the following specific objectives.

(i) To develop and validate the methodology explicitly for evaluating the post-harvest losses at different stages of marketing, and

(ii) To examine the impact of such estimation procedure on farmers' net price, marketing costs, margins and efficiency.

2. Methodology

Based on the definition of post-harvest losses associated with the marketing chain (Acharya and Agarwal, 2001; Kohls and Uhl, 2002) and from the present context of marketing banana, three stages were identified to estimate the post-harvest losses, viz. field level, transit and wholesale marketing level; and retail marketing level. Simple averages and percentages were used for estimation of post-harvest losses at these three stages.

2.1. Estimation Procedures

Marketing Loss: In the conventional estimation procedures, the losses at different stages of marketing are not considered explicitly as an item of

cost. It is considered either as part of net income received by the farmer or the margin of the market intermediaries. The modified formulae, described below, were used for estimating separately the losses in value terms at different stages of marketing as well as for estimation of producers' share and marketing margins.

Farmers' Net Price: The net price received by the farmers was estimated as a difference between gross price received and sum of the marketing costs incurred, including the post-harvest losses at different stages of handling the produce. For estimating the loss in value terms of the produce, gross price received by the farmer was used, as they would have realized the same price if there were no losses. The farmers' net price was expressed mathematically as per Equation (1):

$$NP_F = GP_F - \{C_F + (L_F \times GP_F)\}$$

$$\text{Or } NP_F = \{GP_F\} - \{C_F\} - \{L_F \times GP_F\} \quad \ldots(1)$$

where,

NP_F = The net price received by the farmers (Rs/kg)

GP_F = The gross price received by farmers or wholesale price received by the farmer (Rs/kg)

C_F = The cost incurred by the farmers during marketing (Rs/kg), and

L_F = The physical loss in produce from harvest till it reaches the market (kg).

Marketing Margins: The margins of market intermediaries include profits and returns, which accrue to them for storage, the interest on capital and establishment after adjusting the marketing losses due to handling. The general expression for estimating the margin of the intermediaries is given below:

Intermediaries margin = Gross price (sale price) – Purchase price (cost price) – Cost of marketing – Loss in value during wholesaling

Net marketing margin of wholesaler is given mathematically by Equation (2):

$$MM_W = GP_W - GP_F - C_W - (L_W \times GP_W)$$

$$\text{Or } MM_W = \{GP_W - GP_F\} - \{C_W\} - \{L_W \times GP_W\} \quad \ldots(2)$$

where,

MM_W = Net margin of the wholesaler (Rs/kg)

GP_W = The wholesalers' selling price or purchase price of retailer (Rs/kg)

C_W = The cost incurred by the wholesalers during marketing (Rs/kg), and

L_W = The physical loss in the produce at the wholesale level (per kg)

The definition of GP_F is same as given in Equation (1).

In the marketing chain, when more than one wholesaler is involved, i.e. there are primary wholesalers, secondary wholesalers, etc., then the total margin of the wholesaler is the sum of the margins of all the wholesalers. Mathematically,

$$MM_W = MM_{W1} + \ldots + MM_{Wi} + \ldots + MM_{Wn}$$

where, MM_{Wi} is the marketing margin of the ith wholesaler.

Net marketing margin of the retailer is given by Equation (3):

$$MM_R = GP_R - GP_W - C_R - (L_R \times GP_R)$$

$$\text{Or } MM_R = \{GP_R - GP_W\} - \{C_R\} - \{L_R \times GP_R\} \quad \ldots (3)$$

where,

MM_R = Net margin of the retailer (Rs/kg)

GP_R = Price at the retail market or purchase price of the consumers (Rs/kg)

L_R = Physical loss in the produce at the retail level (per kg), and

C_R = The cost incurred by the retailers during marketing (Rs/kg).

The definition of GP_W was the same as given in expression (2).

The first bracketed term in Equations (1), (2) and (3) indicates the gross return, while the second and third bracketed terms indicate the cost and the loss at different stages of marketing, respectively.

Thus, the total marketing margin of the market intermediaries (MM) was calculated by Equation (4):

$$MM = MM_W + MM_R \quad \ldots (4)$$

Similarly, total marketing cost (MC) incurred by the producer/seller and by various intermediaries was calculated as per Equation (5):

$$MC = C_F + C_W + C_R \quad \ldots (5)$$

Total marketing loss (ML) in value of produce due to injury/damage caused during handling of produce from the point of harvest till it reaches the consumers was estimated as per Equation (6):

$$ML = \{L_F \times GP_F\} + \{L_W \times GP_W\} + \{L_R \times GP_R\} \quad \ldots (6)$$

Marketing Efficiency: Most commonly used measures are conventional output to input ratio, Shepherd's ratio of value (price) of goods marketed to the cost of marketing (Shepherd, 1965) and Acharya's modified marketing efficiency formula (Acharya and Agarwal, 2001). However, all these

measures do not consider explicitly the loss in the produce during the marketing process. As reduction of loss in itself is one of the important efficiency parameters, there is a need to consider this component explicitly in the analysis to improve the measures of marketing efficiency ratios used for comparing alternate markets/channels. The present study, therefore, incorporated 'marketing loss' as one of the components in the denominator of the formula suggested by Acharya and Agarwal (2001) for the measurement of marketing efficiency. The modified formula was expressed as Equation (7):

$$ME = \frac{NP_F}{MM + MC + ML} \quad \ldots (7)$$

The definitions of NP_F, MM, MC and ML were the same as in expressions (1), (4), (5) and (6).

2.2. Data

The above methods were validated by using the data collected on post-harvest losses in marketing of banana *var Ney-poovan* in Karnataka. Multi-stage random sampling technique was used for the selection of area and the sampling units. Karnataka was purposively selected for the study, as it is the major banana-growing state for *var*. *Ney-poovan*. In the second stage, the Bangalore rural district was selected for estimating losses at field level for its highest contribution to production of banana *var*. *Ney-poovan*. Three important talukas in this district, viz. Channapatna, Ramanagaram and Kanakapura, were selected purposively at the third stage, based on their contributions to the production. Thirty-two farmers were randomly selected from these talukas and three bunches were selected randomly from each of the farmers' field for estimating the loss at the field level. The collection centres of banana *var*. *Ney-poovan* of HOPCOMS (Horticultural Producers Co-operatives Marketing Society) were also located in the study area.

For estimating losses at the wholesale level, two major markets in Bangalore, viz. banana wholesale market and HOPCOMS were selected. A sample consisting of 15 commission agents in banana wholesale marketing and five units in the main centre of HOPCOMS were selected to estimate the transit and ripening losses. At the retail level, Bangalore was purposively selected, as it is a major consuming centre of banana *var*. *Ney-poovan*. Fifteen retail outlets in the open market and five HOPCOMS retail outlets in Bangalore were selected randomly to estimate the losses at the retail level. Data were collected from farmers, wholesalers, retailers and HOPCOMS between October 2001 and January 2002.

3. Results and Discussion

3.1. Marketing Practices and Channels

The marketing of banana *var. Ney-poovan* through various channels in the study region has been depicted in Fig. 1. About 60-70 per cent of banana was marketed through Channel-2 (henceforth referred to as wholesale channel) and Channel-4 (co-operative channel). In the wholesale channel, banana was brought to the exclusive regulated banana market at Binny Mills, Bangalore from the districts of Bangalore rural, Bangalore urban, Kolar, and Mysore in Karnataka, Satyamangalam, Tirupatur and Trichi in Tamil Nadu and parts of Andhra Pradesh. Banana was sold through auction to wholesalers and other buyers within and outside the state of Karnataka.

In the co-operative channel, HOPCOMS procures banana (*var. Ney-poovan*) from farmers through its collecting centres located at the producing areas, viz. Channapatna, Ramanagaram and Kanakapura and disposes the same to the consumers through its 256 retail outlets located in major cities in Karnataka like Bangalore, Mysore and Mangalore. Channel-1 was also in practice for banana marketing, but the extent of trade was low. The pre-harvest contractors (PHC) also play an important role and they enter into a contract with the farmers for a mutually agreed price. PHCs harvest and transport banana to the nearby markets.

3.2. Post-harvest Losses (PHL)

The losses at different stages of handling banana, viz. field, transit, ripening, wholesale and retail levels were estimated for the wholesale and cooperative marketing channels, as banana was marketed mostly through these two channels (Table 1).

The post-harvest losses were as high as 28.84 per cent in the wholesale channel; comprising 5.53 per cent at the field and assembly level, 6.65 per cent at the wholesale level and 16.66 per cent at the retail level. These

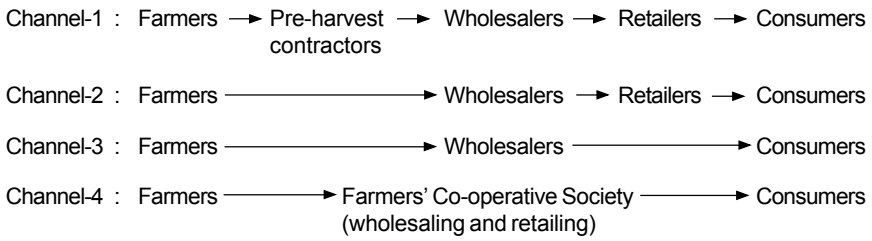

Fig. 1. Marketing channels for banana in Bangalore rural district, Karnataka

Table 1. Post-harvest losses in banana at different stages of marketing in Karnataka

Sl No	Stages of marketing	Wholesale channel		Cooperative channel	
		Post-harvest losses (%)	Per cent to total losses	Post-harvest losses (%)	Per cent to total losses
1	Field and assembly level	5.53	19.17	7.82	42.71
2	Wholesale level	6.65	23.06	1.77	9.67
3	Retail level	16.66	57.77	8.72	47.62
4	Total	28.84	100.00	18.31	100.00

losses in the co-operative marketing channel were 18.31 per cent with 7.82, 1.77 and 8.72 per cent in the corresponding stages. The losses in co-operative channel were higher in the first stage of handling, i.e. assembly level and lower in the later stages of marketing. The losses at the field and assembly levels accounted for as high as 42 per cent of the total loss in the co-operative channel compared to about 19 per cent in the wholesale channel. Procurement of quality produce and rejection of substandard produce by the HOPCOMS were the major reasons. Losses at wholesale and retail stages in the wholesale channel accounted for 23 per cent and 58 per cent, respectively, compared to 10 per cent and 48 per cent in co-operative channel. Better loading and transportation, less handling and acceptance of good quality produce at the time of procurement contributed to the lower losses at the later stages of marketing in the co-operative channel.

Further, market-wise analysis revealed that the losses were higher during retailing than in other stages of marketing. In the cooperative channel, post-harvest losses at the retail level accounted for 48 per cent, while it was 58 per cent in the wholesale channel.

3.3. Marketing Costs

The total marketing cost for all stages was higher in the wholesale channel, which amounted to Rs 4.36/kg compared to Rs 1.30/kg in the co-operative channel. It was due to high cost incurred by the farmers in the wholesale channel, accounting for 83.5 per cent of the total marketing costs (Table 2). Transportation from the field to wholesale market of Bangalore (Rs 1.07/kg), ten per cent commission on the value of the produce and ten per cent deduction on weight loss were the major components of the marketing costs incurred by the farmers. Cost of market intermediaries together accounted for 16.5 per cent of the total marketing cost. In the co-operative marketing, the society itself acted as a single window agency for procurement

Table 2. Cost of marketing banana in Karnataka through wholesale and cooperative channels

(Rs/kg)

Particulars	Wholesale channel	Co-operative channel
Farmers	3.64	0.57
Wholesalers	0.21	0.73
Retailers	0.51	0.00
Sub-total	4.36	1.30
Share in the consumers price (%)	27.53	10.0

and distribution and the marketing costs were substantially lower at Rs 1.30/kg. It was further reflected in the share of consumers' price, which accounted for 27.53 per cent in the wholesale channel as against 10 per cent in the co-operative channel. This supports the theory that direct procurements from the farmers and direct sales to the consumers can reduce the marketing costs substantially, by eliminating the market intermediaries.

3.4. Marketing Losses

The marketing losses are seldom included as an explicit item of marketing cost. In the present study, the losses at various stages of marketing were separately estimated for the major channels and the results have been presented in Table 3. The marketing losses ranged between Rs 2.02/kg in the co-operative channel and Rs 4.23/kg in the wholesale channel which accounted for 26.7 per cent and 15.5 per cent of the consumers' price, respectively. The losses occurred at the retailing level were higher in the wholesale channel (more than 62 %). In the case of co-operative channel, retail level losses were not separately estimated since handling at different levels was by the same agency in this case. The marketing losses incurred by the farmers during sorting, grading and marketing were Re 0.66/kg in the case of wholesale channel and to Re 0.72/kg in the co-operating channel.

Table 3. Losses during marketing of banana in Karnataka

(Rs/kg)

Particulars	Wholesale channel	Co-operative channel
Farmers	0.66	0.72
Wholesalers	0.93	1.30*
Retailers	2.64	-
Sub-total	4.23	2.02
Share in the consumers price (%)	26.70	15.54

*Combined losses during wholesaling and retailing

3.5. Impact of Marketing Loss on Margins and Efficiency

In general, the marketing costs and margin analysis do not explicitly consider the post-harvest losses at different stages of marketing and hence these get absorbed in either the farmers' net margin or margins of the market intermediaries. This invariably overestimates the profit margins of the market intermediaries. An attempt was made in this study, by separately accounting for the losses, for a more precise estimation of the marketing margins. The farmers' net price, margins of market intermediaries, price-spread and efficiency indicators as estimated by the conventional and new methods have been presented in Table 4.

Farmers' Net Price: It can be seen from Table 4 that the net price received by the farmers for banana (*var Ney-poovan*) was higher in the co-operative channel eventhough the gross price received was higher in the wholesale channel. The net price received by the farmers, as estimated using the

Table 4. Impact of marketing losses on farmers' net price, margin, efficiency index and price-spread in banana in Karnataka

(Rs/kg)

Particulars	Before separating losses		After separating losses	
	Wholesale channel	Co-operative channel	Wholesale channel	Co-operative channel
Farmers' net price	8.36	8.68	7.70	7.96
Wholesalers' margin	1.79	3.22	0.86	1.92
Retailers' margin	1.33	-	-1.31	-
Marketing efficiency	1.12	2.01	0.95	1.58
Price-spread (Rs/kg)	7.48	4.32	8.14	5.04
Consumers' price (Rs/kg)	15.84	13.00	15.84	13.00

conventional method, was Rs 8.68/kg in the co-operative channel and Rs 8.36/kg in the wholesale channel. It was possible due to low marketing cost, particularly, the commission charges and the transportation costs. The farmers' net share in the consumers' price was higher (66.77%) in the co-operative than wholesale (52.78%) channel. In the conventional estimation, the damaged fruits were separated out during sorting and grading but before selling to wholesalers. The value of such rejects was not accounted anywhere. Farmers normally do not get any price for such produce.

In the present analysis, the post-harvest losses during grading and transit from field to assembly market were accounted and valued at the prevailing prices. The extent of such losses varied from Re 0.66/kg to Re 0.72/kg, depending on the methods of marketing. There was reduction in the net

price received by the farmers to the extent of 8.57 per cent in the wholesale channel compared to about 9.05 per cent in the co-operative channel. Consequently, the producers' share, as estimated by the conventional method, decreased from 66.77 per cent to 61.23 per cent in the co-operative channel, and from 52.78 per cent to 48.61 per cent in the wholesale channel.

Wholesalers' and Retailers' Margin: The total margin of wholesalers and retailers did not vary much in both the channels, it was Rs 3.12 /kg in the wholesale channel and Rs 3.22/kg in the co-operative channel. This margin also included the post-harvest losses at the wholesale and retail levels. The separation of the post-harvest loss from the gross margins and accounting it as a separate item reduced the wholesalers' margins from Rs 1.79/kg to Re 0.86/kg and retailer's margin from Rs 1.11/kg to (-) 1.31/kg. The negative value for retailers indicated that they incurred net loss during the retail trade due to high (16.67 %) post-harvest losses. The rotting of fruits due to bruises and rough handling was the major cause for these losses. The other causes for increased losses were cracks and blackening of fruits due to over-ripening which were the characteristics of banana (*var*. *Ney-poovan*). Fruits need to be sold within 2-3 days to avoid blackening during retailing. In the case of co-operative channel, the reduction in actual margin due to losses as a separate item was to the extent of Rs 1.30/kg from Rs 3.22/kg, because of higher losses during retailing. The reasons for losses as stated in the wholesale channel, were also applicable here. Thus, there was a need to improve the existing cultivar *Ney-poovan* by incorporating the character of longer shelf-life to avoid cracking and blackening of the fruits.

Price-spread: The price-spread was Rs 7.48/kg in the wholesale channel before separating out the marketing loss, which was 47.0 per cent of the consumers' price. The share of marketing cost was Rs 3.64/kg (22.98%), which included commission charges, transportation costs, physiological weight loss, etc. The share of the marketing margin was Rs 3.84/kg (24.24%) comprising wholesaler's margin of Rs 2.00 and retailer's margin of Rs 1.32, while the price-spread in the co-operative channel was Rs 4.32/kg, which was about 33.33 per cent of the consumers' price. This price-spread was comprised of Rs 1.07 of marketing cost (8.23 % of consumers' price) and Rs 3.25 towards co-operative society's margin towards wholesaling and retailing (25%). The producers' share in the consumers' rupee was higher (66.67%) in co-operative than wholesale (52.78%) channel, mainly due to lower marketing costs. Thus, on this account, the marketing of banana through co-operative channel was more efficient since the price-spread was lower, nearly by 73 per cent.

As regards the impact of consideration of loss as a separate item, it was observed that the price-spread increased to Rs 8.14/kg in the wholesale channel and to Rs 5.04/kg in the co-operative channel. It was due to the decrease in the producers' share and market intermediaries margin on one hand and inclusion of marketing loss as a separate component of the cost, on the other hand. The losses accounted for 53 per cent of the price-spread in wholesale channel and 40 per cent in the co-operative channel. This signifies the importance and necessity of accounting post-harvest losses as an item of marketing cost.

Efficiency Index: The modified marketing efficiency ratio was higher in the co-operative channel mainly because of higher price realization by the farmers due to reduced marketing costs. The operational efficiency, measured in terms of cost of performing marketing function, was also higher in the co-operative channel due to lower marketing cost and reduced post-harvest losses. As regards pricing efficiency, which referred to the structural characteristics of marketing system, where the sellers were able to get the true value of their produce and the consumers received the true worth of their money (Acharya and Agrawal, 2001), the co-operative channel was found more efficient.

The price paid by consumers for banana (*var. Ney-poovan*) in the retail outlet of the co-operative society was Rs13.00/kg compared to Rs 15.84/kg in the open market (wholesale channel), which was higher by 21.85 per cent. Thus, in banana (*var. Ney-poovan*), the co-operative marketing benefitted both the producers and the consumers. But the extent of benefit was more to the consumers than produces, as they paid about 22 per cent less price compared to the open-market price. Similar results have been reported in few other studies (Krishna, 1976; Subrahmanyam *et al.*, 1994; Gajanana and Subrahmanyam, 1996).

4. Conclusions and Policy Implications

The study has revealed that in the two major channels of marketing of banana *var. Ney-poovan*, viz. wholesale and co-operative, the latter is a more efficient system in terms of both operations and price. The operational efficiency has been reflected by the reduced post-harvest losses (18% compared to 29%) due to strict procurement procedure, better transportation and handling and lower marketing costs. Improvement in pricing efficiency has been reflected in terms of lower price-spread, higher efficiency index, increased producers' share and lower consumers' price. Both farmers as well as consumers are benefitted, but the extent of benefit is more to the consumers. This single window marketing system of procurement and

distribution may be extended to other perishable crops like grapes, tomato, pomegranate, etc. However, certain policies like limited procurement and no provisions to buy second-grade produce may be addressed to strengthen the system. It has been further highlighted that transit losses can be reduced by adoption of improved transportation methods, which strengthen the need for specialized transport vehicles for perishables commodities. Marketing cost has been identified as the major constraint in the wholesale channel and bringing down the costs particularly the commission charges as demonstrated in the co-operative channel, will help in reducing the price-spread and increasing the producers' margin.

By separating out marketing loss at each stage of marketing, the actual margins of intermediaries have been estimated. It has been observed that the existing methods tend to overstate the farmers' net price and margins of the intermediaries. In fact, the margin of the retailers' after accounting for the physical losses during retailing has been found to be negative (loss), which was otherwise positive (profit) in the conventional estimation. Similarly, the producers' net share and wholesalers' margin have also been reduced substantially. It has been shown that marketing efficiency is inversely proportional to the volume of post-harvest losses. Thus, it is appropriate to account for the marketing losses separately for precise estimation of margins and efficiency.

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