Marketing efficiency of India's horticultural commodities under different supply chains

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Abstract: *India's horticulture sector is growing and playing a vital role in the continent's agricultural economy. India is the second largest producer of fruit and vegetables globally, but horticultural development is currently constrained by poor marketing. The gap between prices received by farmers and those paid by consumers is large, reflecting inefficient marketing arrangements. This study estimates the market costs, market margins, price spread, the producer's share of the consumer's rupee and the market efficiency of horticultural commodities under different supply chains, and suggests measures to improve marketing efficiency. The study was conducted in the states of Andhra Pradesh, Karnataka, Tamil Nadu, Punjab, Rajasthan, West Bengal, Manipur and Mizoram, covering 29 crop types. The results show that, in the case of most commodities, marketing costs, marketing margins, transport costs and labour charges adversely affect marketing efficiency, and open market price, volume of produce handled and net price received increase market efficiency or have a positive effect. The highest marketing efficiency was found in the producer-to-consumer channel. Government policies should promote direct marketing models for more efficient horticultural marketing.*

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There is strong growth potential for the production of horticultural commodities in underdeveloped and emerging-economy countries. The development of horticultural production promises to provide these countries with the ability to meet domestic food needs and diversify income sources. In addition, horticulture affords excellent opportunities for improvements in human health, farmer household income and economic and social advancement. In India, horticulture development has not been a priority. Between 1948 and 1980 the main focus was cereals. Between 1980 and 1992 there was consolidation of institutional support and a

planned process for the development of horticulture. It was only later on that attention was given to horticultural development through an enhancement of plan allocation and knowledge-based technology.

The National Horticulture Mission was launched in 2005 as a central scheme to promote the holistic growth of the horticulture sector through an area-based regional strategy. The foreign trade policy in 2004–09 emphasized the need to boost agricultural exports, growth and promotion of exports of horticultural products. The horticultural sector contributed 28% of agricultural GDP and 54% of agricultural exports in India in 2007–08. The sector has grown at an average rate of 3.6% per annum over the last decade.

India produced around 111.8 MT of vegetables and 57.73 MT of fruit in 2006-07, accounting for almost 1.9% and 10.9% respectively of the country's share in global production of fruit and vegetables. It is the second largest producer of fruit and vegetables globally after Brazil and China. The country's annual requirement is 74.40 MT of fruit and 175.2 MT of vegetables. With current population growth, the annual requirement will soon exceed production levels. India thus plans to increase the production of horticultural crops to 300 MT by 2012 (Government of India, 2001) from the current level of 202.68 MT (National Horticulture Board, 2008).

Accelerated agricultural growth will require diversification in horticulture and floriculture, which in turn implies structural changes in the relationship between agriculture and non-agriculture. Diversification requires effective marketing linkages, supported by modern marketing practices including the introduction of grading, post-harvest management and cold storage chains. The objective of the government was to regulate trade practices, increase marketing efficiency by reducing marketing charges, eliminate intermediaries and protect the interests of the producer/seller. Though regulated markets helped to reduce multiple charges to the producer/seller, the system failed to check trade malpractices, making such markets highly restrictive, inefficient and dominated by traders. To overcome the defects of regulated markets, direct marketing by farmers was tried out with *Apni Mandis* in Punjab and Haryana, *Rythu Bazars* in Andhra Pradesh (AP) and *Uzahvar Santhaigal* in Tamil Nadu (TN). Private companies such as Cargill India, Mahindra, ITC-e Choupal and Bharti also emerged with sophisticated supply chain management systems and vertical coordination. Horticultural crops are highly seasonal, perishable and capital- and labour-intensive and thus need care in handling and transportation. Their bulk makes handling and transportation difficult, leading to huge post-harvest losses, estimated to be around Rs23,000 crore, or nearly 35% of total annual production (Confederation of Indian Industry, 1997). Their seasonal production pattern results in frequent market gluts and associated price risks, thereby forcing farmers into distress sales to pre-harvest contractors and commission agents. The price spread along the marketing channel is directly proportional to the number of market intermediaries involved (Gupta and Rathore, 1998).

Most bulky and seasonal fruits are sold through pre-harvest contractors (PHCs) in the field before harvest.

Often, the PHC takes most of the production risks due to pests and diseases and the cost of maintenance, while the margin is made through bulking (Sudha and Kruijssen, 2006). Vegetables, apart from cabbage and cauliflower, are sold through commission agents at the market, who transport the produce to markets to make their margin; traditional flowers are self-marketed at the wholesale auction centres (Subrahmanyam, 1989).

Horticulture development is currently constrained by poor marketing arrangements. The gap between prices received by farmers and those paid by consumers is large, reflecting inefficient marketing arrangements. Horticultural produce is typically collected from farmers by market agents, who sell it into organized markets under the Agricultural Produce Marketing Acts. Unfortunately, these markets are controlled by only a few traders and operate in a non-transparent way. The net result is much lower income realization for farmers. Previous studies by Bansal (1994), Bhatia (1994) and Sudha and Gajanana (2001) have focused on traditional areas and conventional crops. Studies by Raju and Rao (1993) and Ganesh *et al* (2004) focused on traditional marketing channels. Limited scientific studies on the emerging/newer institutional marketing models are available (Chengappa, 2001). Hence this study had the following objectives:

(1) to estimate the marketing costs and marketing margins of different functionaries for selected horticultural commodities under various supply chains;

(2) to analyse the price spread, marketing efficiency and farmers' share in consumers' rupees in various supply chains;

(3) to study the factors influencing marketing efficiency; and

(4) to suggest suitable strategies to enhance the marketing efficiency for horticultural commodities.

Data and methodology

The study was conducted by the National Centre for Agricultural Economics and Policy Research (NCAP) in eight states (Andhra Pradesh, Karnataka, Tamil Nadu, Punjab, Rajasthan, West Bengal, Manipur and Mizoram) between April 2009 and August 2010. In all, 29 crops were studied and for each crop 120 farmers were selected. Farm data relate to the period 2009–10. For all crops, a primary survey was conducted to elicit information on marketing channels, marketing costs, market margins, price spread, producer share in consumer rupees, constraints and opportunities. Analytical techniques were employed including functional, logistic model, rank correlation and the Delphi technique. The Shepherd formula and Acharya's Modified Marketing Efficiency formula were used for estimating marketing efficiencies. The Shepherd formula is:

$$E = (O/I)*100$$

where E is the index of marketing efficiency, O is the value added by the marketing system and I is 'cost + margin' of the market intermediaries.

Acharya's Modified Marketing Efficiency (MME) is:

$MME = FP/(MC + MM)$

where *MME* is a modified measure of marketing efficiency, *FP* is the price received by farmers, *MC* is the marketing cost and *MM* is the marketing margin.

Producer share in consumer rupees (PS) was calculated as:

$PS = (PF/PR)*100$

where *PF* is the price received by the farmer, and *PR* is the retail price (consumer price).

Price spread is the difference between the two prices: that is, the price paid by the consumer and the price received by the producer. For example, P1 – P2, where P1 is the price at one level or stage in the market and P2 is the price at another level.

Factors affecting marketing efficiency

A multiple linear regression analysis with the following variables was used to assess the effect of these variables on marketing efficiency:

$y = f(x1,…………xn)$

where *y* = marketing efficiency (%), *x*1 = marketing cost (Rs), *x*2 = marketing margin (Rs), *x*3 = transport cost (Rs), *x*4 = open market price (Rs), *x*5 = labour wages (Rs), *x*6 = controlling middlemen (1 if middlemen are controlled, 0 if not), *x*7 = volume of produce handled (kg), *x*8 = presence of cold storage facilities (1 if present, 0 if not), *x*9 = length of market channel (number of market intermediaries), *x*10 = net price received and *x*11 = nature of produce (1 if semi-perishable, 0 if perishable).

Result and discussion

Market channels

The agricultural commodities reach the final consumer through various channels, depending on season and price movement in the market. The marketing channels for different horticultural crops are presented in Table 1. The results show that the most common channel for all crops is producer–wholesaler–retailer–consumer (PWRC) (in some cases middlemen will come in place of the wholesaler), followed by producer–retailer–consumer (PRC) and producer–consumer (PC). Analysis shows that in different states for the same crop, different marketing channels are adopted because of the local situation and convenience. Farmers in most of the states adopt traditional market channels in spite of modern markets being available.

Marketing cost

The marketing cost of different crops for the most efficient channels is presented in Table 2. In AP, the total marketing cost was Rs95/q for potatoes, Rs312/q for tomatoes, Rs310/q for baby corn, Rs341/per large bag (comprising 45 mini-bags with 30 to 35 flowers each) for roses and Rs212/q for grapes. In TN, the marketing cost was Rs180/q for brinjal, Rs165/q for potatoes and Rs50/q for tapioca. In Manipur and Mizoram, the marketing cost was Rs437.10/q for tomatoes, Rs37.98/q for cabbage, Rs158.22/q for passion fruit and Rs1.02/stem for anthurium flower. In

West Bengal, the marketing cost was Rs335/q for brinjal, Rs330/q for bhindi, Rs345/1,000 for guava and Rs360/100 units [*kuri*] of garlands. In Rajasthan, the total marketing cost for tomatoes was Rs178.41/q, Rs144.66/q for carrots, Rs170.84/q for aonla and Rs278.52/q unit [*kuri*] for kinnow marketing. In Punjab, the marketing cost was Rs52.17/q for potatoes, Rs76.27/q for tomatoes, Rs69.48/q for green pea, Rs63.48/q for brinjal and Rs73.70/q for okra.

In AP and West Bengal, the marketing cost was more than in TN, Manipur and Rajasthan. But it was lower in Punjab for all crops compared with other states because of direct marketing. It varied from 7% to 24% of the consumer price in AP, 5% to 23% in West Bengal, 16% to 22% in Rajasthan, 5% to 60% in Manipur, 4% to 9% in TN and 6% to 7% in Punjab.

Marketing margin

The marketing margin of different crops for the most efficient channels is given in Table 3. In the case of AP, TN and Punjab, the marketing margins of the selected crops indicated that wholesalers were gaining a greater percentage of benefit and the most efficient channel was PWRC. In AP, the total marketing margin was calculated to be Rs732/q for potatoes, Rs1,760/q for tomatoes, Rs1,740/q for baby corn, Rs1,110/per large bag (45 mini-bags with 30 to 35 flowers each) for roses and Rs1,750/q for grapes. In TN, the marketing margin was Rs205/q for brinjal, Rs275/q for potatoes and Rs145/q for tapioca. In West Bengal, the marketing margin was Rs770/q for brinjal, Rs890/q for bhindi, Rs800/q for tomatoes, Rs675/1,000 guava and Rs2,550/100 units [*kuri*] of garlands. In Manipur and Mizoram, the marketing margin was Rs544.62/q for tomatoes, Rs232.74/q for cabbage, Rs519.77/q for passion fruit and Rs4.10/stem for anthurium flowers. In Rajasthan, it was Rs355.06/q for tomatoes, Rs412.71/q for carrot, Rs910.37/q for aonla and Rs1,047.11/q unit for kinnow. The marketing margins for tomatoes, carrots and aonla indicated that traders and commission agents made more profit. In Punjab, it was Rs140.31/q for potatoes, Rs448.31/q for tomatoes, Rs164.06/q for green pea, Rs228.07/q for brinjal and Rs285.77/q for okra.

The results show that in AP and West Bengal the marketing margin was greater for all crops, and that in Rajasthan it was greater for aonla and kinnow than in other states. It varied from 54% to 78% of the consumer price in AP, from 34% to 51% in West Bengal, from 35% to 94% in Rajasthan, from 24% to 49% in Manipur, from 10% to 13% in TN and from 15% to 40% in Punjab.

Price spread

The price spread of different crops is presented in Table 4. In AP, the price spread was Rs690/kg for potatoes, Rs900/q for tomatoes, Rs1,850/q for baby corn, Rs774/large bag (45 mini bags with 30 to 35 flowers each) for roses and Rs790/kg for grapes. In TN, the price spread was Rs180/q for brinjal, Rs190/q for potatoes and Rs50/q for tapioca. In West Bengal it was Rs955/q for brinjal, Rs850/q for bhindi, Rs1,055/q for tomatoes, Rs985/1,000 guava and Rs2,800/100 units [*kuri*] for marigolds. In Manipur, it was Rs379.92/q for tomatoes, zero for cabbage, Rs469.88/q for passion fruit and Rs5.12/stem for anthurium flowers. In Rajasthan, the price spread was Rs485.29/q for tomatoes, Rs435.23/q

Table 1. Marketing channels for horticultural crops in different states in India.

AP	*Crops*	Potato	Tomato	Baby corn	Rose	Grape
	Preferred channel	P–W–R–C	P–M–W–R–C	P–M–R–C	P–W–R–C	P–M–W–R–C
Tamil Nadu	*Crops*	Brinjal	Potato	Tapioca		
	Preferred channel	P–W–R–C	P–W–R–C	P–R–C		
West Bengal	*Crops*	Brinjal	Bhindi	Tomato	Guava	Marigold
	Preferred channel	P–F–W–R–C	P–F–W–R–C	P–F–W–CA–R–C	P–F–W–R–C	P–F–W–CA–R–C
Manipur	*Crops*	Tomato	Cabbage	Passion fruit	Anthurium flower	
	Preferred channel	P–R–C	P–W–R–C	P–W–R–C	P–R–C	
Rajasthan	*Crops*	Tomato	Carrot	Aonla	Kinnow	
	Preferred channel	P–CON–CA–R–C	P–T–CA–R–C	P–T–CA–R–C	P–C–W–R–C	
Punjab	*Crops*	Potato	Tomato	Green peas	Brinjal	Okra
	Preferred channel	P–C	P–C	P–C	P–C	P–C
Karnataka	*Crops*	Banana	Tomato			
	Preferred channel	P–HOPCOMs–C	P–HOPCOMs–C			

Note: P = producer; W = wholesaler; M = middlemen; CA = commission agent; R = retailer; C = consumer; CON = contractor; HOPCOMs = horticultural produce cooperative marketing societies.

Table 2. Marketing cost of horticultural crops in different Indian states (Rs/q).

AP	*Crop*	Potato	Tomato	Baby corn	Rose	Grape
	Efficient channel	P–W–R–C	P–R–C	P–M–R–C	P–W–R–C	P–R–C
	MC	95 (7.04)	312 (12.73)	310 (12.65)	341 (23.84)	212 (7.07)
Tamil Nadu	*Crop*	Brinjal	Potato	Tapioca		
	Efficient channel	P–C	P–C	P–C		
	MC	180 (9.09)	165 (6.90)	50 (4.54)		
West Bengal	*Crop*	Brinjal	Bhindi	Tomato	Guava	Marigold
	Efficient channel	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C
	MC	335 (18.06)	330.9 (22.76)	345 (22.19)	415 (2.09)	360 (4.93)
Manipur	*Crop*	Tomato	Cabbage	Passion fruit	Anthurium flower	
	Efficient channel	P–R–C	P–C	P–R–C	P–R–C	
	MC	437.10 (60.33)	37.98 (5.42)	158.22 (9.24)	1.02 (12.24)	
Rajasthan	*Crop*	Tomato	Carrot	Aonla	Kinnow	
	Efficient channel	P–CA–R–C	P–CA–R–C	P–CA–R–R	P–CA–R–C	
	MC	178.41 (17.56)	144.66 (22.25)	170.84 (17.68)	278.52 (15.67)	
Punjab	*Crop*	Potato	Tomato	Green peas	Brinjal	Okra
	Efficient channel	P–C	P–C	P–C	P–C	P–C
	MC	52.17 (7.45)	76.27 (6.93)	69.48 (6.32)	63.14 (7.01)	73.70 (7.37)

Note: Figures in parentheses indicate percentage share of market cost in consumer price. MC = marketing cost. See note to Table 1 for other definitions.

Table 3. Marketing margin of horticultural crops in different Indian states (Rs/quantity).

AP	*Crop*	Potato	Tomato	Baby corn	Rose	Grape
	Efficient channel	P–W–R–C	P–R–C	P–W–R–C	P–M–W–R–C	P–W–R–C
	MM	732 (54.22)	1,760 (71.02)	1,740 (71.02)	1,110 (77.62)	1,750 (58.33)
Tamil Nadu	*Crop*	Brinjal	Potato	Tapioca		
	Efficient channel	P–W–R–C	P–W–R–C	P–R–C		
	MM	205 (10.35)	275 (11.51)	145 (13.18)		
West Bengal	*Crop*	Brinjal	Bhindi	Tomato	Guava	Marigold
	Efficient channel	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C
	MM	700 (37.73)	590 (40.69)	800 (51.45)	675 (34)	2,550 (34.93)
Manipur	*Crop*	Tomato	Cabbage	Passion fruit	Anthurium flower	
	Efficient channel	P–R–C	P–W–R–C	P–W–R–C	P–R–C	
	MM	544.62 (24.72)	232.74 (33.24)	519.77 (30.35)	4.10 (49.22)	
Rajasthan	*Crop*	Tomato	Carrot	Aonla	Kinnow	
	Efficient channel	P–CA–W–R–C	P–T–CA–R–C	P–T–CA–R–C	P–C–W–R–C	
	M.M	355.06 (34.95)	412.71 (63.49)	910.37 (94.30)	1,047.11 (58.9)	
Punjab	*Crop*	Potato	Tomato	Green peas	Brinjal	Okra
	Efficient channel	P–W–R–C	P–W–R–C	P–W–R–C	P–W–R–C	P–W–R–C
	MM	140.31 (20.04)	448.31 (40.75)	164.06 (14.91)	228.07 (25.34)	285.77 (28.98)

Note: Figures in parentheses indicate percentage share of marketing margin in consumer price. MM = market margin. See note to Table 1 for other definitions.

Table 4. Price spread of horticultural crops in different Indian states (Rs/q).

AP	Crop	Potato	Tomato	Baby corn	Rose	Grape
	Price spread	690	900	1,850	774	790
Tamil Nadu	Crop	Brinjal	Potato	Tapioca		
	Price spread	180	190	50		
West Bengal	Crop	Brinjal	Bhindi	Tomato	Guava	Marigold
	Price spread	955	850	26	985	2,800
Manipur	Crop	Tomato	Cabbage	Passion fruit	Anthurium flower	
	Price spread	379.92	0	469.88	5.12	
Rajasthan	Crop	Tomato	Carrot	Aonla	Kinnow	
	Price spread	485.29	435.23	52.40	861.76	
Punjab	Crop	Potato	Tomato	Green peas	Brinjal	Okra
	Price spread	0	0	0	0	0

Table 5. Producer's share (%) in consumer's rupee for horticultural crops in different Indian states.

AP	Crop	Potato	Tomato	Baby corn	Rose	Grape
	Producer's share	48.54	63.26	24.48	45.87	73.66
Tamil Nadu	Crop	Brinjal	Potato	Tapioca		
	Producer's share	90.90	92.05	95.45		
West Bengal	Crop	Brinjal	Bhindi	Tomato	Guava	Marigold
	Producer's share	44	26	26	45	60
Manipur	Crop	Tomato	Cabbage	Passion fruit	Anthurium flower	
	Producer's share	84.73	94.57	90.76	87.75	
Rajasthan	Crop	Tomato	Carrot	Aonla	Kinnow	
	Producer's share	52.24	33.04	59.58	51.53	
Punjab	Crop	Potato	Tomato	Green peas	Brinjal	Okra
	Producer's share	100	100	100	100	100

Table 6. Marketing efficiency of crops in different Indian states for the most efficient channels.

Punjab	Crop	Potato	Tomato	Green peas	Brinjal	Okra
	ME ratio	12.42	13.42	14.83	13.25	12.56
	Efficient channel	P–C	P–C	P–C	P–C	P–C
AP	Crop	Tomato	Grapes	Baby corn	Potato	Rose
	ME ratio	1.07	1.15	0.30	0.75	0.54
	Efficient channel	P–W–R–C	P–RL–C	P–R–C	P–R–C	P–R–C
Karnataka	Crop	Banana	Tomato			
	ME ratio	2.29	0.79			
	Efficient channel	HOPCOMs	HOPCOMs			
Tamil Nadu	Crop	Potato	Brinjal	Tapioca		
	ME ratio	14.33	10.00	21.00		
	Efficient channel	P–C	P–C	P–C		
West Bengal	Crop	Tomato	Bhindi	Brinjal	Guava	Marigold
	ME ratio	0.36	0.58	0.79	0.82	1.51
	Efficient channel	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C	P–F–W–R–C
Manipur	Crop	Tomato	Cabbage	Passion fruit	Anthurium	
	ME ratio	4.80	17.43	2.64	0.83	
	Efficient channel	P–R–C	P–C	P–R–C	P–Zopar–C	
Rajasthan	Crop	Tomato	Carrot	Aonla	Kinnow	
	ME ratio	1.09	0.49	1.47	1.06	
	Efficient channel	P–CA–R–C	P–CA–R–C	P–CA–R–C	P–CA–R–C	

Note: P = producer; W = wholesaler; R = retailer; RL = reliance; F = Fariah; CA = commission agent; C = consumer; Zopar = a company that exports flowers.

Table 7. Factors affecting market efficiency of horticultural commodities in different Indian states.

	Potato		Tomato		Baby corn		Rose		Grape	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Andhra Pradesh										
Marketing cost ×1	−0.1467***	3.581	−0.0676***	6.2538	0.0005***	6.553	0.0136	1.455	−0.0043***	13.566
Marketing margin ×2	−0.2385***	38.189	−0.1041***	25.5595	−0.1136***	14.049	−0.1185***	21.126	−0.0189	1.459
Transport cost ×3	0.0005	0.467	0.0031**	1.9694	0.0006	65.535	−0.0833***	3.172	−0.0084*	1.757
Open market prices ×4	0.1218***	27.089	0.0543***	16.9106	0.0831***	8.907	0.0893***	22.901	−0.0011	0.165
West Bengal	**Brinjal**		**Bhindi**		**Tomato**		**Guava**		**Marigold**	
Marketing cost ×1	−0.0020	−1.3407	−0.0020	−1.3407	−0.0020	−1.3407	−0.002***	−2.010	−0.0018	−0.216
Open market price ×2	0.0069**	1.9846	0.0069**	1.9846	0.0069**	1.9846	0.0055***	5.500	0.0014	0.553
Manipur & Mizo	**Tomato**		**Cabbage**		**Passion fruit**		**Anthurium**			
Marketing cost ×1	−1.143***	−4.447	−1.143***	−4.447	−4.191***	−19.368	–	–		
Transport cost ×2	−0.487*	−1.774	−0.487*	−1.774	3.071***	14.808	0.030	0.295		
Volume handled ×3	0.935***	6.841	0.935*	6.841	0.176*	1.810	0.343*	1.978		
Rajasthan	**Tomato**		**Carrot**		**Aonla**		**Kinnow**			
Marketing cost ×1	−0.0016***	−3.0663	−0.0023*	−1.70483	−0.00038*	−1.565	−0.0003***	−6.4906		
Punjab	**Potato**		**Tomato**		**Green peas**		**Brinjal**		**Okra**	
Marketing cost ×1	−0.3703*	0.0102	−0.3814*	0.0088	−0.4467*	0.0103	−0.3274*	0.0175	−0.3752*	0.0132
Transport cost ×2	−0.1021*	0.0044	−0.0671*	0.0121	−0.0780*	0.0019	−0.0920*	0.0076	−0.0650*	0.0022
Labour charges ×3	−0.0609*	0.0118	−0.0607*	0.0098	−0.0325*	0.0059	−0.0655*	0.0096	−0.0465*	0.0027
Marketing margins ×4	−0.6100*	0.0073	−0.6972*	0.0148	−0.4554*	0.0236	−0.5778*	0.0122	−0.5442*	0.0054
Net price received ×5	0.9878*	0.0078	1.1036*	0.0549	0.9947*	0.0062	1.1874*	0.0293	1.0095*	0.0165

Note: R^2 varies from 0.68 to 0.91 for all commodities in different states. * 1% level of significance; ** 5% level of significance; *** +10% level of significance.

for carrots, Rs52.40/q for aonla and Rs51.53/q unit [*kuri*] for kinnow. In Punjab, the price spread was zero as the producer sold his product directly to the consumer and there were no middlemen involved.

The results showed that in Andhra Pradesh and West Bengal, apart from tomato, the price spread was high compared with TN, Manipur and Rajasthan. There was no price spread in Punjab because of direct marketing.

Producer's share in the consumer's rupee

The producer's share in the consumer's rupee for different crops is given in Table 5. In AP, it was estimated to be 48% for potatoes, 63% for tomatoes, 24% for baby corn, 46% for roses and 74% for grapes. In TN, it was 91%, 92% and 95% for brinjal, potatoes and tapioca respectively. The farmers' markets and local shanties helped producers to market directly to consumers and realize more shares. In West Bengal, the producer's share of the consumer's price was 44% for brinjal, 26% for bhindi, 26% for tomatoes, 45% for guava and 60% for marigolds. In Manipur and Mizoram, the share was 85% for tomatoes, 94% for cabbage, 91% for passion fruit and 88% for anthurium flowers. In Rajasthan, it was estimated at 52% for tomatoes, 33% for carrots, 60% for aonla and 52% for kinnow. In Punjab, the producer's share in the consumer's price was 100% as the producers sold their product directly to the consumer and there were no middlemen.

The results showed that the producer's share in the consumer's rupee was higher in Punjab, TN and Manipur than in AP, West Bengal and Rajasthan. It varied from 46% to 74% in AP, 26% to 60% in West Bengal, 33% to 60% in Rajasthan, 85% to 88% in Manipur, 91% to 95% in TN and 100% in Punjab.

Market efficiency

Marketing efficiency estimated by Acharya's modified method is presented in Table 6. The results show that for most crops the marketing efficiency was more than 1.0. In TN and Punjab, the efficiency was very high for all crops studied compared with those in AP, Karnataka, West Bengal, Manipur (except cabbage) and Rajasthan. In TN, the efficiency ratio was highest for tapioca with the supply chain of producer to consumer. In Punjab, the efficiency was high for all crops with the direct supply chain of producer to consumer. In Manipur, the efficiency ratio was high for cabbage. The study showed that the majority of the horticultural commodity markets were operating efficiently. The most efficient marketing channels were from producer to consumer. Hence, government policies should promote direct marketing models for horticultural marketing.

Factors affecting marketing efficiency

The marketing efficiency of horticultural commodities was found to be influenced by several variables (Table 7). In AP, marketing cost, marketing margin and transport cost all negatively influenced marketing efficiency; in contrast, an open market price had a positive effect. In West Bengal, marketing cost had a negative effect and open market price a positive effect. In Manipur and Mizoram, marketing and transport costs had negative effects and the volume of produce handled had a positive

effect. In Rajasthan, marketing cost had a negative effect on marketing efficiency. In Punjab, marketing cost, transport cost, labour charges and marketing margins constituted negative effects and the net price received was a positive effect.

Summary

A typical marketing channel for horticultural crops involves a number of intermediaries – such as the pre-harvest contractor, commission agent, wholesaler and retailer – operating between producer and consumer. The most common marketing channel for the majority of crops is producer–wholesaler–retailer–consumer, followed by producer–retailer–consumer and producer–consumer. Some of the states studied (Punjab and TN) practise direct marketing (producer to consumer). The study showed that the majority of horticultural commodity markets were operating efficiently, while the most efficient channel was producer–consumer. Government policies should promote direct marketing models for horticultural marketing.

The marketing efficiency of selected commodities could be significantly enhanced through interventions such as (1) scaling up the volume of produce handled through technology and institutions, (2) integrating various markets through better transport facilities to reduce costs, (3) regular information flows to farmers about prevailing wholesale market prices for commodities, (4) providing market intelligence support to farmers, particularly on when to grow crops and making suitable seed available, (5) improving basic infrastructure in the market yard, and (6) enforcing government regulations for free and fair marketing practices.

These findings have implications for agricultural policies and programmes to improve farmer-to-market linkages in Asian and Eastern European markets. Over 90% of India's exports of fresh products go to West Asian and Eastern European markets. There are now also exports of mangoes, grapes and mushrooms to the UK, the Middle East, Singapore and Hong Kong. Recent ventures by domestic and foreign investors in Indian food retail and supply chains are indicative of the need to promote equitable and more efficient agricultural markets.

Acknowledgments

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