

Efficiency of The Marketing System for Selected Horticultural Products in West Bengal

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Abstract

The horticultural industry is one of the leading industries in the international market after globalization. This paper offers a overview of horticultural product marketing with special focus on India and tries to measure the marketing efficiency of different horticultural products, like fruits, vegetables, and flowers in West Bengal, an Indian state. This study has used primary data that has been collected from the district of North Twenty-Four Parganas in West Bengal, India. It has conducted a multivariate regression analysis to investigate the determinants of marketing efficiency of horticulture products. It has considered marketing channels as a prime determinant of marketing efficiency and the results of the study also confirms this in the sense that as the number of middlemen in marketing channel increases, marketing efficiency decreases. The findings suggest that the marketing efficiency of the fruit traders is higher than flowers and vegetables sellers for the presence of less middlemen.

Keywords: *Marketing efficiency, Horticultural product, Marketing channels, Traders.*

I. Introduction

The horticultural trade contributes significantly to India's national income and generates employment opportunities. India is the second largest producer of horticultural products after China. India's agrarian economic structure has helped to boost horticulture production. Indian fruits and vegetables have a high competitive advantage in the global market. In this context, a detailed review of the marketing channels, marketing barriers, and area-based production of fruits and vegetables in India assumes significance. The consumption demand for fruits and vegetables is towering throughout the world due to the presence of vitamins and bioactive ingredients in fruits and vegetables. As Indian weather and soil are perfect for the cultivation of fruits and vegetables, India has gained benchmark progress in the case of horticultural production, and consequently, marketing these products by incorporating modern technologies, innovative marketing strategies, and other facilities that accelerate the development of this sector has become very vital (Sah et al., 2022). Marketing management is the most necessary step to illuminate the horticultural industry and that is why India has focused on value addition, technological improvement, and marketing for a few decades. Indian fruits and vegetables production and marketing sector engages many skilled and unskilled people, creating employment opportunities mainly in rural areas (Chakraborty and Sarkar, 2011). Self-sufficiency in the production of vegetables is also very important to meet the domestic demand of the population of India. Vegetable-producing activities engage many people, and those performing actors are farmers, wholesalers, retailers, brokers, commission agents, and many

others who shape the marketing of those agrarian products (Abdulai et al., 2017). The development of the horticultural industry depends significantly on the marketing of the products. Marketing is a key to success in international trade in terms of capturing bigger markets. Keeping this in mind, an enterprise marketing system should bring a feasible assortment policy. (Shaimardanovich et al., 2018).

In this context, the present study wants to accomplish the following objectives-

- First, the present study aims at measuring marketing efficiency for different types of horticulture products in India.
- Second, the study will investigate the factors leading to marketing efficiency in the horticultural products market.

Given these objectives, this study will assess the existing marketing system for horticulture products mainly in terms of measuring marketing efficiency, margins, and performances of informal vendors selling fruits, vegetables, and flowers in different product-specific markets in West Bengal. Marketing of fruits vegetables and flowers is becoming more important because the market size of these commodities is expanding as the urban population is growing up. On the other hand, the marketing issues of perishable commodities including fruits, vegetables, and flowers are also serious. Appropriate marketing strategies help to identify what is in demand and to guide that demand into channels that will enable the industry to operate at the highest possible level of productivity.

The rest of the paper is structured as follows. The next section reviews relevant empirical literature on different aspects of horticultural product marketing and their contribution to economic development. Next, it presents data and methodology applied to accomplish the objectives in detail. Thereafter, this paper presents and discusses the results of the study. Finally, it draws conclusions in relation to the research objectives of the study and discusses their implications with respect to policymaking.

II. Literature Review

Marketing plays one of the most important roles to ensure success of a business. Several empirical studies have been conducted to evaluate the impact of different marketing strategies in the horticulture sector of different countries. Ilona and Iryna (2018) identified assortment policy as an integral part of a good marketing system for a product. Assortment policy helps the market to run several marketing parameters properly. Assortment policy includes tasks like exclusion of old goods and induction of new goods, manipulation of marketing margins, and determination of up-down of product range. Industrial enterprises need new approaches to run the marketing of goods smoothly which can be addressed and solved by an effective assortment policy. Thereby, to enhance product competitiveness and sustainability, a proper assortment policy must be in place to ensure high profitability (Ilona and Iryna, 2018).

In one study Kaur (2016) investigated the horticulture industry of Malaysia as it is one of growing horticulture producing countries. To achieve goals including shortening of aging farmer population, reducing high cost, competing with other improved markets like Thailand and China, and attaining food sufficiency, the vegetable industry of Malaysia has to give high focus on its marketing (Kaur, 2016). The Malaysian vegetables producing sector needed to cut its post-harvest loss to maintain food security and profitability. This study found market efficiency and marketing margins of the Malaysian vegetable industry to be very important in

addressing these challenges (Kaur, 2016). Kaur (2016) analyzed different market chains and costs to evaluate marketing efficiency. A number of studies has also focused on vegetables seed marketing as it has a significant role in the case of agribusiness. For example, Mustafiz et al. (2021) noted that vegetable seed farming has to be improved to gain economic growth and that there should be a fair distribution of marketing margins in Bangladesh. The farmers, the most important factor in the value chain, are provided with a very little marketing margins, whereas the other actors in the value chain have high marketing margins. Because of this disparity, farmers of Bangladesh are becoming less interested in producing vegetables. The vegetable seed farming of Bangladesh needs governmental support and funding to develop it by offering a fair marketing system. The functions of the seed marketing system are palpitating due to a lack of infrastructure which must have been addressed to promote efficient marketing by inducing various policies. In one of the recent studies, Manjunatha et al. (2021) found brinjal to be one of the most important horticultural products of India with Karnataka leading the brinjal-producing states in India. Brinjal production in Kalaburagi district of Karnataka is very famous. However, the farmers fail to earn handsome income from brinjal because of the inefficient market and production infrastructure. To overcome the existing limitations in the case of brinjal production, certain measures should have been taken. In this context, Manjunatha et al. (2021) suggested that private commissions should get a license to develop the farmers market in Karnataka, and for the betterment of the brinjal production industry of Kalaburagi district of Karnataka, they advocated for major reforms in marketing structures by removing barriers such as price fluctuations, high transportation costs, and lower access to market knowledge (Manjunatha et al., 2021). In most cases, middlemen take away the major share of profits through. It is found that if farmers produce and sell their horticultural products independently, they are able to earn more profit and avoid financial loss due to unethical practices of middlemen in this sector. These middlemen indirectly exploit the small farmers through their intermediation between purchasers and sellers, and thereby, these farmers cannot achieve high profit margin from the horticultural industry (Mutwiwa, et al. 2022). On the other hand, proper infrastructure is also important for the selling of horticulture products. For example, efficient and cost effective transportation and communication systems are necessary to run the floricultural industry smoothly (Wani et al., 2010). The flower production quality, marketing channel, cost and benefits of flower production in rural area affects the marketing efficiency (Hussain et al., 2015). Horticulture has brought various scopes for profitable floricultural businesses. Many developing and poor countries like Equator and Ethiopia have earned high financial prosperity through demandable flowering plants. The floriculture sector across the globe has started to expand through various modifications in the last few decades (Mukaila,2021). India and other developing countries have an advantage expand their floriculture sector due to their high population and favourable climate that can boost their economies. Women are the primary producers of floricultural and horticultural crops. Indian rural tribal women work in the floricultural sector and contribute to the local economy. The Indian floricultural industry can witness remarkable improvement with proper infrastructure and marketing that may raise employment opportunities for women (Agoramoorthy and Hsu, 2012). Marketing efficiency is very important in the context horticulture business while marketing strategies should be designed based on product types (Agele et al. 2021). Due to lack of marketing efficiency and systematic flaws, Indian farmers who produce fresh fruits and vegetables suffer to gain high profit and often have to bear losses. Price instability, post-harvest losses, lack marketing knowledge of the farmers are some major reasons behind low profits. To overcome these problems, integration of a digital market information system is also very important (Nedumaran and Ravi 2019). In another study, Ahmed et al. (2017) analysed different marketing channels in the supply chain and looked into marketed and marketable surplus for different vegetables. They found out price spread for vegetables and marketing channels to be

highly important (Ahmad et al., 2017). In the context of the management and marketing efficiency, factors like the choice of means of production, choice of labor resources, choice of technology and organization of production, target use of depreciation, and distribution of profits have been found to be very (Mishra et al., 2014).

There is, however, lack of comprehensive studies on determining marketing efficiency different types of horticulture products in India and finding out the factors that are crucial for enhancing marketing efficiency of these products. Given this background in the context of horticulture product markets and marketing of these products, the current study wants to contribute to this gap in literature by estimating marketing efficiency of different types of horticulture products and how various factors including marketing channels influence marketing efficiency of these products in India.

III Data and Methodology-

This section elaborates on the data source used in this study and the method applied to accomplish the research objectives. The present study has used primary data and this data has been collected from West Bengal, a state located in the eastern region of India. As for methods, econometric analytical tools have been applied to analyse the data.

III.A Data Source

We have considered the North Twenty-four Parganas district in the southern part of West Bengal in India, as a study area. A multi-stage random sampling technique is used to select 250 sample traders/respondents from the three sample markets. From the list of different markets of North twenty-four parganas were collected from the District Horticultural Office, Barasat. Next researcher randomly selected three markets: Thakurnagar Flower Market, Habra Supermarket (Fruits Market), and Barasat Dainik Bazar Market (Vegetables Market). In the second stage, a list of traders is collected from the management officials of the three markets. The market survey is conducted in two phases. In the first phase general information about the structure of the market is collected from the managing official staff. In the second phase during operational hours, the market was visited and mainly the traders (farmers, wholesalers, retailers, exporters, and importers of flowers, vegetables, and fruits) were interviewed in depth based on well-structured questionnaire. From each category, the study selects respondents of traders on purely random choosing. The survey was carried out from 5th January to 12th April 2023. We have considered different vegetables Tomato, Broccoli, Bitter gourd, Raw jackfruit, Brinjal, Pumpkin, green banana, etc. The total number of vegetables is thirty. Fruits are Lemon, Grapes, Cucumber, Guava, Mango, Pomegranate, Apple, Date, Watermelon, Wood apple, Coconut, and Banana, etc. Eighteen varieties of fruits are considered. Marry gold, Hibiscus, Tube rose, Balsa mina, Rose, Lotus, Bela flower, Moti, Giant calotrope, Butterfly pea, Tuberoses stick, Gerbera Jamesoni, Mango leaves, Stone apple leave, Bermuda grass, Chrysanthemum, Jasminum Sambac, Holy Basil, Canada golden rod, Pot plant, Jarbera, and Orchid are flowers enlisted in this research. The total number of types of flowers is twenty-two. The questionnaire covers demographics, occupational various aspects of trading (such as items, variety, price, grading, shorting, etc.) marketing efficiency (marketing channel, cost, margin, etc.), and market structure.

III.B Structure of the Sample Market

There are three markets in North twenty-four Parganas, WB. The name of the flower market is Thakurnagar Flower Market (TFM), Barasat Dainik Bazar (BDB) is a vegetable market and the last one is Habra Super Market (HSM) is a fruit market.

Table 1: Salient features of sample markets

SL.NO	Particular	Name of the markets		
		TFM	BDB	HSM
1	Year of establishment	2 nd March,1970	1 st April,1882	12 th January, 1950
2	Regulated/ Unregulated	Regulated	Regulated	Regulated
3	Year of regulation	1971	1985	1960
4	No. of shops	150	300	200
5	Location of the market	Village	Town	Town
6	Distance from the national highway(km)	8	2	Adjoining
7	Distance from the nearest city (km)	5	1	1
8	Distance from the bank branch (km)	3	2	Within market
9	Coverage of market/ radius (acre)	16.78	30.14	50.63
10	Geographical area served by markets (no of villages)	45	82	61
11	No. of buyers coming to the market per day	1000	3000	1800
12	Commission (%)	3	3	3
13	Market fees (%)	2	2	2
14	Weighment (Rupiah/ kg)	5	5	5

Source: Authors compilation, From primary data.

Table 1, depicts that the BDB market is the oldest market among the three. This market was established in 1882, the TFM market was established in 1970 and the HSM market was established in 1950, just after the independence of India. All three sample markets are regulated markets. BDB and HSM markets are also city markets and located in town whereas TFM is a village market. The BDB market is not only an ancient market, it is also large in size. 3000, which is the maximum population in BDB markets, the next second largest population survived in the HSM market and last is the TFM market. The percentage of commission, market fees, and Weighment (Rupiah/ kg) in all three markets is the same which is 3, 2, and 5 respectively.

Table 2 highlights the supporting infrastructure facilities in selected markets. Supporting infrastructure of a market is classified into different aspects such as public address system, canteen and toilet facilities, internal road, parking, fencing, saving drinking water, electricity, CCTV coverage, cold storage facilities, auction platform, etc. two important factors are CCTV cover market is only TFM market and cold storage facility provides only HSM fruit market.

Table 2: Supporting infrastructure facilities in selected markets

Particulars	Markets		
	TFM	BDB	HSM
Public address system	Available	Available	Available
Canteen	Available	Not Available	Available
Toilets	Available	Available	Available
Internal roads	Available	Available	Available
Parking	Not Available	Not Available	Available
Fencing	Available	Not Available	Not Available
Adequate drinking water supply	Available	Available	Available
Electricity	Available	Available	Available
CCTV	Available	Not Available	Not Available
Cold storage facility	Not Available	Not Available	Available
Market office building	Available	Not Available	Available
Auction platform	Available	Available	Available
Information unit	Available	Available	Available

Source: Authors compilation based on primary data

III.C Methodology

In this study marketing channels and marketing efficiency of selected products are two very important concepts. We will measure marketing efficiency for different horticulture products from the point of view of producers, and will look into the impact of marketing channels while evaluating marketing efficiency of these products. Price spread is often calculated while measuring marketing efficiency (Mukaila et al. 2021). Price spread is inversely proportion to marketing efficiency. The following equation is used to calculate price spread:

$$PS = P_1 - P_2 \dots\dots\dots(1)$$

Equation (1) reveals that price spread is the difference between the two prices, i.e., the price paid by the consumer and the price received by the producer. In equation (1), PS stands for Price Spread for a particular product while P_1 is the price at one level or stage in the market

P_2 is the price at another level. The higher the value for PS, the lower is the marketing efficiency for a product for its producers.

In this study, we will also calculate producer's share in consumer's rupees for measuring marketing efficiency. It stands for the share of producers in the price paid by final consumers for a particular product. There is a positive relationship between producer's share and marketing efficiency. Greater producer's share would led to higher marketing efficiency or vice versa. It is measured in percentage. It is estimated using the following formula:

Producers' share in Consumers' Rupee = (PPF/SP) * 100

Where PPF= Purchase price from Farmers (₹), SP= Sales price to consumers Price (₹)

III.D Model Specification

The econometric model to investigate the determinants of marketing efficiency takes in to account a number of factors and takes the following representation:

$$Z_i = \alpha + \beta_1 D_Flower_i + \beta_2 D_Fruit_i + \beta_3 K_{2i} + \beta_4 K_{3i} + \beta_5 K_{4i} + \beta_6 D_Mkt.Channel2_i + \beta_7 D_Mkt.Channel3_i + \beta_8 D_Mkt.Channel4_i + u_i \quad (3)$$

From the primary sample, we get 70 different horticultural products. To analyze the above statement, we use the Multivariate Linear Regression Model (MLRM) with product specific. (Products are three types, flowers, fruits, and vegetables). Applying OLS technique and infer result with robust standard.

Observational Unit: Product

Dependent Variable: Marketing efficiency (Z_i)

Independent Variable:

In the model presented above the main independent variable of interest is the type of marketing channels that is a qualitative variable. In case of marketing channels, we consider four marketing channels where the minimum middle men exist in channel-1 and the channel-1 has been considered as the base group. Therefore, three marketing channel dummies have been incorporated in the model. On the other hand, another independent variable of interest is the type of market where we have considered three types of market in this research, namely flower market, fruit market, and vegetables market. Considering the vegetables market as the reference group, we have incorporated flower market dummy and vegetable market dummy in the model. We have additionally included a few controls variable as well such as the proportion of retailers to total vendors for a product (K_{2i}), male to female ratio (K_{3i}), and general caste to non-general caste (K_{4i}).

For the qualitative variables as mentioned above, we have use used dummy variables in the following way-

Dummy explanatory variables:

$D_Flower_i = 1$ for flowers

0 otherwise

$D_Fruit_i = 1$ for fruits

0 otherwise

Vegetables are a reference group.

On the other hand, for marketing channels, we included the followings:

$D_Mkt.Channel2_i =$ Minimum number of middlemen exist in marketing.

$D_Mkt.Channel3_i =$ Medium number of middlemen exist in marketing.

$D_{Mkt.Channel4_i}$ = Maximum number of middlemen exist in marketing.

Given this model, we have estimated it using Ordinary Least Square Method after testing for heteroskedasticity, autocorrelation and multicollinearity. The next section presents the result of the study and discusses its findings.

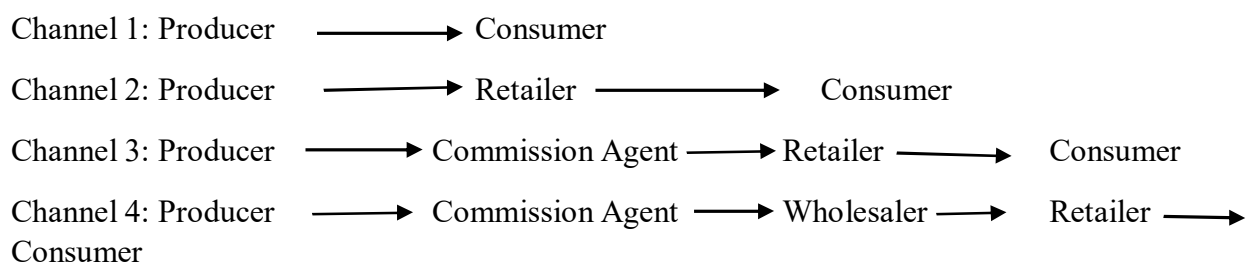
IV. Results and Findings

IV.A Marketing Channel and Marketing Efficiency-

Marketing efficiency is something that ascertains the marketing performance of products. From producer to the final customer, products move and efficient marketing confirms the process at the lowest probable cost. A lot of people are engaged in the market channel to move the commodities from the grower point to the consumer point. According to channel levels, persons involved in the marketing of commodities are categorized and it depends on product and location. By applying the methods described in the last section, the marketing efficiency of the chosen products has been calculated. The net price obtained by the farmers has been estimated by excluding transportation costs and loss from the price farmers got.

The agricultural commodities reach the final consumer through different channels, depending on season and price movement in the market. The marketing system involves different channel operators. In our study, we focused on four marketing channels for the local horticultural market refers to the chain of percipients engaged in the movement from producer to the final consumer. Four major marketing channels were identified in the study.

In the marketing channel system, channel 1 represents selling of products directly from producers to consumers; Channel 2 highlights the presence of one intermediary between the relationship between producers and consumers in the form of retailers; Channel 3 involves two intermediators between producers and consumers in the form of commission agents and retailers; while the highest number of intermediators exists in case of Channel 4. All these four types of marketing channels are presented as the followings:



In our data used in this study, only 10.58 % of traders are under marketing Channel 1, i.e., products sold from farmer/ producer to consumer, and no middleman exists in this marketing channel. 15 percent of total traders are under Channel 2, while 32.42 % are under Channel 3 and 42 % percentage are under Channel 4.

Table 3.1, 3.2 and 3.3 present price spread and marketing efficiency measured in terms of producers' share in consumers' rupee for different horticultural products in West Bengal based on the selected sample. From the tables, it can be seen that price spread and marketing efficiency varies significantly across different products. We have 22 types of flower products,

30 different varieties of vegetable products, and 18 types of fruit products. Thus, in total this study deals with 70 horticultural products including in all three markets. Table 3.1 presents price spread and marketing efficiency related information calculated based on primary data for flowers.

Table 3.1: Average Price Spread and Marketing Efficiency for flowers in West Bengal

Product Items	Unit	Sales (to consumers) Price (₹)	Purchase (from wholesalers) Price (₹)	Purchase (from Farmers) Price (₹)	Price Spread (₹)	Producer's Share in consumer's price (₹)
		SP	PPW	PPF	SP-PPF	(Marketing Efficiency)
						PPF/SP*100
Marry gold	kg	400	300	200	200	50
Hibiscus	Garland/ 10pc	200	150	100	100	50
Tube rose	Loss/kg	2400	2000	1500	900	62.5
Balsa mina	Loss/kg	85	55	30	55	35.3
Rose	100 pc	900	600	450	450	50
Lotus	100 pc	2700	2400	1800	900	75
Bela flower	loss	250	150	100	150	40
Moti	Loss/kg	500	400	350	150	70
Giant calotrope	One pc	5	2	1.5	3.5	30
Butterfly pea	Loss/kg	70	40	30	40	42.85
Tuberose stick	Single stick	18	12	10	8	55.55
Gerbera jamesoni	kg	60	45	35	25	58.33
Mango leaves	100 pc	1200	500	400	800	33.33
Stone apple leave	100kg	4000	3500	3000	1000	45
Bermuda grass	Bunch	5	4	2	3	40
Chrysanthemum	kg	55	40	30	25	54.54
Jasminum sambac	kg	55	40	32	23	58.18
Holy Basil	Bunch	6	3	2	4	33.33
Canada golden rod	kg	40	25	20	20	50
Pot plant	1000pc	5000	3000	2000	3000	40
Jarbera	Single pc	30	20	15	15	50

Orchid	Single pc	35	30	22	13	62.85
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Source: Author's calculation based on primary data

It is clear from Table 3.1 that marketing efficiency varies across different products in flower market. Lotus has highest marketing efficiency that means producers who sell lotus flower product got maximum marketing efficiency. The second highest marketing efficiency exist in Moti flower producers and third rank hold by orchid producers. Giant calotrope producers have the lowest marketing efficiency.

Table 3.2: Average Price Spread and Marketing Efficiency for vegetables in West Bengal

Product Items	Unit	Sales (to consumers) Price (₹)	Purchase (from wholesalers) Price (₹)	Purchase (from Farmers) Price (₹)	Price Spread (₹)	Producer's Share in consumer's price (₹) (Marketing Efficiency)
		SP	PPW	PPF	SP-PPF	PPF/SP*100
Brinjal	kg	80	60	50	30	62.5
Pumpkin	kg	70	55	40	30	57.14
Green banana	pie	5	3	2	3	40
Raw jackfruit	pie	15	10	7	8	46.66
Bitter gourd	kg	85	70	50	35	58.82
Broccoli	kg	40	25	15	25	37.5
Tomato	kg	50	40	35	15	70
Chili	kg	150	120	90	60	60
Taro Corm	kg	70	58	45	25	64.28
cauliflower	pie	30	20	12	18	40
Cucumber	kg	60	48	30	30	50
Bitter melon	kg	100	90	60	40	60
Papaya	kg	60	50	35	25	58.33
Drumsticks	kg	180	140	100	80	55.55
Lemon	pie	5	3	2	3	40
Carrot	kg	50	35	25	25	50
Beans	kg	100	90	70	30	70
Onion	kg	50	30	20	30	40
Ladies finger	kg	80	70	40	40	50
Potato	kg	30	20	10	20	33.33
Radish	kg	35	30	20	15	57.14
Arum- lobe	kg	60	45	30	30	50
Pea	kg	50	40	32	18	64
Capsicum	kg	60	45	30	30	50
Sweet potato	kg	85	68	55	30	64.7
spinach	bundle	120	110	90	30	75
Mint	bundle	140	120	95	45	67.85

Coriander Leaves	bundle	55	38	25	30	45.45
celery	bundle	125	105	90	35	72
cabbage	pie	30	20	10	20	33.33

Source: Author's calculation based on primary data

For vegetables as can be seen in Table 3.2, the marketing efficiency is highest for spinach at 75. On the other hand, producers' share in consumers' price seems to be the lowest for potato and cabbage at 33.33. On the other hand, among fruits, strawberry has the highest marketing efficiency at 83.32 followed by dragon fruits (see Table 3.3).

Table 3.3: Average Price Spread and Marketing Efficiency for fruits in West Bengal

Product Items	Unit	Sales (to consumers) Price (₹)	Purchase (from wholesalers) Price (₹)	Purchase (from Farmers) Price (₹)	Price Spread (₹)	Producer's Share in consumer's price (₹)
		SP	PPW	PPF	SP-PPF	(Marketing Efficiency) PPF/SP*100
lemon	pie	5	3	2	3	40
grapes	kg	80	65	45	35	56.25
cucumber	kg	30	20	8	22	26.66
guava	kg	80	65	50	30	62.5
mango	kg	70	50	30	40	42.85
pomegranate	kg	130	110	100	30	76.92
apple	kg	220	180	140	80	63.63
date	kg	480	450	300	180	62.5
water melon	kg	25	15	8	17	32
wood apple	kg	60	50	40	20	66.66
Coconut	pie	30	20	10	20	33.33
Banana	dozen	60	45	30	30	50
orange	pie	70	50	35	35	50
Dragon fruit	kg	180	160	140	40	77.76
Avocado	kg	180	155	120	60	66.65
Cherry	kg	600	500	350	250	58.33
Pineapple	pie	90	60	50	40	55.55
Strawberries	kg	420	400	350	70	83.32

Source: Author's calculation based on primary data

If we consider all 70 horticultural products in our study, strawberry has the highest marketing efficiency, while the lowest marketing efficiency can be observed for cucumbers at 26.66. The results show that marketing efficiency is relatively higher for fruits and vegetables than flowers on average. The monetary benefit coming from horticultural sector depend on various factors including marketing channels, market margins, supply chain performance, and market efficiency. Due to inconsistency in the supply chain of vegetables, the farmers cannot get a good share of the consumer rupee. Higher monetary profit may be possible only when multiple market channels are removed. The marketing obstacles in the supply chain need to be overcome to gain market effectiveness for the fruits grown in Barasat Block 1, North 24 parganas.

IV.B Impacts of different factors influencing marketing efficiency

The present paper tries to estimate the marketing efficiency of different horticultural products and how different factors influence marketing efficiency. In doing so, we have estimated a multiple linear regression model presented in the method section.

Table 4 offers descriptive statistics of all the variables which have been used estimation in our analysis.

Table 4: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	CV	VIF
ME	52.93	12.89	25	77.27	24.35	-
Retailer to total vendors	25.51	20.07	2	88.56	78.68	4.61
Gender ratio (male to female traders)	41.98	26.88	6.87	82.03	64.03	4.76
General to Non-General traders	11.82	8.64	1.01	30.56	73.09	3.12

Note: The estimation is based on 70 observations.

Source-Author's calculation based on primary data

Table 4 presents the mean, standard deviation, coefficient variation, VIF, and maximum and minimum value for the quantitative variables used for the regression model. Dispersion about the mean is higher for the Marketing Efficiency (ME). No sch multicollinearity is found for our chosen model.

Table 5: Determinants of Marketing Efficiency

Independent Variables	Regression Coefficients	P Value
Retailer to total vendors Ratio	-.075* (.043)	0.092
Male to Female Ratio	.102*** (.030)	0.001
General Caste to Non-General Caste Ratio	-.174** (.076)	0.026
Product Types (Base category: Vegetables)		
Flower (Dummy)	-.95 (1.25)	0.447
Fruit (Dummy)	-1.35 (1.38)	0.331
Types of Marketing channel (Base category: Channel 1)		
Marketing Channel 2 (Dummy)	-6.66*** (1.66)	0.000
Marketing Channel 3 (Dummy)	-15.03*** (2.29)	0.000
Marketing Channel 4 (Dummy)	-22.74*** (3.08)	0.000
Constant	67.74*** (3.99)	0.000
No. Of observation:70		
Adjusted R ² :0.92		

Note: Figures in parentheses represent robust standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels respectively,

Source-Author's calculation based on primary data

Table 5 represents the results of the regression that show the impact of different factors on marketing efficiency of different products for producers. The regression report is based on OLS results with robust standard errors (to check for heteroscedasticity) and takes care of the multicollinearity problem.

In regression results presents in Table 5 offers some interesting insights about the impact of different factors on marketing efficiency of horticultural products from the point of view of producers. The presence of more retailers in the market may reduce marketing efficiency of horticultural products as we can see the coefficient of retailers to total traders to be negative and statistically significant at 10 percent level of significance. Furthermore, it is also interesting to see that as the male to female traders' ratio increases, marketing efficiency also rises. In other words to say, in the market of a product that is more dominated by male traders than females, marketing efficiency increases. It may be implying that in horticulture product market males are more efficient in gaining higher market margins than their female counterparts. As a result, producers' share in consumers' price received on average by male traders are higher than that of females. So, the markets dominated by males tend to experience higher marketing efficiency. On the other hand, the results of the regression analysis also suggest that the horticulture product markets dominated by Non-General Caste traders tend to experience higher marketing efficiency as the coefficient for General to Non-general Caste traders ratio is negative and significant. This result is quite interesting given the presence of socio-economic inequality in India since ages where General Caste individuals who are referred to as forward castes enjoy more privileged position in the socio-economic spheres of life in India (Gupta and Kothe, 2021). However, the result is also not totally unexpected as the primary sector of the economy is still dominated by the presence of non-General Castes people in India since ages that may have translated into higher expertise in gaining higher margins. Horticulture product type, however, does not have any significant impact on marketing efficiency. It implies that marketing efficiency does significantly vary across flowers, fruits and vegetables. Nevertheless, marketing channel has appeared as a very important determinant of marketing efficiency for horticultural products. The minimum number of middlemen exists in channel 1 and the number keeps on rising in ascending order from channel 2 to channel 4, with the maximum number of middlemen being there in channel 4. We have incorporated 2 marketing channel dummies considering channel 1 as the reference group. Regression coefficient of each marketing channel dummy is negative. It implies that compared to marketing channel 1, any product associated with higher marketing channel suffers loss in marketing efficiency. These results are similar to the outcome i.e "the highest marketing efficiency was found in the producer to consumer channel" (Dastagiri, et.al. 2021). It can also be seen that for higher order marketing channel, the difference in marketing efficiency from channel 1 is also higher. Thus, it can be inferred from this results that as middle men increases within marketing channels, producers' share in consumers' price reduces that in turn leads to lower marketing efficiency.

V. Conclusions and Recommendations

The present study estimates marketing efficiency of different horticultural products and tries to find out how different factors influence marketing efficiency of these products. This study has used data collected from a primary survey conducted in horticultural markets of West Bengal. Econometrics analytical method has been applied to find out the impacts of different factors like marketing channels, type of products, etc. on the marketing efficiency of horticultural products. From the findings of the current study, it can be inferred that retailers to total vendors ratio, gender, caste, and marketing channels are very determinants of the marketing efficiency of horticulture products. Structural changes in the Indian economy have transformed how agricultural food is consumed and produced. The demand and supply of agro-processing companies have been modified, while supermarket chains have been developed and numerous intermediaries have been growing rapidly. Consequently, marketing channels are becoming more complex for agricultural products by incorporating more players. On the other hand, governments have also been taking various steps to reduce post-harvesting losses. Govt takes necessary action. The Agricultural Produce Market Committee (APMC) and the Mandi Model Act (2003) play an important role in enhancing marketing efficiency in the horticultural products market in India. Given these, the findings of the study suggest simplification of marketing channels for horticultural products as we may see that producers' share in consumers' prices declines as intermediaries increases within the marketing channel. Complicated marketing channels that lowers return to producers may demotivate them that can be translated into lower production of horticultural products over long run. A few recommendations can be offered based on this study. First, there needs to be more focus on and investment in developing more efficient horticultural production techniques to enhance production and also on offering technical training to farmers. Second, cold storage facilities need to be upgraded so that post-harvest losses get reduced. Third, there should be more public-private investments in research and development of the horticulture sector. Fourth is to promote commercial production and marketing of horticultural products. Finally there needs to be more focus on skill development related to post-harvest marketing techniques for selling fruits, vegetables, and flowers directly to consumers for local producers.

Declaration of Interest Statement: *This is to declare that there is no conflict of interest.*

Acknowledgement: We are immensely indebted to Prof. (Dr.) Ajitava Ray Chaudhury, Professor and HoD in Department of Economics and Commerce, Adamas University, and former Professor and HoD of Department of Economics, Jadavpur University, for his guidance, encouragement and support in conducting this research and drafting the paper. His valuable discussions have helped us to understand the intricacies of the topic and shape it in its present form.

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