



Research Article

ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF MAIZE IN PERAMBALUR DISTRICT, TAMIL NADU

MINITHRA R.¹, ASHOK K.R.^{*2} AND VIDHIYAVATHI A.¹

¹Department of Agricultural Economics, Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu, India

²Director, Centre for Agricultural and Rural Development Studies, Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu, India

*Corresponding Author: Email - ashok10tnau@yahoo.com

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Abstract: Maize is the most important cereal and it is mostly used as grain, feed, fodder, and industrial products. In the present study, an attempt was made to calculate the cost of cultivation and to evaluate the performance of different marketing channels and to find out constraints in marketing of maize in the study area. A multi-stage sampling method involving a combination of purposive and random sampling procedures was employed in drawing up the sample block, villages and farmers for collecting primary data. Three different marketing channels were identified in the study area. The marketing efficiency was relatively higher in channel I (2.16), followed by channel III (1.95) and channel II (1.83) because of less intermediaries in the channel. The problems such as high cost involved in different marketing functions, Lack of Market Information, Lack of transportation Facility, Lack of Storage Facility, Low Price, Irregular Payment are hindering farmers to realize their higher returns. The study suggested that a well-built strong infrastructure provision with efficient use of inputs and without marketing malpractices would show the way to an economically well-built maize economy.

Keywords: Maize, Marketing, Marketing Channel, Cost and Returns, Perambalur

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Introduction

Maize is cultivated worldwide and having wider adaptability under varied agro-climatic conditions. It is an important cereal crop after wheat and rice. In Tamil Nadu maize is sown by the end of October to mid-November. Maize is a non-traditional crop in Tamil Nadu. Farmers affected by price volatility in sugarcane, turmeric and vegetable shifting to maize cultivation. The immediate liquidity in the market, store and sell facility and high demand has prompted Tamil Nadu farmers to increase maize cultivation and also other importance of the crop lies in its wide industrial applications. Agriculture is the primary occupation of Perambalur district. Perambalur district having 1,75,739 ha of geographical area, of which 93,581 ha is cropped area. Maize and cotton are the important crops of Perambalur district which accounts 80 percent of the total cultivated area. Perambalur district stands first in maize cultivation. Maize is grown as one of the important *kharif* crop which occupied first place with an average area of about 48537 hectares among all the district of Tamil Nadu during 2016-17 and approximately about 325548 tones maize is been produced. Thus, boosting agricultural productivity has been an issue of paramount importance to enhance farmer's income. Agricultural technology helps to shifts the production function up, enabling higher quantity and better quality of output from a given set of inputs. At the prevailing prices, it turns into higher income. Though production is the initiation of the developmental process, it could provide less gain to the producers unless there exists an efficient marketing system. Agricultural marketing has its greatest and most enduring role to play in increasing food production. The most significant characteristic of a sound marketing system lies in the distribution channel which determines the paddy producers' share and profit [1]. Using the efficient channel reduces the distance between the farmer and the final consumer thereby increasing the farmers' share and their standard of living [2]. The marketing problems such as superfluous middlemen, multiplicity of market charges, malpractices, lack of market information, and inadequate marketing infrastructure such as storage, transport and processing facilities create obstacles against the use of efficient Channels.

Therefore, it is imperative to identify the efficient marketing channels and constraints to formulate suitable policies thereby increasing the production. This paper aims to (i) analyze the economics of maize production (ii) examine the existing marketing channels as well as estimate the price spread (iii) identify the constraints faced by the farmers in marketing of maize which are useful to address the marketing problems and to encourage the rice farmers to produce more.

Materials and methods

Three-stage sampling procedure was adopted for the study. In the first stage, Perambalur districts were purposively selected because Perambalur districts topped the list of districts ranked according to the total area under maize cultivation. In the second stage Perambalur and Kunnam taluks from the Perambalur district were selected based on the taluk wise area under maize cultivation. List of progressive farmers were collected from agriculture department and randomly selected then selected farmers were interviewed through pre tested schedule.

Tools for analysis

Marketing efficiency

Marketing efficiency is the ratio of the market output to market input. An increase in this ratio represents improved efficiency and decrease denotes reduced efficiency. It is the effectiveness or competence with which a market structure performs its designed function. According to Acharya and Agarwal [3] MIE is the ratio of net price received by the farmer to the total marketing cost plus total margins follows

$$MEI = FP / (MC + MM)$$

MEI= Marketing efficiency Index;

FP = Farmer Price;

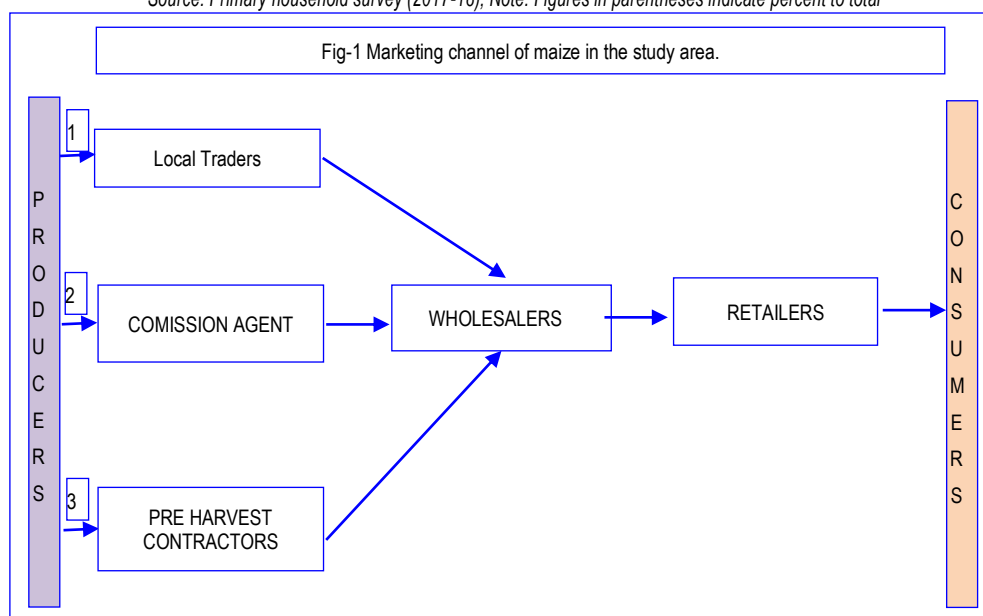
MC= Marketing cost;

MM = Marketing margin

Table-1 Cost and returns of the sample respondents

SN	Particulars	Marginal farmers		Small farmers	
		Adopters	Non-adopters	Adopters	Non-adopters
1	Operational cost				
	Human labour	11256	12864	12684	13654
	Machine & bullock labour	9878	8243	11223	9865
	Seed	1016	1874	1730	2086
	Fertilizer & manures	3713	3865	3158	4135
	Plant protection charges	350	400	560	450
	Irrigation charges	0	0	0	0
	Interest on working capital @7%	1834.91	1907.22	2054.85	2113.3
	Total operational cost	28047.91	29153.22	31409.85	32303.3
2.	Fixed cost				
	Land tax	150	150	150	150
	Rental value of own land	6000	6000	7000	6500
	Depreciation on farm buildings	1350	1250	1350	1400
	Total fixed cost	7550	7400	8500	8050
	Subtotal (1+2)	35547.91	36553.22	39909.85	40353.3
	Managerial cost @10%	3554.79	3655.322	3990.98	4035.33
3.	Total cost	39102.70	40208.54	43900.84	44388.63
4.	Yield (kg/ha)	2780	2500	3150	2800
5.	Cost of production (Rs/kg)	14.07	16.08	13.94	15.85
6.	Total revenue	52820	47500	59850	53200
7.	Net income	13717.30	7291.46	15949.17	8811.37
8.	Benefit and cost ratio	1.35	1.18	1.36	1.20

Source: Primary household survey (2017-18), Note: Figures in parentheses indicate percent to total



Constraint Analysis- Garrett's ranking technique:

To identify the major marketing constraints faced by the farmers, Garrett's ranking technique was used. According to this, the respondents were asked to assign rank to different problems by using the following formula [4]:

$$\text{Percent position} = [100(R_{ij} - 0.5)] / N_j$$

Where,

R_{ij} = rank given for i^{th} problem by j^{th} individual;

N_j = number of problems ranked by the j^{th} individual.

By referring to Garrett's table the estimated percent positions were converted into scores, thus for each factor the scores of various respondents were added and the mean score was estimated. The means thus obtained for each of the attributes were arranged in a descending order.

Results and discussion

Cost and returns

For decision making process in any farm business analysis, cost structure composition is crucial. The cost structure include variable cost, fixed cost, cost ratios etc. The analysis of cost and return indicates profitability of the farm

business. The concept of cost and return used in the present discussion are the same as generally adopted in the farm management studies conducted in the country. This section provides the cost structure prevailing in the study area. The costs were determined keeping into account the inputs that the farmers in the study area use in the maize cultivation. The cost and returns in crop cultivation by adopters and non-adopters have been computed and presented in the [Table-1]. Maize is grown as one of the major crop in Perambalur district by various categories of farmer's mainly by small and marginal farmers. Marginal farmers adopt various technologies for cultivating maize. The result in the [Table-1] would show cost and returns from maize cultivation. Among marginal farmers in Perambalur district maize yield was higher for technology adopters (2780 kg/ha) when compared to non-adopters (2500 kg/ha). The total cost of cultivation per hectare was Rs.39102.07 and Rs.40208.54 for adopter and non-adopters respectively. Total cost of cultivation for per kg based on total cost was Rs. 14.07 for adopter and Rs.16.08 for Non -adopter of technology. The net income realized by adopter is Rs.13717.30 and Rs.7291.46 by non-adopters. The share of human labour was highest in the total cost accounted for 28.78 percent for adopters 31.99 percent for non-adopters followed by machine and animal labour cost which accounted for 25.26 percent for adopters and 22.50 percent for non-adopters.

Similarly, small farmers also grow maize crop. Maize yield was higher for technology adopters (3150 kg/ha) when compared to non-adopters (2800 kg/ha), the total cost of cultivation per hectare was Rs.43900.84 and Rs.44388.63 for adopter and non-adopters respectively. Total cost of cultivation for per kg based on total cost was Rs. 13.94 for adopter and Rs.15.85 for Non –adopter of technology. The net income realized by adopter is Rs.13717.30 and Rs.7291.46 by non-adopters. The share of human labour was highest in the total cost accounted for 28.89 percent for adopters 30.76 percent for non-adopters followed by machine and animal labour cost which accounted for 25.56 percent for adopters and 22.22 percent for non-adopters. It was also found that Benefit Cost Ratio is higher for farmers adopting improve technology rather than non-adopters which can be further inferred that adopting technology improves production as well as farmers income by reducing the cos of cultivation.

Marketing strategy

The maize being not a staple food in study area it could not be marketed like other traditional crops grown in that area. Maize is consumed very little by producer's family so most of maize produced was marketed.

Table-2 Percentage quantity of marketing of maize by sample farms

SN	Marketable surplus	Maize
1	100% of harvested produce	42(57.53)
2	99-75% of harvested produce	13(17.81)
3	74-55 % of harvested produce	10(13.70)
4	54-25 % of harvested produce	8(10.96)
5	Upto 25% of harvested produce	0(0.00)
	Total	73(100.00)

Source: Primary household survey (2017-18), Note: Figures in parentheses indicate percent to total

From the [Table-2] it is obvious that 57.53 percent of maize growers marketed cent percent of their produce immediately after harvest, while 17.81 percent of farmer marketed 76 to 99 percent of their harvested produce, 13.70 percent of farmers marketed 55 to 75 percent of their produce and remaining 10.96 percent farmers marketed 25 to 54 percent of their harvested produce. So, it was found that majority of the maize growers (57.53 percent) marketed their entire harvested produce.

Marketing channels for maize

To understand the marketing practices and problems different marketing channels through which products marketed were traced out. The following marketing channels were identified in the study area. It was observed from that supply chain of maize involves different types of intermediaries like Local traders, commission agent wholesalers and retailers. The Maize growers, particularly small scale producers, used to sell their products to the local traders. The reason quoted is significant distance between the farm and market centres. Small farmers used to sell their produce to the local traders as they couldn't bear the transport cost in transporting their produce individually to distant place. All the local traders used to go to the farmer's field and purchase the commodity bearing the transportation cost. About 80 percent of the traders had tie up arrangements with their buyers and sellers on quantity, variety and handling and transport expenses. The local traders sold the produce to the commission agents or wholesalers. Of these channels, the first two were important since more than 50 percent of farmers marketed their produce.

Marketing Cost and price spread analysis

Next to identifying the marketing channels existing in the study area, marketing cost and returns for the intermediaries functioning in channels were calculated. It could be observed from the table that in marketing channel I, the net price received by the farmers in the existing channel was Rs.1900/qt, which constituted about 78.84 percent of the consumer's price. The marketing cost incurred by local traders which constituted about 6.64 percent followed by wholesaler with 8.71 percent respectively. The marketing margin was highest for wholesaler which constituted about 12.03 percent, followed by local traders' 9.13 percent. The difference between net price received by the farmer and price paid by the

consumer was Rs.510 /qt and the price spread were 21.16 percent.

Table-3 Price Spread Analysis for Marketing channel -I (Rs/qt) –maize

SN	Particulars of cost	Market channel-I Amount (Rs.)	In %
1	Farmer		
	Price received	1900	78.84
	Loading &unloading	0	0.00
	Transportation cost	0	0.00
	Marketing cost	0	0.00
	Net price received	1900	78.84
2	Local Traders		
	Purchase price	1900	78.84
	Loading &unloading	60	2.49
	Transportation cost	80	3.32
	Miscellaneous charges	20	0.83
	Marketing cost	160	6.64
	Marketing margin	220	9.13
	Sale price	2120	87.97
3	Wholesaler		
	Purchase price	2120	87.97
	Loading and unloading	80	3.32
	Transportation cost	100	4.15
	Miscellaneous charges	30	1.24
	Marketing cost	210	8.71
	Marketing margin	290	12.03
	Sale price	2410	100.00
4	Consumer		
	Purchase price	2410	100.00
5	Price spread	510	21.16

In marketing channel II, the net price received by the farmers in the existing channel was Rs.1980 /qt, which constituted about 78.07 percent of the consumer's price. The marketing cost which includes the commission charges for the commission agents was highest for the wholesaler, which constituted about 9.29 percent.

Table-4 Price Spread Analysis for Marketing channel -II (Rs/qt) –maize

SN	Particulars of cost	Existing channel Amount (Rs.)	In %
1	Farmer		
	Price received	2100	78.07
	Loading &unloading	40	1.49
	Transportation cost	80	2.97
	Marketing cost	120	4.46
	Net price received	1980	73.61
2	Wholesalers		
	Purchase price	2100	78.07
	Loading &unloading	40	1.49
	Transportation cost	100	3.72
	Miscellaneous charges	30	1.12
	Marketing cost*	250	9.29
	Marketing margin	350	13.01
	Sale price	2450	91.08
3	Miller/retailer		
	Purchase price	2450	91.08
	Loading and unloading charges	30	1.12
	Transportation cost	60	2.23
	Miscellaneous charges	30	1.12
	Marketing cost	120	4.46
	Marketing margin	240	8.92
	Sale price	2690	100.00
4	Consumer		
	Purchase price	2690	100.00
5	Price spread	590	21.93

The total marketing margin was highest for wholesaler which constituted about 13.01 percent, followed by marketing margin of the retailer 8.92 percent. The difference between net price received by the farmer and price paid by the consumer was Rs.590 /qt and the price spread were 21.93 percent. It could be observed from the table that in marketing channel III the net price received by the farmers was Rs.2300 /qt, which constituted about 76.76 percent of the consumer's price. The marketing cost incurred by local traders was highest, which constituted about 6.29 percent. The total marketing margin was highest for wholesaler which constituted about 8.28 percent, followed by marketing margin of the contractors 7.95 percent.

The difference between net price received by the farmer and price paid by the consumer was Rs.720 /qt and the price spread were 23.84 percent. Farmers due to distress sale their produce to pre harvest contractor without considering the market price information in market.

Table- 5 Price Spread Analysis for marketing channel -III (Rs/qt) –maize

SN	Particulars of cost	Marketing channel Amount (Rs./qt)	In %
1	Farmer		
	Gross price received	2300	76.16
	Loading & unloading charges	0	0
	Transportation cost	0	0
	Miscellaneous charges	0	0
	Marketing cost	0	0
	Net Price received by farmer	2300	76.16
2	Pre-harvest contractor		
	Purchase price	2300	76.16
	Loading and unloading charges	50	1.66
	Transportation cost	120	3.97
	Miscellaneous charges	20	0.66
	Marketing cost	190	6.29
	Marketing margin	240	7.95
	Sale price	2540	84.11
3	Wholesaler		
	Purchase price	2540	84.11
	Loading and unloading charges	30	0.99
	Transportation cost	80	2.65
	Miscellaneous charges	30	0.99
	Marketing cost	140	4.64
	Marketing margin	250	8.28
	Sale price	2790	92.38
4	Retailer		
	Purchase price	2790	92.38
	Loading and unloading charges	30	0.99
	Transportation cost	80	2.65
	Miscellaneous charges	20	0.66
	Marketing cost	130	4.3
	Marketing margin	230	7.62
	Sale price	3020	100
5	Consumers		
	Purchase price	3020	100
6	Price spread	720	23.84

Marketing efficiency

Marketing is said to be efficient if the total marketing margins are higher per unit of marketing cost. The marketing efficiency in different marketing channels for maize was estimated using Acharya's approach is presented in the below table.

Table-6 Estimation of marketing efficiency in various channels-maize

Marketing channel	Price received by farmer(Rs)	MC+MM (Rs)	Marketing efficiency
I	1900	880	2.16
II	1980	1080	1.83
III	2300	1180	1.95

Source: Primary household survey (2017-18)

From Table it could be seen that the marketing efficiency was relatively higher in channel I (2.16), followed by channel III (1.95) and channel II (1.83) because of less intermediaries in the channel.

Table-5 Marketing constraints faced by the farmers

SN	Constraints in marketing	Score	Rank
1	Lack of Market Information	7.4	4
2	Lack of transportation Facility	19.6	3
3	Lack of Storage Facility	6.0	5
4	Low Price	35.6	1
5	Irregular Payment	31.4	2

Constraints in Marketing of Maize Farmers

All problems perceived by farmers were analyzed by Garrett ranking technique. 35.6 Score was gone for low market price of maize which fetched less profit to the farmer in the marketing. Irregular payment for maize by purchaser accounted about 31.4 of the score which got second next problem of marketing faced by

maize producer. About 19.6 scoring complained was lack of transportation facility. Other problems are lack of market information, lack of storage facility which scores about 7.4 and 6.0 [5, 6].

Conclusion

Farmers are diverting to maize cultivation from rice and wheat. The reasons are low cost of production, higher profitability, and higher demand in poultry industry. The farmers are allocating a major share of their total cultivable land to maize. But it was frequently discussed by the farmers and the policy makers that the farmers are not receiving expected price due to various reasons such as higher marketing cost, large number of intermediaries, lack of information, seasonal price variability, high price difference between maximum and minimum price etc. In channel I, the farmers could secure more prices for selling i.e. the share of producers' was the highest which was expected by every farmer. Due to the presence of minimum number of intermediaries, maize moved through a short channel which facilitated to reduce marketing cost. Based on the study the following recommendations can be made Transportation and communication system should be developed which can contribute greatly to reduce the transportation cost and increase overall efficiency of the maize marketing system, Credit facilities should be made available to the maize farmers from different formal and informal financial institutions. Farmers may be suggested to form Cooperative. Market information should be provided to the farmers regularly.

Application of research: Research can be applied in the field of production and marketing of maize to enhance the farmers income

Research Category: Farm Management and Agricultural Economics

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Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Perambalur / 230 samples were collected

Cultivar / Variety name: Maize

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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