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Determinants of Tomato Seed Purchasing Decisions among Coimbatore Farmers

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Tomato (Lycopersicon esculentum) typically constitutes an essential part of the daily diet and it has great demand round the year. The commercial value of tomato in terms of direct consumption, processing as well as trade has risen substantially in recent years. The top ten major tomato producing countries are China, India, USA, Turkey, Italy, Egypt, Spain, Iran, Brazil and Mexico of the world area and production. China ranks first in an area under tomato 10 lakh hectares with annual production of 50 million tonnes fallowed by India ranks second in an area under 8.8 lakh hectare with annual production of 18 million tonnes. Among the tomato cultivation districts, Coimbatore district was purposively selected, which accounted tomato area of 3033 ha. The collected data were analysed with reference to the objectives set forth for the study. The analytical techniques employed in this study are explained by Conventional (Percentage) analysis, Factor

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analysis, Marko chain analysis, Garrett ranking technique, Multi-dimensional scaling technique. Our study revealed that, nearly 52% of the sample farmers learned about hybrid tomato seeds via dealers, and the majority of the farmers (65%) are aware that hybrid tomato seeds exist in the Coimbatore district. Retail stores make up the majority of places to shop (76 percent). Approximately 60% of farmers favor making purchases with cash. Family members account for 71% of the information that influences a decision to purchase tomato seeds. The purchase of distinct firm seeds is influenced by several key elements, including recommendations from other farmers, prior experience, retailer insistence, advertising campaigns, and demonstrations.

Keywords: Hybrid tomato; tomato seeds; seed industry; structural change.

1. INTRODUCTION

Indian agriculture has come a long way since the Green Revolution of the late 1960s. India's GDP and food grain production in the country have risen faster than the growth in population over the last 50 years. But now the situation is becoming alarming as the agricultural growth was 1.9 per cent in 2013-14 [1]. The enormity of the problem is indicated by the fact that the during the 10-year period 1997-98 to 2006-07, country's food grain production has grown at an average annual growth rate of only 1%. Interestingly, while the nation rejoices at the recovery in food grain production at 263 million tons in 2013-14, the fact remains that the production has increased by of 29 million tons over the production of 233.88 million tons in 2008-09. The total demand estimate for food grains will touch 280 million tons by 2020. To achieve the future projected amount of production, a growth rate of 4 per cent in agricultural sector has to be maintained over next 15 years [2]. It is very important that the economic growth fosters social equity. For this the agricultural growth should be in the forefront of country's GDP growth [3].

Therefore, the focus of the Second Green Revolution or the so called "Evergreen Revolution" is on ensuring food and nutritional security to the Indian populace especially below poverty line population which constitutes around 28 per cent of the Indian population. With practically no more additional land for farming and also with some of degraded agricultural land, this miracle is not easy to achieve. Science and technology will play a big role to meet the future food grain demand. Hence a Second Green Revolution that maximizes productivity, and generates income and employment opportunities for the rural population is crucial for the country. Among the critical farm inputs for increased agricultural production, seeds holds the key for increased productivity. Coupled with biotechnology and other crop improvement technologies, seeds offer tremendous opportunity for improving the productivity of Indian Agriculture [4].

Indian seed Industry is one of the most mature and vibrant one in the world, currently occupying the 6th position with nearly Rs 13500 crore turnover. During the past 5 years the Indian Seed Industry has been growing at a CAGR (Compounded Annual Growth Rate) of 12 per cent compared to global growth rate of 6-7 per cent. In value terms the major growth has come from the increased adoption of Bt cotton and hybrid vegetables [5]. The volume growth has mainly come through increased Seed Replacement Rate in crops like Paddy and Wheat and also rising income and profitability. Indian seed industry is undergoing wide range of transformation including increased role of private seed companies, entry of MNCs, joint ventures of Indian companies with multinational seed companies and consolidations. New biotech traits will further boost the seed market value [6].

With the technological advancement and the modernization of Indian agriculture, the agriculture inputs firms were gaining strategies importance in the country. The strategy and product development of any business was based on the demand and the market potential for their products. To realize the potential, the input firms may have adequate information on the farmer's preference, awareness, acceptance and buying behavior of their products. This study will give information on buying behavior of farmers for the tomato seeds. The results of the study will give feedback to the seed firms on the popularity of their products and the effectiveness of their promotional activities [7,8,9].

2. MATERIALS AND METHODS

2.1 Selection of Study Area

The total area covered by tomato in Tamil Nadu is 0.25 lakh ha during 2013-14, major tomato

producing districts are Coimbatore, Dharmapuri, Erode, Salem, Krishnagiri, Theni, Dindigal and Vellore. Among the eight districts, Coimbatore district was purposively selected, which accounted tomato area of 3033 ha.

2.2 Sampling Design

A multi stage sampling process was resorted to collect the data. Based on the maximum area under tomato, two blocks were selected from the Coimbatore district (first stage) and six villages were selected from each block (second stage). From each village 10 farmers were selected at random (third stage), and the total sample size was 120 farmers. The list of selected blocks, villages and selection of farmers are presented Table 1.

2.3 Method of Data Collection

The data required for the present study were collected using well-structured and pre-tested interview schedule. The data required for the study were collected by personally interview method [10]. The data collected from the sample farmers included general characters like age, educational status, family type, experience in farming and tomato farming, land particulars, cropping pattern, different brand seeds used, and some of attributes farmers are looking in a hybrid tomato is buying behavior, factors influencing the purchase of hybrid, farmers preference brand switching behavior and constraints faced by farmers for growing quality tomato.

Apart from the primary data, information from secondary sources like government institutes, government publications, other publication and annual reports were also collected.

2.4 Tools of Analysis

The collected data were analyzed with reference to the objectives set forth for the study. The analytical techniques employed in this study are explained [11,12].

1. Conventional (Percentage) analysis
2. Factor analysis
3. Marko chain analysis
4. Garrett ranking technique
5. Multi-dimensional scaling technique

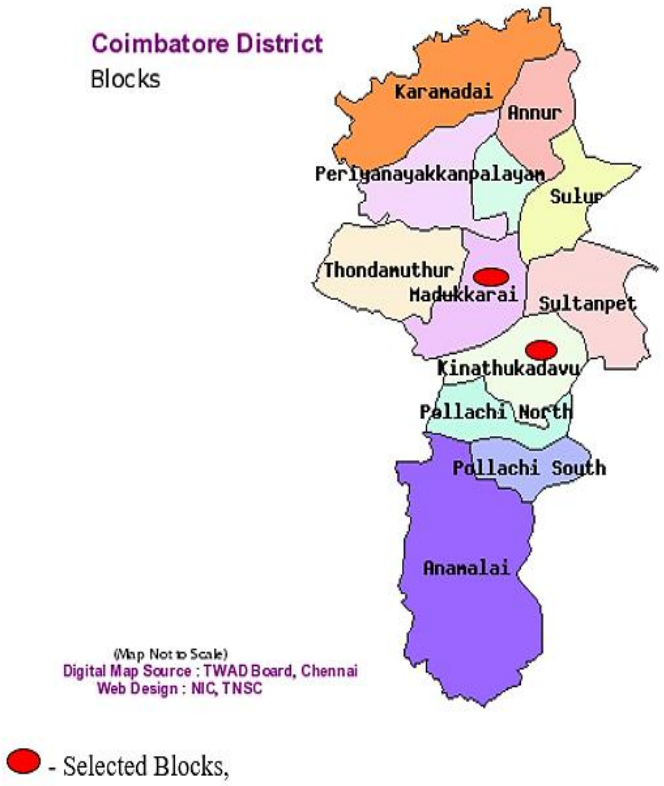

Fig. 1. Coimbatore district map showing the eleven blocks

Table 1. List of selected villages and No. of respondents in selected district

S.No	District	Blocks	Villages	No of Farmers
1.	Coimbatore	Kinathukadavu	Muthur	10
			Govindhapuram	10
			Solanur	10
			Varadanur	10
			Kovilpalayam	10
			Devarayapuram	10
			Nachippalayam	10
		Madhukarai	Pichanur	10
			Arisipalayam	10
			Seerapalayam	10
			vallukuparai	10
			Maleripalayam	10
Total				**120**

3. RESULTS AND DISCUSSION

3.1 Buying Behaviour

3.1.1 Awareness among farmers towards hybrid tomato seeds

It could be inferred from Table 2 that, most of the sample farmers 65 per cent has Awareness towards Hybrid tomato seeds and 35 per cent of sample farmers are not aware towards Hybrid tomato seeds.

3.1.2 Source of information for awareness of hybrid seeds among farmers

The farmers were asked to express their source of information of hybrid tomato seeds regarding the awareness level provided by hybrid tomato seed companies. The major choices discussed with farmers were dealers, peer group and media. Their responses were measured through conventional analysis and the results are presented in Table 3.

3.1.3 Place for purchase of tomato seeds

Place of purchase plays a vital role in selection of good seeds. It could be observed from Table 3 that retail outlets accounted for 76.06 per cent of the purchase place among farmers followed by the agriculture centres contributed 23.03 per cent. Thus, the retail outlets contributed for major place for purchase of tomato seeds.

Table 2. Awareness among farmers towards hybrid tomato seeds (ha)

District	Awareness		Total No. of Farmers
	Aware	Not aware	
Coimbatore	78 (65.00)	42 (35.00)	120 (100)

Table 3. Source of information

District	Source of information			Total No. of Farmers
	Dealers	Peer group	Media	
Coimbatore	63 (52.05)	26 (21.06)	31 (25.08)	120 (100.00)

Table 4. Place for purchase

District	Place of purchase		Total No. of Farmers
	Retail outlets	Agri centers	
Coimbatore	92 (76.06)	28 (23.03)	120 (100)

Table 5. Mode of purchase

District	Mode of purchase		Total No. of Farmers
	Cash	Credit	
Coimbatore	73 (60.08)	47 (39.16)	120 (100)

Table 6. Source of information

District	Who influence to buy tomato seeds			Total No. of Famers
	Relatives	Shopkeepers	Friends	
Coimbatore	86 (71.06)	27 (22.05)	7 (5.83)	120 (100)

Table 7. Farmers preference towards particular brand of tomato seeds in Coimbatore district

Company	Farmers Preference						
	Brand	Yield	Stress Tolerance	Easy Availability	Credit	Price	Company Wise Mean Score
Syngenta	4.76	4.32	3.95	4.42	2.30	2.08	4.36
Rasi	4.18	3.95	3.96	4.26	2.67	1.98	4.20
Mahyco	4.70	3.83	3.85	4.50	2.21	2.08	4.23
Namdhari	3.81	3.39	4.51	3.59	1.98	2.44	3.94
Indo American	4.25	3.78	4.28	3.78	2.34	2.03	4.09
Attribute Wise Mean Score	4.34	3.85	4.11	4.11	2.32	2.12	-

3.1.4 Mode of purchase of tomato seeds

It could be inferred from Table 4 that, most of the sample farmers 60.08 per cent used to purchase through cash and only 39.16 per cent of sample farmers used to purchase through credit.

3.1.5 Source of information to influence to buy tomato seeds

Here major choices discussed with farmers were relatives, shopkeeper and friends. Their responses were measured through conventional analysis and the results are presented in Table 5. Majority of the sample farmers got information through Relatives 71.06 percentage fallowed by shop keepers 22.05 percentage and through friends 5.83 percentage.

3.1.6 Farmers preference towards particular brand of hybrid tomato seeds

The farmers were asked to express their preference towards hybrid tomato seeds provided by hybrid companies. The major attributes discussed with farmers were brand, yield, stress tolerance, easy availability, credit, and price of seeds. Their response was assessed and the results are presented in Table 7.

It could be inferred from the Table 8 that attribute wise mean score indicated that farmers in Coimbatore district preferred Hybrid tomato seeds with brand (4.14) followed by easy availability (4.05), and stress tolerance (3.88). The farmers expressed satisfaction with regard to yield (3.69), credit (2.32) and price (2.17) respectively.

Company wise mean score indicated that farmers highly preferred Syngenta (3.63), followed by Mahyco (3.53) and Rasi (3.50) and while just satisfied with regard to Indo American (3.41) and Namdhari (3.29).

3.2 Brand Switching Behavior of Farmers in Tomato seeds

Markov Chain analyses were used to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable (Dent, 1967). In this study, the brand switching behaviors of tomato seed farmers were analyzed using the Markov Chain model. This analysis involves developing a

Transitional Probability Matrix 'P' whose elements, P_{ij} indicate the probability of brand switching from i^{th} brand to j^{th} brand over a time. The diagonal elements P_{ij} where i = j measures probability of the brand to retain its loyalty position or the loyalty of the farmers to the particular branded tomato seed in Coimbatore district. In this analysis, brand switching were treated as random process with the selected brands of farmers purchase assuming that the average purchase of tomato seed in the Coimbatore district in any year depends only on the purchase in the previous year and this dependence were same among all the years.

Markov analyses were employed to assess the brand switching behavior of farmers of the selected seed Company in Coimbatore district. The 5 years purchase details (2010-2014) of the selected brands were used to estimate the transitional probabilities. The major seed firms selling tomato seeds in Coimbatore district are Syngenta, Rasi, Mahyco, Namdhari, and Indo American. The Transitional Probability Matrix is presented in Table 7. which indicates a broad indication of brand switching pattern of tomato seeds of the selected firms in the districts. The row elements in the transitional probability matrix provide the information on the extent of loss in brand preference on account of competing tomato seed brands. The column elements indicate the probability of gains in volume of purchase from other competing brands by the specific seed company and the diagonal elements indicate probability of retention of the previous brands of the respective tomato seed company.

It is inferred from Table 7. that Syngenta were the most stable brand among the major tomato seeds brands in the Coimbatore district as reflected by its probability of retention of 50.29 per cent of the previous share. This is plausible as the Syngenta and other firms promptly undertaken the major three promotional programs, advertisement campaign, retailers meeting and posters and banners. The most unstable brands among the tomato seeds are Mahyco, Namdhari, and Indo American care with zero per cent retention. Next to Syngenta, other brands and Rasi retained 21.53 per cent and 61 per cent of previous share in the Coimbatore districts respectively. In terms of gains Syngenta brand gained 100 per cent of Indo American previous market share and simultaneously lost 43 per cent of its previous share to Rasi. Similarly other firms gained 75 per cent from Mahyco and lost 29 and 10 per cent to Namdhari and Mahyco respectively [13].

3.2.1 Factors influencing the farmers of purchasing hybrid tomato seeds

Farmers were asked about the factors which are influenced by them in purchasing of hybrid tomato seeds in Coimbatore district and the results are presented in Table 9.

It could be inferred from the Table 9 that factors influencing to purchase Syngenta seeds are reference from fellow farmer (35.00 per cent), past experience (22.50 per cent), and insistence of retailers (22.50 per cent). Rasi seeds the farmers are influenced by reference from fellow farmers (30.00 per cent), past experience (30.00 per cent), and insistence of the retailers (15.00 per cent). Mahyco influenced by following factors such as insistence of retailers (20.00 per cent), reference from fellow farmer (30.00 per cent) and past experience (15.00 per cent). In case of Namdhari seeds farmers are influenced by advertisement campaign (35.00 per cent), reference from fellow farmers (20.00 per cent), and insistence of the retailers (20.00 per cent). Finally, Indo American seeds farmers are influenced by advertisement campaign (30.00 per cent), insistence of the retailers (25.00 per cent) and reference from fellow farmers (15.00 per cent).

Table 8. Transitional probability matrix for tomato seeds purchase in Coimbatore district

Firms	Coimbatore District					
	Syngenta	**Rasi**	**Mahyco**	**Namdhari**	**Indo American**	**Others**
Syngenta	**0.5029**	0.4319	0.0000	0.0000	0.0652	0.0000
Rasi	0.1928	**0.2153**	0.0638	0.4709	0.0572	0.0000
Mahyco	0.0000	0.2447	**0.0000**	0.0000	0.0000	0.7553
Namdhari	0.0000	0.0000	1.0000	**0.0000**	0.0000	0.0000
IndoAmerican	1.0000	0.0000	0.0000	0.0000	**0.0000**	0.0000
Others	0.0000	0.0000	0.0974	0.2926	0.0000	**0.6100**

Table 9. Factors influencing purchase of hybrid tomato among farmers in Coimbatore district

Company	Factors Influencing Purchase of Hybrid Tomato among Farmers in Coimbatore District					
	Past Experience	Reference From Fellow Farmer	Insistence of the Retailer	Advertisement Campaign	Demonstration	Number of Farmers
Syngenta	9 (22.50)	14 (35.00)	9 (22.50)	5 (12.50)	3 (07.50)	40
Rasi,pio	6 (30.00)	6 (30.00)	3 (15.00)	3 (15.00)	2 (10.00)	20
Mahyco	6 (30.00)	6 (30.00)	4 (20.00)	2 (10.00)	2 (10.00)	20
Namdhari	2 (10.00)	4 (20.00)	4 (20.00)	7 (35.00)	3 (15.00)	20
Indo American	3 (15.00)	3 (15.00)	5 (25.00)	6 (30.00)	3 (15.00)	20

(Figures in the parenthesis indicate percentage to number of farmers in each row)

4. CONCLUSION

Most of the sample farmers (65 percent) have awareness among hybrid tomato seeds in Coimbatore district and nearly 52 percent of the farmers got information to know about hybrid tomato seeds through dealers. Retail outlets (76 percent) constitute the major place for purchase. About 60 percent of farmers prefer mode of purchase through cash. Relatives (71 percent are the major source of information to influence to buy tomato seeds. Major factors influence the purchasing of different firm seeds are reference from fellow farmer, past experience, insistence of the retailer, advertisement campaign and demonstrations, respectively. However the order of rank of these attributes varied from different firms seeds. In these Syngenta, Rasi, Mahyco seeds farmers are highly influenced by fellow farmers and past experience. Advertisement campaign was found to be the major factor influencing purchase of Namdhari and Indo American.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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