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Factors influencing the preference for specific pesticides and product loyalty among the tomato farmers of Anantapur district in Andhra Pradesh

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Abstract
Tomato is an important commercial and dietary vegetable and is a protective supplementary food. Its' short duration and higher yield potential is important from economic point of view. Andhra Pradesh state stood first in total area under cultivation and Anantapur district contributed to 33 per cent of the state's total area. It is important that the farmers use right amount of pesticide that save the excess use and reduce their investment. Most of the tomato growing farmers are small and medium, understanding their preferences for pesticides and the factors that influenced their loyalty to a particular product is important. Simple random sampling technique was used to select 90 farmers. Descriptive and factor analysis was used to identify the factors that influenced the preference of farmers towards a particular company's products. Tomato farmers preferred the pesticide product from DuPont Company and there was a high degree of product loyalty. Four factors namely promotional attributes, flexibility, innovativeness and product acceptance were found to be most important factors that influenced them. Product loyalty was established by the immediate effectiveness of the pesticide followed by aspects like product quality, communication strategies adopted, discounts offered, competitive pricing, value added services extended and introduction of new product and package.

Keywords: Farmers' preference, product loyalty, pesticides, usage pattern

Introduction
Tomato is the world's largest vegetable crop and known as protective food because of its special nutritive value and its wide spread production. Tomato is one of the most important vegetable crops cultivated for its fleshy fruits. Tomato is considered as important commercial and dietary vegetable crop and is a protective supplementary food. As it is short duration crop and gives high yield, it is important from economic point of view and hence area under its cultivation is increasing day by day. Tomato is also rich source of minerals, vitamins and organic acid, essential amino acids and dietary fibers.

Andhra Pradesh state stood first in terms of total area under cultivation (76.50 %) followed by Bihar (46.00 %) and Chhattisgarh (29.20 %). Andhra Pradesh stood first in production (14.53 %) followed by Karnataka (12.70%) and Orissa (11.21%). During 2015-16, Anantapur district contributed to 33 per cent of the state's total Area under tomato. However, it accounted for 24.78 per cent of state's total tomato Production. The average productivity of tomato in Andhra Pradesh is 19 tonnes/ha (www.nhb.gov.in).

Being a very important crop for the farmers in terms of livelihood, it is important that the farmers use right amount of inputs and not only save the excess use but also the investment made on raising the crop. As most of the tomato growing farmers are small and medium, understanding their preferences and the factors that influence their loyalty to a particular product will be helpful not only from the point of view of the manufacturer but also the regulators in bringing out suitable policies. Hence this study aimed at understanding these two important aspects of pesticide use in tomato.

Methods and Tools Used
The second largest area under tomato is prevalent in Anantapur district of Andhra Pradesh that was purposively selected for the study. Simple random sampling technique was used for selection of thirty tomato farmers from three taluks and totally 90 farmers growing tomato were selected for the survey. The information was collected from the sample respondents during the month of March and April 2017. Descriptive analysis was used to analyze some of the responses of the farmers.

Factor analysis was employed to identify the underlying constructs and investigate the factors influencing preference of farmers towards a particular company's products.

In Factor Analysis, correlated continuous variables are modeled as conditionally independent given hidden (latent) variables that are termed factors. Factor Analysis serves as a tool for dimension-reduction; the possibly many observed variables are summarized by fewer factors (Drton *et al*., 2004) [1]. It is a statistical approach used to analyze interrelationships among a large number of variables and to explain the variables in terms of their common underlying dimensions (factors). The statistical approach involves finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information. A list of statements were prepared and the customers were asked to indicate on a five point Likert scale whether they highly agree, agree, neutral, disagree and highly disagree.

The responses of the customers were recorded and score was given to each factor, then the scores in turn were added to obtain the total score. Principal component analysis was employed for extracting factors. Orthogonal varimax rotation was also applied. Variables, whose communalities are greater than 0.50 were retained. The factors with Eigen- values greater than 1.0 were considered and the analysis was done.

Results and Discussion

It is essential to understand the profile of the respondents to proscribe the preference analysis and the applicability of the results from the factor analysis meant for identifying and grouping the preference of the tomato growing farmers for their preference for pesticides from specific companies and brands.

General profile of the respondents

The highest percent of sample respondents (47%) were in the age group of 26-35 years followed by the group of respondents belonging to 36-45 years and 46-55 years. Most of the Farmer respondents (91%) who purchased pesticides from the dealer/retail shops were males and the rest (9%) were female farmers. The education level of farmers was of mostly primary level and to understand this is important for identification of right methods to educate the farmers so as to bring about knowledge on new technologies and methods of pesticide use. Majority of the respondents (94 %) were involved in farming as their main business. The family type of majority respondents was nuclear family type (58 %). Hence, it could be inferred that decision making would be relatively simple and easier. Most of the sample farmers, (46 %) belonged to the medium sized (5 – 10 acres) followed by large farmers (more than 10 acres) (26 %), and small farmers (24 %) (Less than 5 acres). Among the sample farmers who cultivated tomato, 41% belonged to the middle income group and 29 % of the sample respondents incurred Rs.20, 000 to Rs.25, 000 on purchase of pesticides. Similar results were reported by Padmanaban and Rohini (2001) [3].

Pesticide usage pattern among tomato farmers

All the sample farmers used pesticides for the tomato crops they cultivated. In Anantapur district most of the tomato growing farmers preferred the pesticides from companies like DuPont (21 %), Syngenta (13 %), and Bayer (12 %). About 42 per cent of the sample farmers used the same product for the past 5-6 years, while 26 % of the farmers used the same product for last 2-4 years. The sample respondents used the pesticides particularly during summer season (25%) followed by Kharif season (19 %). Majority of the respondents (52 %) applied the pesticides through the knapsack sprayer and remaining respondents (48 %) used power operated sprayer. Majority of the respondents (43 %) applied the pesticides in both prophylactic and post incident situation and most of the sample respondents (50 %) used the recommended dosage. The results coincided with the findings of Sivakumar *et al*., (1994) [5].

The results from subjecting the data with factor analysis to identify and group the factors influencing the preference for particular pesticide companies are presented and discussed in the following paragraphs.

Factors influencing tomato farmers preference for particular pesticide companies

Factor analysis is a multivariate statistical technique used to condense and simplify the set of large number of variables to smaller number of variables called factors. This technique is helpful to identify the underlying factors that determined the relationship between the observed variables and provided an empirical classification scheme of clustering of statements into factors.

In this study, factor analysis was used to identify the major factors that influenced the preference for the particular company's pesticide. The respondents gave their opinion on five point's Likert scale ranging from 'highly agree' to 'highly disagree'. Principal component analysis was used for extracting factors. Eigen value represented the total variance explained by each factor. The Eigen values and loadings are given in table 1.

Effective marketing relies on identifying a lucrative target audience and then finding ways to access and influence then small business owners can start by using their knowledge of the buying habits of their customers to define target audiences that are likely to use their products or services. After that, it's just a matter of choosing the right strategies to reach and influence to audience. Thirteen factors were identified for analyzing the preference of respondents while purchasing the pesticides for tomato crop.

Table 1: Considerations while buying the pesticide

Components	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Percentage of variance (%)	Cumulative Percentage (%)	Total	Percentage of variance (%)	Cumulative	Total	Percentage of variance (%)	Cumulative Percentage (%)
1	5.742	44.171	44.171	5.742	44.171	44.171	5.136	39.504	39.504
2	2.236	17.202	61.373	2.236	17.202	61.373	2.470	18.999	58.503
3	1.560	11.997	73.369	1.560	11.997	73.369	1.732	13.326	71.829
4	1.302	10.019	83.388	1.302	10.019	83.388	1.503	11.558	83.388
5	.763	5.870	89.258						
6	.475	3.654	92.913						
7	.361	2.780	95.693						
8	.270	2.079	97.772						
9	.151	1.158	98.930						
10	.069	.529	99.459						
11	.042	.321	99.780						

12	.026	.201	99.980						
13	.003	.020	100.000						

Extraction method: Principal Component Analysis.

Table 2: Identification of factors influencing the preferences of specific pesticides

S. No	Statements	Factor loading	Name of the factor
1	Recommendation by dealer	0.950	Promotional attributes
2	Advertisement by company	0.928	
3	Long expiry period	0.872	
4	Availability in small/large quantity pack sizes	0.831	
5	Timely availability	0.812	
6	Long term protection	0.630	
7	Recommended by the co-farmers	0.598	
8	New product in the market	0.943	Flexibility
9	Possibility of mixing with other chemicals	0.900	
10	Any newly released chemicals	0.892	Innovative products
11	Eco-friendly	0.900	
12	Brand popularity	0.909	Product Acceptance
13	Low price	0.666	
Note: Extraction method: Principal Component Analysis			

Small values (< 0.5) indicated variables that do not fit well in the factor solution and should possibly be dropped from the analysis. But in the above case all the variables have communalities of more than 0.5 and hence none of the factors were dropped from the analysis. In order to reduce the number of factors and enhance effective interpretability, the factors was rotated. The rotation increased the quality of interpretation of the factors. There are several methods of the initial factor matrix to attain simple structure of the data. The Varimax rotation is one such method to attain better result for interpretation and it was employed and the results are given in Table 2.

From the results of factor analysis of consumer preference towards pesticide buying, four factors were extracted. The identified factors were (i) promotional attributes with seven statements grouped under it, (ii) flexibility with two statements grouped under it (iii), Innovative with two statements grouped under it, and (iv) Product acceptance with two statements grouped under it.

Factors influencing Product Loyalty

The factors influencing product loyalty was analyzed using Garrett's ranking technique and the results are presented in Table 3.

Table 3: Factors influencing Product Loyalty

S. No	Factors	Garrets score	Rank
1	Effectiveness	78.93	I
2	Product quality	67.26	II
3	Communication strategies (advertisement/demonstration)	58.68	III
4	Discounts	54.80	IV
5	Competitive pricing	47.00	V
6.	Value added service	38.40	VI
7	New product /package	33.60	VII
8	Others	20.00	VIII

The Table 3 indicates that among the attributes that helped for building good product loyalty, immediate effectiveness was ranked first followed by product quality was ranked second, communication strategies, discount, competitive pricing, value added services and new product/ package were ranked in that order.

Conclusion

All the tomato growing farmers used pesticide and preferred the pesticide product from DuPont Company and there was a high degree of product loyalty among the tomato farmers of the district. Four factors namely promotional attributes, flexibility, innovativeness and product acceptance were found to be most important factors influencing the tomato farmers of Anantapur district. Hence the company's marketing pesticides in Anantapur district should take in to account these factors for improving their sales and compete efficiently in the market.

Good product loyalty was established by immediate effectiveness of the pesticide which was ranked first followed by product quality, communication strategies, discount, competitive pricing, value added services and new product/ package were ranked in that order.

References

1. Drton Mathias, Bernd Sturmfels, Seth Sullivant. Algebraic factor analysis: tetrads, pentads and beyond, Probability Theory and Related Fields 2006;138:463-493.
2. Padmanaban NR. Brand and dealer loyalty of farmers to pesticides in Tamil Nadu. Indian journal of Agricultural Marketing 1999;13(1):24-29.
3. Rohini A, Padmanaban NR. Farmers brand and dealer loyalty to pesticides in Coimbatore district. Madras Agricultural Journal 2001;87(1/3):133-137.
4. Samanic C, Hoppin J, Lubin J *et al.* Factor analysis of pesticide use patterns among pesticide applicators in the Agricultural Health Study. J Expo Sci Environ Epidemiol 2005;15:225-233. https://doi.org/10.1038/sj.jea.7500396
5. Sivakumar SD, Srinivasan N, Harini K. Buying behavior of farmers with reference to pesticides- An analysis. Indian journal of Agricultural Marketing 1994;8(1):127-133.