Asian Journal of Agricultural Extension, Economics & Sociology

Volume 41, Issue 10, Page 709-715, 2023; Article no.AJAEES.107672
ISSN: 2320-7027

Analysis of the Marketing Status of Insecticide Brands and Buying Behavior of Chilli Growers in Rajkot District, Gujarat, India

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Authors' contributions

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

Article Information

DOI: 10.9734/AJAEES/2023/v41i102217

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/107672

Original Research Article

Received: 01/08/2023
Accepted: 07/10/2023
Published: 13/10/2023

ABSTRACT

The present study was undertaken in Gondal, Jamkandorna, Upleta and Dhoraji talukas of Rajkot district, as all four talukas have higher areas under chilli cultivation. A total of 120 chilli growers and 20 insecticide dealers were selected with the help of a multistage sampling method. The study was mainly based on primary data, which were collected through personal interviews with the help of a well-structured survey schedule. The results showed that the highest percentage of chilli growers belonged to middle age group and had higher secondary education. The majority of the chilli growers belonged to small and semi-medium land-holding categories and had annual incomes

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between ₹2,59,036 to ₹5,91,582. Near about two-thirds (66.67 %) of chilli growers belonged to the nuclear family. The majority (37.50%) of the chilli growers were found engaged in farming with business as their occupation and the majority of chilli growers had farming experience of more than 15 years. Bore wells (56.87%) were reported as the main source of irrigation in the study area. The study also revealed that the highest market share was captured by Nagarjuna Agrichem Limited company followed by Bayer Crop Science and United Insecticides Pvt. Ltd. company. With regard to the mode of purchase of insecticides most of 40.00 per cent of the chilli growers used to purchase insecticides on a credit basis. So, companies should define and ease the conditions for credit availability, to make it convenient and affordable for both farmers and dealers. Most of the chilli growers were buying insecticides from retailer's shops. The majority (45.83%) of chilli growers preferred to use the same brand with the same quantity when prices of selected insecticides changed (increased) and in the absence of the required insecticide brand; most (85.83%) chilli growers shifted to other insecticide brands. The insecticide companies should make the product available in the market as per the season and demand because if the grower will not get the desired product at the right time, they may switch to an alternative product.

Keywords: Socio-economic; market share; buying behaviour; chilli; growers; insecticide; brand.

1. INTRODUCTION

Pesticides are extensively used in modern agriculture and are an effective and economical way to enhance yield quality and quantity, thus ensuring food security for the ever-growing population around the globe. Approximately, 2 million tonnes of pesticides are utilized annually worldwide, where China is the major contributing country, followed by the USA and Brazil, which is increasing rapidly. However, it has been predicted that by 2020, there would be an increase in pesticide usage up to 3.5 million tonnes [1]. India is the predominant exporter of pesticides to Brazil, the USA and Bangladesh with quantities 129942, 85577 and 36618 MT respectively. Pesticides, in addition to fertilisers, were crucial to the green revolution over the past 50 years. Over the past five years, Indian exports of agrochemicals have had an amazing development. (DPPQs, 2022).

The term vegetable usually refers to the edible portions of certain herbaceous plants. These plant parts are either eaten fresh or prepared in several ways. Consuming the recommended quantity of vegetables on a regular basis leads to sound health [2]. China was the leading producer with a production volume of over 600 million metric tonnes, followed by India. West Bengal is the largest state in area and production of vegetables respectively 1511.78 hectares and 30330.77 MT followed by Uttar Pradesh, Madhya Pradesh, Bihar and Gujarat.

Chilli fruits are rich in vitamins A, C and E. In recent days, apart from its medicinal value, it has gained popularity as a vegetable and spice crop as it prevents heart attacks by dilating blood vessels [3]. India is the largest producer with 20.49 lakh tonnes and contributes 43.00 per cent of world chilli production, followed by Bangladesh, Thailand, China and Ethiopia during the year 2021. Andhra Pradesh was the largest chilli producer with 177.46 ha area and 796.65 MT production in the year 2021 among other states across India. Whereas Gujarat is eighth-ranked in the production of chilli. Rajkot is one of the famous chilli-growing districts of Gujarat. Rajkot district occupies the first position in terms of area and production of chilli [4]. The present research investigation aimed to study the socio-economic profile of growers and the market share of different insecticide companies and to analyse the buying behaviour of chilli growers towards insecticides.

2. METHODOLOGY

A multi-stage sampling method was adopted as an appropriate sampling procedure for the study. In the first stage, Rajkot district was purposively selected for the study. Rajkot district had 1st rank in area and production of chilli crops in Gujarat state. In the second stage, four talukas from Rajkot district were selected purposively. Gondal, Jamkandorna, Upleta and Dhoraji these four talukas have higher areas under chilli crop cultivation. In the third stage, from each taluka, five villages were selected on the basis of a pilot survey. From each village, six chilli growers were randomly selected. The dealers were selected based on the extent of purchase of insecticides for chilli crops by the growers. Hence, a total of 20 dealers were selected to elicit the information required for the study.

The various socioeconomic parameters were classified as par the scale given by Pandya and

Pandya (2008) to study the socio-economic profile of chilli growers of Rajkot district. Analytical tools like simple tabular methods, and mean and standard deviation methods were used to study the socio-economic profile of growers. A similar method was also used by Mishara and Ghadei, [5] and Peer et al. [6].

Mean ($\overline{X}$) is the average of the numbers or a calculated 'central' value of a set of numbers. This was obtained by the total score divided by the number of respondents.

$$\overline{X} = \frac{\sum X_i}{n}$$

Where,

$\overline{X}$ = Arithmetic mean
$\sum X_i$= Observed value
n = Number of observation

Standard Deviation (S.D.) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. The standard deviation was calculated by using the following formula:

$$S.D. = \sqrt{\frac{\sum(X_i - \overline{X})^2}{n - 1}}$$

Where, $\overline{X}$ = Arithmetic mean,
X_i = Observed values of variable,
n = Number of observations,
S.D. = Standard Deviation

The market share of different insecticide companies was measured in terms of major companies preferred by onion growers for the purchase of insecticides and distribution of dealers according to different insecticide companies having various insecticides used in onion crops. The buying behavior of onion growers towards insecticides was determined with the help of the percentage method. A Similar method was used by Hosurkar and Kerur [7] and Gohel et al. [8]. The percentage was calculated by using the following formula:

$$\text{Percentage} = \frac{X}{Y} * 100$$

Where,

X = No. of respondents
Y = Total no. of respondents

3. RESULTS AND DISCUSSION

The social, economic, and political aspects of specific people or social groups in society are the core topics of the socio-economic approach. The socio-economic method typically focuses on determining an individual's or community's ability for adaptation based on internal variables like age, education, type of family, land holding, farming experience, occupation, source of irrigation and annual income. Table 1 depicts the data on the socio-economic status of the sample respondents of the research area.

Age: The results indicated that 57.50 per cent of chilli growers belonged to the middle age group (36 to 50 years) followed by the old age group (31.67%) and only 10.83 per cent of chilli growers belonged to the young age group. Thus, it can be concluded that the majority of the chilli growers belonged to middle age group. Similar results were also reported by Khan et al. [9].

Education level: It is observed that 37.50 per cent of chilli growers have studied up to a higher secondary level. Among these chilli growers, 26.66 per cent belonged to graduation and post-graduation level followed by 20.00 per cent who studied up to secondary level whereas, 11.67 per cent of chilli growers have studied up to primary level and 04.17 per cent chilli growers were reported illiterate. Similar results were also reported by Kumar and Tiwari [10].

Type of family: The result observed that nearly two-thirds of chilli growers (66.67%) belonged to the nuclear family and comparatively less *i.e.,* 33.33 per cent belonged to the joint family. This finding is in accordance with the finding of Nayak and Banerjee [11], those were reported that most of the growers belonged to the nuclear family.

Size of land holding: The highest percentage (47.50%) of chilli growers belonged to small size land holding category followed by semi medium land holding category (30.00%), marginal land holding category (13.33%), medium land holding category (08.34%) and only a few of them belonged to large land holding category (00.83%). This pattern of land-holding distribution showed that most chilli growers belonged to the small and semi-medium land-holding categories. The reported finding of the study is in line with the findings of Rana et al. [12], those were also reported that most of the growers belonged to a small size of land holding.

Table 1. Distribution of chilli growers according to their various socio-economic characteristics (n=120)

Sr. No.	Variable	Frequency	Percentage
Age			
1	Young (18 to 35 years)	13	10.83
2	Middle (36 to 50 years)	69	57.50
3	Old (Above 51 years)	38	31.67
Education level			
1	Illiterate	05	04.17
2	Primary level (1 to 8 Standard)	14	11.67
3	Secondary level (9 to 10 Standard)	24	20.00
4	Higher Secondary (11to 12 Standard)	45	37.50
5	Graduation / Post-graduation	32	26.66
Type of family			
1	Nuclear	80	66.67
2	Joint	40	33.33
Size of land holding			
1	Marginal (up to 1.0 hectare)	16	13.33
2	Small (1.01 to 2.0 hectares)	57	47.50
3	Semi-medium (2.01 to 4.0 hectares)	36	30.00
4	Medium (4.01 to 10.0 hectares)	10	08.34
5	Large (more than 10 hectares)	01	00.83
Farming experience			
1	Up to 5 years	00	00.00
2	6 to 10 years	02	01.67
3	11 to 15 years	10	08.33
4	More than 15 years	108	90.00
Occupation level			
1	Farming	20	16.67
2	Farming+ Animal husbandry	35	29.16
3	Farming+ Animal husbandry+ Business	08	06.67
4	Farming+ Animal husbandry+ Service	02	01.67
5	Farming+ Business	45	37.50
6	Farming+ Service	10	08.33
Sources of irrigation			
1	Bore well	68	56.87
2	Open well	46	38.33
3	Canal	06	05.00
Annual income			
1	₹ ≤ 259035	24	20.00
2	₹ 259036 to ₹ 591582	79	65.83
3	₹ ≥ 591583	17	14.17

(Annual income: Mean- 425308.33, S.D.- 166273.48)

Farming experience: The result of the study revealed the hat highest percentage (90.00%) of chilli growers have more than 15 years of farming experience followed by 11 to 15 years of farming experience (08.33%) and only 01.67 per cent of farmers belonged to low-level experience *i.e.,* 6 to 10 years. It was observed that most of the farmers have more than 15 years, which assures a higher confidence level in following good farming practices.

Occupation level: The result revealed that the majority (37.50%) of the growers had farming with business as their occupation followed by farming with animal husbandry (29.17%), farming (16.67%), farming with service (08.33%), farming with animal husbandry and business (06.67%) and farming with animal husbandry and service (01.67) respectively.

Sources of irrigation: The result showed that bore wells were the main source of irrigation water for the chilli growers *i.e*., 56.87 per cent in

villages of Rajkot district. Other important irrigation sources available with chilli growers were open wells and canals *i.e.,* 38.33 and 05.00 per cent respectively.

Annual income: The detailed description as per annual income of growers was classified into three groups according to Mean - S.D., Mean ± S.D. and Mean + S.D. The result revealed that 65.83 per cent of the chilli growers have an annual income of ₹2,59,036 to ₹5,91,582 while; 20.00 and 14.17 per cent of the chilli growers were found to have an annual income of less than or equal to ₹2,59,035 and more than or equal to ₹5,91,583 respectively. The majority of growers belonged to the middle-income level. Similar results were also reported by Shukla and Singh [13].

2) Market share of the different insecticide companies in the selected area

Market share is the per cent of total sales in the market generated by a particular company. The present study is targeted to examine the market share of different insecticide companies for chilli crops in the selected market. Market share was measured in terms of various companies' insecticides for chilli crops available in dealers' shops and major company's insecticides purchased by the chilli growers.

Companies' insecticides for chilli crop dealers are kept at their shops. Results are given in Table 2. Study revealed that almost 95.00 per cent dealers had Nagarjuna Agrichem Limited company's insecticides for chilli crop followed by Bayer Crop Science (90.00%), United Insecticides Pvt. Ltd. (80.00%), Dhanuka Agritech Limited (70.00%), SWAL Corporation Limited (55.00%), PI Industries Ltd. (45.00 %) and others like Godrej Agrovet and Syngenta (20.00%) insecticides used in chilli crop *etc*.

The data regarding major companies preferred by the chilli growers during purchasing of insecticides for chilli crops are presented in Table 2. The results showed that the highest insecticides purchased volume accounted by Nagarjuna Agrichem Limited company *i.e.,* 25.83 per cent followed by Bayer Crop Science (21.67%), United Insecticides Pvt. Ltd. (20.83%), Dhanuka Agritech Limited (15.00%), SWAL Corporation Limited (10.00%), PI Industries Ltd. (06.67%).

Table 2. Distribution of different company's insecticides used in chilli crop available in dealers' shops (n=20)

Sr. No.	Company name	Frequency	Percentage
1	Nagarjuna Agrichem Limited	19.00	95.00
2	SWAL Corporation Limited	11.00	55.00
3	United Insecticides Pvt. Ltd.	16.00	80.00
4	Bayer Crop Science	18.00	90.00
5	PI Industries Ltd.	09.00	45.00
6	Dhanuka Agritech Limited	14.00	70.00
7	Others	04.00	20.00

Table 3. Major companies preferred by the chilli growers during purchasing of insecticides for chilli crop (n=120)

Sr. No.	Company name	Frequency	Percentage
1	Nagarjuna Agrichem Limited	31	25.83
2	SWAL Corporation Limited	12	10.00
3	United Insecticides Pvt. Ltd.	25	20.83
4	Bayer Crop Science	26	21.67
5	PI Industries Ltd.	08	06.67
6	Dhanuka Agritech Limited	18	15.00
Total:		**120**	**100.00**

Table 4. Buying pattern of insecticides by chilli growers (n=120)

Sr. No.	Particulars	Frequency	Percentage
Source of purchase			
1	Dealer	38	31.66
2	Online	11	09.17
3	Retail shop	71	59.17
Mode of payment			
1	Cash	43	35.83
2	Credit	48	40.00
3	Both cash and credit	29	24.17
Response to price change (increased)			
1	Same brand same quantity	55	45.83
2	Same brand reduced the quantity	14	11.67
3	Switch over to low-price brand	51	42.50
Non-availability of insecticide brand			
	Shift	103	85.83
	Wait	17	14.17

3) Buying behaviour of chilli growers towards insecticides

The results related to the buying behaviour of insecticides by chilli growers are displayed in Table 4. The results indicated that 59.17 per cent of growers were buying insecticides from retail shops, 31.66 per cent of growers were buying from dealers and 09.17 per cent of growers preferred to insecticides from the online platform. The result showed that the majority of the chilli growers *i.e.,* 40.00 per cent were purchased insecticides for chilli crops on credit followed by 35.83 per cent of chilli growers who purchased insecticides on cash and 24.17 per cent of chilli growers purchased insecticides on both credit and cash. From the sample growers, 45.83 per cent of growers preferred to use the same brand with the same quantity, 42.50 per cent of growers were in favour of a low-priced brand and 11.67 per cent of growers felt to use the same brand with a reduced quantity. In the absence of the required brand, 85.83 per cent of chilli growers shifted to another insecticide brand while 14.17 per cent of chilli growers waited for their preferred insecticide brand [14].

4. CONCLUSION

It is concluded that the majority of growers belonged to the middle age group and growers have higher secondary education. Near about two-thirds of chilli growers belonged to the nuclear family and most of the chilli growers had small land holdings. The majority of chilli growers have more than 15 years of farming experience. Most of the chilli growers were found engaged in farming with business as their occupation. Borewell was the main source of irrigation water in the study area. It was observed that the majority of the chilli growers had annual income ranging from ₹2,59,036 to ₹5,91,582. The majority of insecticide dealers had Nagarjuna Agrichem Limited company's insecticides for chilli crops available at their shops. Most of the chilli growers were preferred Nagarjuna Agrichem Limited company's insecticides for chilli crop. The results also revealed that the majority of chilli growers were buying insecticides from retailer's shops and most of the chilli growers used to purchase insecticides on a credit basis. So, insecticide companies should define and ease the conditions for credit availability, to make it convenient and affordable for both farmers and dealers. The majority of chilli growers preferred to use the same brand with the same quantity when insecticides for chilli prices changed (increased) and under the situation of non-availability of the required insecticide brand; most chilli growers shifted to other insecticide brands. The insecticide companies should make the product available in market as per the season and demand because if the grower does not get the desired product at the right time, they may switch to an alternative product and this will be considered as a switching cost for the company.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/107672