MARKETING STATUS OF VARIOUS INSECTICIDE BRAND AND BUYING BEHAVIOUR OF ONION GROWERS IN AMRELI DISTRICT

Comment [RMQ1]: As in this study, the insecticide most used by farmers in the Amreli district was determined. This article must serve to carry out the physicochemical study to determine the negative effects that the most and least used insecticides may have by producers. You could also work in a multidisciplinary way for other publications

ABSTRACT

One of the most significant commercial vegetables is the onion (Allium cepa L.; Family: Amaryllidaceae). Onion is a cool season crop. India stands at second position in onion production after China in the world. In India, Gujarat stands at second position in onion cultivation after Maharashtra state. Thepresentstudyhasbeenundertaken inRajula, SavarKundla, Khambha, and Dhari talukas of the Amreli district, as all four talukas have higher areasunder onion cultivation. A multistage sampling technique was adopted toselect the districts, talukas, and villages. Total 120 onion growers and 20 insecticide dealers were selected for the study. The study was mainly based on primary data,which were collected through personal interviews with the help of a structured survey schedule. The study revealed that the highest market share was captured by United Phosphorus Limited Company followed by DhanukaAgritech Limited Company and Dharmaj Crop Guard Limited Company.The results showed that the highest percentage of onion growers belonged to the 35 to 50 age group and had a primary education level. Most of the onion growers belonged to semi-medium and small land-holding groups and had annual incomes between ₹ 2,27,693 to ₹ 5,10,058. The highest percentage of onion growers belonged to the farming + animal husbandry category. Bore wells were observed as the main source of irrigation in the study area. More than 50 per centof onion growers belonged to the nuclear family. Most onion growers have more than 15 years of farming experience. It is also concluded that most of the growers bought onion insecticides from the dealers on a credit basis. Therefore, companies should define and ease the conditions for credit availability, so that it could be affordable for both farmers and dealers. Most of onion growers preferred the same brand and same quantity and shifted to other brands when insecticides were not available.Both farmers and dealers emphasized quality parameters while purchasing insecticide products, hence insecticide companies should highlight the quality parameters through better promotional activities.

Keywords: Market share,Brand, Insecticide, Onion, Growers, Buying behaviour

INTRODUCTION

Pesticide use is estimated to be 2 million tonnes per year worldwide, with China being the main contributor, followed by the USA and Argentina, whose use is also rising quickly. However, it has been predicted that by 2020, there would be an increase in pesticide usage of up to 3.5 million tonnes.

In terms of vegetable production, China comes in second place, followed by India. Vegetable production in India reached 137.99 million MT in 2021. China is at the top of the charts by producing 600.01 million MT of vegetables (2021) in the world. India's total production of vegetables was recorded as 191769 MT in an area of 10353.88 ha in the year 2019-20. In the country's total production, West Bengal produces29293.24 MT in an area of 1496.07 ha, Uttar Pradesh produces 27195.17 MT in an area of 1274.80 ha, Madhya Pradesh produces 19144.37 MT in an area of 967.23 ha. In the year 2021, vegetables' primary production for the world was 1154 million MT. Tomatoes and onion production are reported as the highest globally. The global vegetable production in the year 2021 showed that approximately 189.13 million metric tonnes of tomatoes and 106.59 million metric tonnes of onion were produced worldwide (www.statista.com).

One of the most significant commercial vegetables is the onion (Allium cepa L.; Family: Amaryllidaceae). It is grown in Western, Northern as well as in Southern India.Major onion-growing states in India include Maharashtra, Gujarat, Uttar Pradesh, Orissa, Karnataka, Tamil Nadu, Madhya Pradesh, Andhra Pradesh, and Bihar. India stands in 2nd position in onion production after China in the world. Gujarat is India's second-largest grower of onions, behind Maharashtra.

The world's largest producer of onions is China. China produces 24,966,366 tonnes of onions with a yield of 22,114.3 kg per hectare over an area of 1,128,970 ha. India produces 22,819,000 tonnes of onions under an area of 1,220,000 ha with a yield of 18,704.1 Kg/ha. In 2019–20, India produced 26.15 million tons of onions on 1.43 million hectares, yielding 16875 (Kg/ha), the greatest production and area in the previous 20 years.[ATLASBIG (2020)]. In the years 2018–19 and 2019–20, the total production of onions was 228.19 lakh tonnes and 268.55 lakh tonnes, respectively. The major share is occupied by the Maharashtra state.Maharashtra produced 80.47 lakh tonnes and occupied a 35.26 per cent share in 2018-19andproduced 113.63 lakh tonnesand occupied43.31 per cent sharein 2019-20. Gujarat produced 11.11 lakh tonnes and occupied 4.87 per cent share in 2018-19 and produced 12.43 lakh tonnes and occupied 4.63 per cent share in 2019-20 [AGRICOOP (2020)].The highest production of onion is in the Bhavnagar district with the production of 1191400 MT and productivity of 25.90 MT/ha in an area of 46000 ha in the Gujarat state. Amreli district production of 400350 MT and productivity of 25.50 MT/ha in an area of 15700 ha(Anon., 2022[d]).The present study aimed to analyse the market share of different insecticide companies, the socio-economic profile of onion growers, and the buying behavior of onion growers towards insecticides.

MATERIALSANDMETHODS

The study was mainly based on primary data, which were collected through personal interviews with the help of a structured survey schedule. A multistage sampling technique was adopted to select the districts, talukas, and villages. The present study has been undertaken inRajula, SavarKundla, Khambha, and Dhari talukas of the Amreli district, as all four talukas have higher areas under onion cultivation. Total 120 onion growers and 20 insecticide dealers were selected for the study. 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 crop. The various socio-economic parameters were classified as par the scale given by Pandya and Pandya (2008) to study the socio-economic profile ofonion growers in Amreli district. Simple tabular method was used for research analysispurposes. A similar method was used by Sangam and Aski (2018) and Peer *et al.* (2020).The data regarding the annual income of the growers were analyzed by the mean and standard deviation method and divided into three categories according to Mean - S.D., Mean ± S.D., and Mean + S.D.

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

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

Where,

$\bar{X}$ = Arithmetic mean

$\sum X_i$ = Observed value

n = Number of observations

Standard deviation (S.D.) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. Standard deviation was calculated by taking the difference of each item (X_i) in the sample from

their arithmetic mean **($\overline{X}$)**, squaring this difference (Xi -$\overline{X}$)^2, summing all the squares differences $\sum$ (Xi - $\overline{X}$)^2, dividing by the number of items minus one (n - 1) and then extracting the square root. 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 buying behavior of onion growers towards insecticideswas determined with the help of the percentage method. Similar method was used by Hosurkar and Kerur (2018) and Gohel *et al.* (2023).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

RESULTSANDDISCUSSION

1. Market share of insecticide companies for onion crop in selected markets

Table 1: Major companies preferred by the onion growers during purchasing of insecticides (n=120)

Sr. No.	Company name	Frequency	Market share (%)
1.	United Phosphorus Limited	68	56.67
2.	Agrichem Life Science Private Limited	02	01.67
3.	PI Industries Limited (PI)	03	02.50
4.	GSP Crop Science Private Limited	05	04.17
5.	DhanukaAgritech Limited	31	25.83
6.	Dharmaj Crop Guard Limited	11	09.17
	Total:	**120**	**100.00**

Onion growers purchased different companies' insecticides. Number of samples of different insecticide brands purchased by growers gives their particular company's current year market share. From the results of the study, it can be interpreted that 56.67 per cent of onion growerspreferred UnitedPhosphorus LimitedCompany followed by DhanukaAgritech Limited (25.83%), Dharmaj Crop Guard Limited (09.17%), GSP Crop Science Private Limited (04.17%), PI Industries Limited (PI) (02.50%) and Agrichem Life Science Private Limited (01.67%) companies onion insecticides. The study revealed that onion growers mostly preferred United Phosphorus Limited company insecticides.

2. Market share of different company's insecticidesavailable in dealer's shop

Table 2: Distribution of different insecticides companies used in onion crop available in dealers' shop

(n=20)

Sr. No.	Companies name	Frequency	Percentage
1.	United Phosphorus Limited	20	100.00
2.	Agrichem Life Science Private Limited	15	75.00
3.	PI Industries Limited (PI)	15	75.00
4.	GSP Crop Science Private Limited	16	80.00
5.	DhanukaAgritech Limited	17	85.00

6.	Dharmaj Crop Guard Limited	13	65.00
7.	Others	04	20.00

The result of the study revealed that almost 100 per cent dealers were having UnitedPhosphorus Limitedcompany's insecticides in their shop, followed by DhanukaAgritech Limited (85.00%), GSP Crop Science Private Limited (80.00%), Agrichem Life Science Private Limited (75.00%), PI Industries Limited (PI) (75.00%), Dharmaj Crop Guard Limited (65.00%) and others companies (20.00%) like Bayer Crop Science and Meghmani Agrochemical Private Limited *etc*.

Socio-economic profile of onion growers

3. Ageofthe oniongrowers

Table3. :Distributionofthe oniongrowersaccordingtotheirage (n=120)

Sr. No.	Age	Frequency	Percentage
1.	Young (18 to 35 years)	18	15.00
2.	Middle (36 to 50 years)	43	35.83
3.	Old (Above 50 years)	59	49.17
	Total:	**120**	**100.00**

The highest percentage *i.e*. 49.17 per cent of onion growers belonged to the old age group thosewere more than 50 years old, followed by the middle age group (35.83%) and young age growers(15.00%). This finding is in accordance with the finding of Baraker*et al.* (2021), who reported that most of the onion growers belonged to the old age group.

4. Family type ofoniongrowers

Table4:Distribution of oniongrowers according to their types of family (n=120)

Sr. No.	Types of family	Frequency	Percentage
1.	Joint family	54	45.00
2.	Nuclear family	66	55.00
	Total:	**120**	**100.00**

The onion growers were categorized into two groups based on their types of family.The highest percentage (55.00%) of onion growers belonged to the nuclear family and near about 45.00 per cent belonged to the joint family. According to the type of family majority of the onion growers belonged to the category of nuclear family. This finding is in accordance with the finding of Sangam and Aski (2018), those were also reported that most of the onion growers belonged to the nuclear family.

5. Educationstatusofoniongrowers

Table 5 :Distribution of oniongrowers according to their educationlevel (n=120)

Sr. No.	Educational status	Frequency	Percentage
1.	Illiterate	05	04.17
2.	Primary level (1 to 8)	48	40.00
3.	Secondary level (9 to 10)	35	29.17
4.	Higher secondary level (11 to 12)	18	15.00
5.	Graduation and Post graduation	14	11.66
	Total:	**120**	**100.00**

The highest percentage (40.00%) of onion growers belonged to the primary level (1 to 8) followed by the secondary level (9 to 10) (29.17%), higher secondary level (11 to 12) (15.00%), under graduation and post-graduation (11.66%) level. Only a few of them belonged to the illiterate category (04.17%). This pattern of education level showed that most onion growers belonged to the primary level of educational status. This finding is in accordance with the findings of Sangam and Aski (2018) and Haile *et al.* (2016), those were also reported that most of the onion growers belonged to primary education level.

6. Occupation level of onion growers

Theonion growers werecategorizedintosixgroupsbasedon theiroccupation level.The highestpercentage of onion growers belonged to the farming + animal husbandrycategory (60.83%) followed by only the farming category (11.67%), farming + animal husbandry + service category(7.50%), farming + animal husbandry + business category (6.67%), farming + businesscategory(7.50%)andonlya fewofthembelonged to farming + service category (5.83%).

Table6:Distribution of onion growers according to their occupation level(n=120)

Sr. No.	Occupation level	Frequency	Percentage
1.	Farming	14	11.67
2.	Farming + Animal husbandry	73	60.83
3.	Farming + Animal husbandry + Business	08	06.67
4.	Farming + Animal husbandry + Service	09	07.50
5.	Farming + Business	09	07.50
6.	Farming + Service	07	05.83
	Total:	**120**	**100.00**

This pattern showed that the majority of onion growers belonged to the farming + animal husbandry category for their occupation.

7. Farming experience of onion growers

The onion growers were categorized into four groups based on their farming experience. The highest per cent (74.17%) of onion growers belonged to the more than 15 years category followed by 11 to 15 years (09.17%), 6 to 10 years (13.33%) farming experience, and only a few of them belonged to category of up to 5 years (03.33%) farming experience.

Table 7:Distribution of onion growers according to their farming experience (n=120)

Sr. No.	Farming Experience	Frequency	Percentage
1.	Up to 5 years	04	03.33
2.	6 to 10 years	16	13.33
3.	11 to 15 years	11	09.17
4.	More than 15 years	89	74.17
	Total:	**120**	**100.00**

This pattern of farming experience showed that most onion growers have more than 15 years of farming experience in growing onion. The reported finding of the study is in line with the findings of Sangam and Aski (2018), those were also reported that most of onion growers have more than 15 years of farming experience.

8. Annualincomeoftheonion growers

The onion growers were categorized into three groups based on their annual income. The highest percentage (64.17%) of onion growers belonged to the annual income range of ₹ 227693 – 510058, followed by 18.33 per cent of onion growers belonged to the annual income range of greater than or equal to ₹ 227692 category, and at last 17.50 per cent growers with an annual income range of less than or equal to ₹ 510059 category.

Table 8:Distribution of onion growers according to their annual income (n=120)

Sr. No.	Annual income range (₹)	Frequency	Percentage
1.	≤ 227692	22	18.33
2.	227693 - 510058	77	64.17
3.	≥ 510059	21	17.50

Total:	**120**	**100.00**

(Mean- 368875, S.D.- 141182.67)

This pattern showed that the majority of onion growers generate an annual income of ₹ 227693 – ₹ 510058 annually.

9. Sizeoflandholdingpossessedbytheonion growers

The onion growers were categorized into five groups based on their land-holding capacity. The highest percentage of onion growers belonged to semi medium land holding category 40.00 per cent followed by small land-holding category (33.33%), medium land holding category (14.17%), marginal land-holding category (10.83%) and only a few of them belonged to large land holding category (1.67%).

Table 9:Land holdingpattern oftheonion growers (n=120)

Sr. No.	Land holding size	Frequency	Percentage
1.	Marginal (up to 1.0 hectare)	13	10.83
2.	Small (1.01 to 2.0 hectare)	40	33.33
3.	Semi medium (2.01 to 4.0 hectare)	48	40.00
4.	Medium (4.01 to 10.0 hectare)	17	14.17
5.	Large (more than 10 hectare)	02	01.67
	Total:	**120**	**100.00**

This finding is in accordance with the findings of Sangam and Aski (2018) and Baraker*et al.* (2021), who also reported that most of the onion growers belonged to semi-medium land holding category.

10. Sourceofirrigationfacilitiesavailablewithonion growers

Table 10:Source ofirrigationfacilitiesavailable withonion growers(n=120)

Sr. No.	Sources of irrigation	Frequency	Percentage
1.	Open well	57	47.50
2.	Bore well	63	52.50
	Total:	**120**	**100.00**

The results displayed in Table 10showed that the bore well (52.50%) is the main source of irrigation water for the onion growers. Whereas another important irrigation source available for onion growers was reported as open well irrigation(47.50%).

The buying behavior of onion growers toward insecticides

11. Source of onion insecticides purchased by onion growers

Table11:Distribution of onion growers according to various purchasing sources of insecticides (n=120)

Sr. No.	Source of purchase	Frequency	Percentage
1.	From dealer	36	30.00
2.	Direct from company	08	06.66
3.	From online purchase	11	09.17
4.	Others (Retail shop)	65	54.17
	Total:	**120**	**100.00**

The result of the study interpreted that 54.17 per cent of farmers purchased onion insecticidesfrom retailshops followed by 30.00 per cent from dealers, 09.17 per cent from online purchase sources *etc*., and very less 06.66 per cent of growers purchased from direct companysources.

12. Mode of payment for purchasing insecticides preferred by onion growers

Table12:Distribution of onion growers according to mode of payment (n=120)

Sr. No.	Mode of payment	Frequency	Percentage
1.	Cash	30	25.00
2.	Credit	56	46.67

3.	Both cash and credit	34	28.33
	Total:	**120**	**100.00**

Among 120 sample respondents, 46.67 per cent of onion growers purchasedonion insecticidesbycreditwhereas28.33 per centofoniongrowerspurchasedby both cash and credit, and only 25.00 per centofoniongrowerspreferred topurchaseby cash.

13. Response to price change (increased) in preferred insecticide brands by onion growers

Table13:Distribution of onion growers according to their response towards price change of insecticides (n=120)

Sr. No.	Response to price change	Frequency	Percentage
1.	Same brand same quantity	50	41.67
2.	Same brand reduced the quantity	29	24.17
3.	Switch over to low-price brand	41	34.16
	Total:	**120**	**100.00**

From the sample,41.67 per cent of growers preferred to use the same brand with the samequantity, 34.16 per cent of growers were in favour of a low-priced brand and 24.17 per cent of growers felt to use thesame brand with a reduced quantity. The same brand with the same quantity was the opinion of a greater percentage of growers compared to same brand reduced quantity and switched over to low price brand when price changes.

14. Farmers' decision during the non-availability of required insecticides

Table 14: Distribution of onion growers according to non-availability of insecticides (n=120)

Sr. No.	Non-availability of insecticides	Frequency	Percentage
1.	Shift	117	97.50
2.	Wait	03	02.50
	Total:	**120**	**100.00**

In the absence of the required brand, 97.50 per cent of onion growers shifted to other insecticide brands while only 02.50 per cent of onion growers waited for their preferred insecticide brand.

CONCLUSION

From the study, it is concluded that the highest market share is occupied by United Phosphorus Limited company. It is also revealed that the majority of the farmers belonged tothe old age category, completed their studies up to primary education, and lived in a nuclear family. Most of the sample respondents were engagedin farming with animal husbandry and bore well was reported as the main source of irrigation. Most of the onion growershad more than 15 years of farming experience. It is also concluded that the majority of the farmers bought onion insecticides from the dealers on a credit basis. Therefore, companies should define and ease the conditions for credit availability, so that it could be affordable for both farmers and dealers. Most of onion growers preferredthe same brand and same quantity and shifted to other brands when insecticides were not available.Both farmers and dealers emphasized quality parameters while purchasing insecticide products, hence insecticide companies should highlight the quality parameters through better promotional activities.

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