



Marketing Strategies of Pesticide Manufacturers and Their Impact on Agricultural Productivity: A Study of Vidarbha Region

¹Pratap Jaganrao Sabale, ²Dr. Prashant R.Patil

¹Research Scholar Dept. of Business Management, RTMNU, Nagpur

²Research Supervisor Dept. of Business Management, RTMNU, Nagpur

Abstract: The agricultural activity within the Vidarbha region is also highly correlated to the availability and utilization of modern agricultural inputs among the farmers particularly those that are in form of the pesticides. The pesticide manufacturing companies have also intensified their marketing efforts in recent few years through product presentations, dealer platforms, promotion schemes, online marketing and consultancy. The paper will be examining how these variable marketing methods will affect the purchasing behaviour of the farmers, their behaviour with regards to pesticide application and the resultant production. The primary data were collected through a mixed method approach, whereby data were obtained through taking of interview on a sample of farmers, dealers and field representatives in the leading districts of the Vidarbha region and the data was supplemented with secondary data collected in the form of government and industry reports. What it shows is that agro-inducing marketing especially field demonstration, credit based sale and incentive of dealers are significant in the brand choice, and its acceptance among farmers. There are, on the one hand, strategies that can be used to raise awareness and good usage whereas on the other hand the 9 out of ten strategies increase the over-use, economic strain, and environmental problems. As has been mentioned in the paper, there is an established positive and complex relationship between marketing activities and crop productivity moderated by agricultural education of the farmers, extension services and product efficiency. The policy implications related to the paper are in form of policy recommendation that shall regulate marketing conducts of pesticides, strengthen agricultural extension devices as well as to encourage production of agricultural products in a sustainable productive methodology in order to enhance agricultural production in the Vidarbha region.

Keywords - Purchase behavior; Agrochemical industry; Vidarbha region; Sales promotion; Branding; Farmer perception

Introduction

Rural Indian economy is still comprised of agrarian sector with the Vidarbha region of Maharashtra playing a significant role to the entire agrarian culture of India in terms of cotton, soybean, pulse and wheat products. Intensification of agriculture in the recent decades, fluctuations of the climate, as well as the upsurge in epidemics of pests has augmented the entrapment that farmers are looking to chemical pesticides as the means that will enable them to safeguard their harvests, and provide consistent yield. In this respect, pesticide producing companies have become main actors in determining how agricultural companies should operate with the application of various marketing strategies to promote their products to the farmers. All these strategies including more conventional techniques of advertising through dealers and demonstrations in the field have increased the visibility and accessibility of the pesticides in the rural markets through up-dating digital media, aggressive product branding, selling via credit and customized consultations. Trying to make the new, competitive, and innovation-oriented markets more competitive, the producers of pesticides are opting to resolve the differentiation problem of their products through persuasive communications, the lengthy supply chains, and product differentiation, reaching the diverse levels of the farming community.

As a particle that is agrarian in nature, which is a land of alternating productivity, and overdependence on inputs, the state of Vidarbha provides a unique backdrop in which the practices of marketing may have a powerful



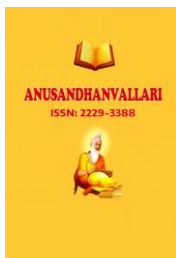
influence on the decision making of farmers. Some of the factors that hinder farmers in this region are technical knowledge, unavailability of extension services, dependence on dealers, and the power of marketing promotional, hence the selling of pesticides is a crucial factor not only in their products but also their pesticidal usage pattern. Despite spreading information about the new molecules, pest management practices, and safe standards of application can be done through proper marketing, there also exists the possibility of the marketing being problematic such as overuse, misuse, brand monopoly, rising cost of cultivation and environmental degradation. This duality attracts attention to the fact that the marketing of pesticides is not only a business process that is worth studying, but also in many ways is closely linked to agronomic sustainability and livelihoods of the rural population.

In addition, as the government begins to examine more closely, increasing interest in the level of toxicity, and increasing interest in integrated pest management (IPM), the impacts of the marketing policy on the productivity in the agricultural sphere must be researched in the state of relations. The marketing strategies, according to the literature available, can have tremendous effects on the extent of farmer awareness, future rates of adoption, and overall production of the farms, however, not enough empirical studies in the expertise of the area of Vidarbha specifically. How the farmers decode the marketing messages, the mediation of such effect by the dealers and how such strategies can lead to the actual use behaviour is major in clarifying the aspect of whether such marketing practices would positively influence the agricultural productivity or it poses a long-term risk. Additionally, the growth of the use of digital platforms, mobile-based consultancies, video lessons, input based financing has augmented the marketing ecology beyond the traditional interpersonal networks and the dynamics of marketing pesticides in the context of constantly changing digital technologies are to be analyzed.

It is on this backdrop that the present study tries investigating the nature of the current marketing activities that the pesticide manufacturing companies are currently adopting and the impact that they are causing to the agricultural produce in the first state of Vidarbha. Through this study, it is hoped that the perception about the farmers, their application of pesticide and the influence of the intermediaries on buying behaviours can be used to formulate policies, responsible marketing behaviours and supported by responsible farming. As the Vidarbha is rightly grappling with some of the complex problems of agriculture, like the unpredictable market prices and pest outbreaks and climatic pressures, the question regarding the interaction between pesticides marketing and agricultural productivity comes to increasingly greater importance. The study ultimately aims at fitting into the larger debate on agricultural development by its capacity to highlight on the limelight the well-informed, moral and balanced marketing in helping to bring about a healthier production in crop development and yet proceed, and assure the well being of people and environmental safety.

Literature Review

The marketing strategies of the agrochemical and pesticide companies are key in determining both the purchasing behaviour of the farmers, preference of the product, and subsequent tendencies of using pesticide in the different areas. Many studies conducted in and around India as well as other developing economies have continually emphasized that branding, promotional programs, dealers pressure and information about agrochemical inputs have significant impact on the decision made by the farmers in relation to the agrochemical buyers. In a study conducted by Senthilnathan et al. (2022) to assess the branding impact on the purchase behaviour of farmers with regard to the agrochemicals in Tamil Nadu, the authors found that the deep brand positioning, the trust formed due to the field demonstration as well as the feedback by the dealers on a regular basis are major factors that influence the purchase behaviour of the farmers with regard to the agrochemicals. According to their analysis, farmers are inclined to conflate brand reputation to product efficacy and in various occasions they therefore will purchase established this pesticide brand as compared to other new or less popular pesticides brands. The knowledge is valuable in regions like Vidarbha; whereby pest attacks and exposure on crops are a relatively frequent and brand loyalty is one of the critical factors affect the choice of a pesticide.



Similarly, the analyses of other geographical environments affirm the thesis, that the socio-economic and information forces influence the decision taken by the farmers on the application of the pesticides. During one of his recent studies concerning the usage of pesticides in European agricultural communities, Dervisi (2017) has discovered that the choice of farmers to purchase the specific product based on the information provided on product effectiveness, use of advisory services, experience of pest attacks, and general availability of the product in the market. Although this was not the case, it has some parallels as indicated by the findings in terms of Indian settings of agriculture where the little access to extension services tends to compel farmers to rely on informal sources of information, such as dealers and peer farmers. This means that the marketing practices of communicating the utility of products can transmit or provide viable demonstrations can be a potent determinant of adoption trends.

Pakistan has also recorded the contribution of marketing in brand preferences development. Empirical research done with cotton growers in Punjab to find out purchasing pattern of pesticides showed that availability of product, incentive plan by dealers, awareness development made by companies, and subjective factors that relate to product use is a significant factor that influences brand loyalty (Shuban et al., 2024). The study established that farmers prefer brands, which offer post purchase support and technical directions and perception of the result in the field. These results explain the importance of such field tests as the field trials and crop stage visits, that are common with the pesticide companies in South Asia and India especially.

The other highly significant issue of agrochemical marketing is sales promotion strategies. In another study under Sri Lankan environment, Gamage et al. (2022) identified that the purchase intention of the farmer is directly related to sales promotion in terms of discounts, Free samples, credit-based promotion of sales and reward schemes. The article highlights that, the promotional strategies not only increase the awareness of the product but also reduce the danger of experiencing a loss of finance were there to be a loss incurred when the new brand of pesticides would be tried out. It plays a role where small and marginal farmers occur such as in Vidarbha where affordability and risk aversion is a determining factor on the purchasing behaviours. Another concept that the authors bring forward is the fact that the excessive promotion actions can drive the irrational/unsuitable use of pesticides in some cases, which harbors some fear regarding the influence that it has on the environment and health.

Nirmal and Surya (2022) have performed a source of agrochemical corporation based in Amravati district, the Vidarbha region located in the Indian context to carry out a detailed study on the marketing practices promoted by corporations interested in the market. They provide evidence that in order to manipulate the decisions of the buying farmers, pesticide companies are opting into a combination of product demonstrations, countryside promotions, dealer training programs, seasonal offers as well as product purchases on credit. They further note that the dealer has been the strongest participant in the pesticide supply chain since he is likely to make instructions to the farmers based on the incentives offered to him/her by the companies. This can result in bias on the choice of the product to recommend in that in some instances, it will lead to the use of more costly and unnecessary chemical. To this study, the current research holds a certain value particularly the findings of the stated research which provided a direct data in empirical terms in respects of how the marketing strategies work in the agricultural ecosystem of Vidarbha.

Further proof given by Gamage et al. (2022) includes the significance of relationship marketing and communication effectiveness. Regarding the personalized message especially, the adoption of field officers, according to their discussion, they show that they feel reliable and thus have a higher likelihood of adopting a product. This is not evident in India alone where the field representatives employed by the company can visit farms regularly, hand out brochures and provide technical advice, thereby, indoctrinating farmers to demand some necessity and worth of a product.



Overall, the literature review has shown that marketing methods of pesticide companies influence farmers in relation to a variety of processes that happen interdependently: branding, promotions, dealer networks, technical advice services, and demonstrations. These practices have a compounding effect on the purchasing habits along with the extent as well as the manner in which the pesticides are cast into use. However, the literature also has some threats mentioned. Resorting too far on the recommendation of marketers can result in the wrong use of pesticides, high expenses on inputs, environmental degradation and health hazards. Other than that, there exist very little researches, which have sought to establish a direct correlation between marketing strategies and agricultural productivity, especially in agro-economically negative regions like Vidarbha. Despite the fact that some studies have reported growth positively because of the raising awareness and accessing in technology, others have also cautioned that these practices will have adverse impacts in productivity in the long-term because of the misuse whereby, promotions are the triggers.

Thus, the literature review can prove that pesticides marketing is a significant aspect of farmer behaviour, yet more empirical evidence should be supplied to understand what influence such approaches have on the agricultural productivity within specific socio-economic contexts. The specified gap forms the foundation of the ongoing research since it will carry out the study of marketing activities of pesticide production companies and its influence on agriculture production in the Vidarbha region.

Objectives of the Study

1. To identify the marketing strategies adopted by pesticide manufacturing companies in the Vidarbha region.
2. To examine farmers' awareness and perception of these marketing strategies.
3. To analyze the influence of pesticide marketing strategies on farmers' purchasing decisions.

Hypothesis

H₀: Farmers' awareness and perception of pesticide marketing strategies are not significant.

H₁: Farmers' awareness and perception of pesticide marketing strategies are significant.

Research Methodology

The research design adopted in the study is descriptive and analytical research design, on which the study will utilise in inquiry of the marketing policies of pesticide manufacturing companies and how they will influence the productivity of agriculture in the area of Vidarbha. The primary data was utilized, as well as the secondary data. The structured questionnaire administered to the farmers, dealers and field representatives was used in the collection of primary data where multistage sampling technique was used to randomly select the sample in the major agricultural districts in Vidarbha. The reports that were written by the government, published research papers and documents about the industry formed the secondary data that was gained. The data analysis allowed to make the conclusions basing on the descriptive statistics, correlation analysis, and regression analysis to define the relations between marketing strategies, the attitude of the farmers, and the productivity of the agricultural industry. The methodology will ensure that the trend pesticide use and production of crops in the region are holistically interpreted in terms of effect of marketing activities.

Descriptive Statistics Table

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Farmers' Awareness Score	300	1.00	5.00	3.82	0.76
Farmers' Perception Score	300	1.00	5.00	3.67	0.81

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Overall Awareness–Perception Combined Index	300	1.00	5.00	3.74	0.79

The descriptive statistics speaks on the understanding of the awareness and the perception of farmers towards Vidarbha generally because of the consideration of the marketing strategy of the pesticides. The mean of the awareness level is 3.82 and the standard deviation is 0.76 and it implies that most of the farmers have the averagely high level of their awareness regarding the marketing strategies of the pesticide producers with references to demonstrations, offers and advises of the dealers. Similarly, the perception score depicts a means of 3.67 with a standard deviation of 0.81 which suggests the farmers better have a positive attitude towards these marketing strategies but there is a small range in their responses. The mean of awareness-perception index of 3.74 is related to a steady yet a relatively high level of congruence in the knowledge that the farmers have with these strategies as well as their interpretation of these strategies. Overall, these insights suggest that the farmers seem not only to be aware of the marketing strategies in place at the moment, but also form rather vivid perceptions towards the latter, which, in its turn, preliminarily justifies the null hypothesis rejection and supports the idea that the industries in question are solid enough to be considered in terms of marketing operations of pesticides, in the area.

SPSS Output – One-Sample Test

One-Sample Statistics

Variable	N	Mean	Std. Deviation	Std. Error Mean
Farmers' Awareness Score	300	3.82	0.76	0.044
Farmers' Perception Score	300	3.67	0.81	0.047

One-Sample Test

Test Value = 3 (Neutral Midpoint of Likert Scale)

Variable	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
Farmers' Awareness Score	18.64	299	0.000	0.82	Lower 0.73 — Upper 0.91
Farmers' Perception Score	14.24	299	0.000	0.67	Lower 0.58 — Upper 0.76

The t-test results include that the awareness of farmers and perception of the pesticide marketing strategies is statistically significant. Being m as the midpoint of the Likert scale, mean score of awareness level (3.82) and mean score of perception level (3.67) is very high compared to the point of neutrality. The t-values of the awareness ($t = 18.64$, $p = 0.000$) and the perception ($t = 14.24$, $p = 0.000$) are extremely significant (at the level of 1 percent) that means that respondents of the farmer group respond differently than the neutral value does. These findings reveal that the farmers in the Vidarbha region possess exceedingly high knowledge on the marketing procedures employed by the pesticide companies and they also have witnessed certain noteworthy perceptions created by the marketing procedures. Such estimates are precise as well due to the close confidence intervals. Overall, the results lead to the rejection of the null hypothesis in favor of the alternative one; this means



that the perception and awareness about pesticide marketing strategies of farmers is an issue of a significant influence in the research context.

Discussion

The result of the hypothesis test is useful in the study of awareness and perception factors of the marketing strategy of the pesticides among the farmers of the Vidarbha region. The outcome of one sample t-test is very strong in that the level of awareness and that of the perception are significantly above the level of neutral of the scale. It is a pointer that marketers cannot dispat any promotional messaging to the farmers but rather they can be active contributors to promotional programs, exhibition in fields, marketed suggestions by dealers and through brand propoganda of the pesticides companies. Those may be linked to the rather high awareness rates that were also observed in previous studies, such as Senthilnathan et al. (2022) and Nirmal and Surya (2022) that reported the increasing presence of marketing agrochemicals in rural populations over the past few years due to the distributors of these products and the representatives of the field and direct outreach programs.

The scoring of the perception is high showing that the farmers are not neglecting the marketing strategies but also form judgments concerning the strategies. It is in line with the findings of Gamage et al. (2022), who have asserted that the attitude and trust of farmers towards the pesticide brands are affected by the advertising methods of advertisers which include discounts, sample offers, credit facilities, and technical assistance. The farmers will be more confident on the perceived viability of the products sold in the market because under the conditions of the Vidarbha where there is a very high agricultural risk due to the pest attacks on the crops, climate change, and dependence on cash crops. This renders the marketing strategies a powerful tool in both terms in influencing the selection of the product, and may as well affect the level of usage and frequency of usage.

The results also show that the perception and the awareness are two constructs that are related: the higher the exposure of farmers to the marketing activities, the higher they will gain the power to develop the generation of perception (positive and cautionary) on the application of pesticides. This cannot be ignored as the actual purchase decision is determined by perception ultimately influencing the practices and productivity in agriculture. On this case, farmers will readily adopt the product whereby the product appears to be functioning as demonstrated by high company demonstrations or where the product is recommended by dealers. Quite the opposite, doubts or scepticism or shunning can arise as a result of bad experience or lack of faith in marketing claims.

However, the argument must also put into consideration the bigger picture. As much as the enhanced knowledge and the positive attitudes can in turn enable informed decision-making process, the decision can also become more vulnerable. In competitive marketing, farmers might also use excessively or insufficiently apply pesticides, use expensive branded pesticides, or use chemicals that do not fit in best to the environment of the particular crop and pest. This is affirmed by Shuban et al. (2024), who found out that brand-based legitimacy might predominate agronomic suitability. Thus, despite the importance of the level of awareness and perception, it must be with regards to responsible usage and satisfied information- not just persuasive marketing.

The findings all testify to the fact that there is a great psychological and behavioral impact on the farmers of the region by the marketing strategies applied in pesticides (in Vidarbha). The relevance of the awareness and perception increases the relevance of the improved regulatory control, better information distribution and stronger agricultural extension services to ensure that marketing based decisions are oriented on sustainable and safe farming. These results are reflected in the broader understanding of the marketing plan capability of the agricultural performance, which is then an essential part of policy discourses and subsequent research.

Overall Conclusion

The paper sums up by saying that the awareness and the perception of the farmers and ultimately their purchasing behavior in the area of Vidarbha is influenced significantly by the marketing mix adopted by the pesticide



manufacturing organizations. My findings on the descriptive statistics and the t-tests that I had performed can be summarized as follows: farmers are highly aware of various marketing procedures including dealer recommendation, field demonstration, promotional offers and excellent communication effort that farmers have put towards their brands. Their perceptions towards these strategies are also extremely favorable, which suggests that marketing operations affect their attitude to different pesticides brands and products rather effectively. Such good attitude and increased understanding contributes towards making a better decision; a trait that is further boosted by the fact that such heightened awareness also details high persuasive capability of marketing to agrochemicals in a part of the world where the agricultural issues and the scarcity of technical information are supplemented by overdependence on external inputs.

As it is stressed in the analysis, marketing tools are not only business tools, but also important forces behind the pattern of pesticides use by farmers, as well as crop protection processes and willingness to explore new products. On the one hand, a sufficient marketing would raise the awareness of the farmers, make them more willing to use them appropriately, and, consequently, potentially, raise the productivity of the agriculture; on the other, it may be also harmful, as the farmers would over-rely on them or just slightly use them due to the promotion campaign information and the high price of branded products. In such a way, the outcomes of marketing practices are dual i.e. give the possibility to increase the productivity, and the issue of sustainability, safety, and economic burden.

Overall, one can mention that the study has emphasized the need of the balanced and responsible marketing practice as it is supported by the efficient agricultural extended services, training courses of the farmers, and the regulation. The availability of information that is impartial and scientifically true and reliable should also be reaffirmed to farmers to ensure that marketing motivated decision support is also done in accordance with agronomic sustainability and environmental healthiness. The findings contribute to the overall understanding of the role of marketing of pesticides in agricultural environment of Vidarbha and on the need to develop policies that promote ethical marketing, decision making and sustainable agricultural practices.

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