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Comparative analysis of promotional approaches adopted by pesticide companies

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Abstract

The study concludes that pesticide promotional strategies play a decisive role in shaping farmer's purchasing behavior in Mungeli district of Chhattisgarh. The analysis reveals that local dealers (score 77), peer farmers (66), and company sales representatives (60) remain the most trusted and influential information sources, while digital platforms (55) are gaining prominence but institutional sources such as KVKs (32), agricultural universities (25), and mobile apps (20) lag behind in effectiveness. Brand recall analysis further demonstrates that UPL (29.66), Bayer Crop Science (24.16), and Syngenta (23.66) dominate unaided recall, whereas FMC Corporation (30.00) leads under aided recall, reflecting the critical role of farmer-centric engagement tools such as field demonstrations, van campaigns, and direct personal contact. Companies with sustained investment in on-ground, interactive, and trust-based promotional activities achieve significantly higher brand equity and visibility, while those with limited outreach remain less recognized. Overall, the findings emphasize that pesticide companies must strategically prioritize dealer networks, peer influence, and experiential promotions to strengthen market competitiveness. Aligning promotional efforts with farmers' preferred communication ecosystems not only enhances brand equity but also contributes to more informed decision-making in Chhattisgarh's agricultural sector.

Keywords: Pesticide, promotional strategies, purchasing behavior, brand recall

1. Introduction

Agriculture is the backbone of Chhattisgarh's economy, engaging nearly 80% of its rural population, with 37.46 lakh farm families cultivating a net sown area of about 4.828 million hectares (GoCG, 2023) [4]. Often referred to as the *"Rice Bowl of Central India,"* rice dominates the cropping pattern, accounting for about 77% of the total cultivated area, alongside maize, pulses, oilseeds, and horticultural crops. Despite this, productivity remains lower than the national average due to reliance on rainfed farming only 20% of the cultivated land is irrigated (Kumar & Sharma, 2019) [6]. This underscores the increasing dependence on inputs like pesticides to stabilize yields and protect crops from pests and diseases.

The state has witnessed a significant rise in pesticide use, from 1,672 MT in 2019-20 to 1,781 MT in 2023-24 (DAC&FW, 2024). Studies indicate that pesticide consumption in Chhattisgarh grew by nearly 247% between 2007 and 2023, making it one of the fastest-growing pesticide-using states in India. Researchers such as (Gupta *et al*. (2021) [4] emphasize that high pesticide usage in paddy-dominated states like Chhattisgarh correlates with farmers' low awareness of integrated pest management (IPM) practices, pushing them toward chemical-based solutions. At the same time, the adoption of biopesticides has shown steady growth, reaching around 740 MT in 2022-23.

The pesticide market in Chhattisgarh is dominated by multinational and national firms. Bayer Crop Science, Syngenta, and Corteva Agriscience hold the largest market shares, accounting for nearly half of the ₹946 crore market. Research by Aiyeloja *et al*. (2012) [2] on pesticide marketing emphasizes that farmer decision-making is not only influenced by product performance but also by aggressive marketing strategies, such as demonstrations, credit availability, and retailer recommendations. Similarly, Rao & Raju (2018) highlight that in Indian states with low farmer literacy, dealer-driven promotions heavily impact brand preference.

To reduce farmers' vulnerability, the Government of Chhattisgarh has introduced schemes such as the Rajiv Gandhi Kisan Nyay Yojana (RGKNY), benefiting nearly 24 lakh farmers with direct income support. ICAR-NIBSM outreach programs under the Viksit Krishi Sankalp Abhiyan have also promoted IPM, direct-seeded rice, and bio-input adoption in 49 villages, reaching over 4,100 farmers (ICAR-NIBSM, 2025). Previous studies, such as Prasad & Singh (2017), show that government extension activities

significantly increase the likelihood of bio-pesticide adoption, reducing over-reliance on chemical pesticides.
Scholars agree that farmers' purchasing decisions are shaped by a combination of product quality, credit availability, peer influence, dealer recommendations, and promotional strategies (Ali & Kapoor, 2016) [1]. In Chhattisgarh, where subsistence-level farming prevails, companies often employ field demonstrations, attractive pricing schemes, free samples, and farmer meetings to penetrate rural markets. As Kaur & Sharma (2019) [6] argue, these strategies become more impactful when coupled with government initiatives and awareness programs.

2. Material and Method

The study focused on examining promotional strategies employed by pesticide companies in the Mungeli district, which was deliberately chosen for this purposefully. Chhattisgarh state 10th position (1775 MT) in pesticide consumption in India. In Chhattisgarh mungeli district is known for intensive pesticide usage for the cultivation of paddy. It is the third highest paddy productivity district in Chhattisgarh. In the district, two blocks, Mungeli and Pathariya, have larger crop areas under paddy cultivation. From these two blocks, 10 villages representing 2% of the total villages in both blocks were randomly selected, and from each selected village, 10% of the paddy-growing farmers were chosen at according to probability proportionate to size. In this way, a total of 174 sample respondent farmers were selected. To achieve the study's objectives, data were collected from primary and secondary sources.

3. Analytical tools and techniques

The fundamental characteristics of the study's data were described using descriptive statistics. To evaluate the data pertaining to the socioeconomic characteristics of the sample respondents, such as age, education, occupation, and family size, percentage analysis and averages were performed. The study also examined understanding the sources and awareness of pesticides, Comparison of promotional strategies among companies based on unaided and aided recall. Tabulation is the systematic and logical representation of numeric data in rows and columns to facilitate comparison and statistical analysis. It facilitates comparison by bringing related information close to each other and helps in statistical analysis and interpretation. The basic objectives of tabulation are to simplify complex data, bring out essential features of data, facilitate comparison, facilitate statistical analysis, and save space. In mathematics, a percentage is a number or ratio that can be expressed as a fraction of 100. If we have to calculate percent of a number, divide the number by the whole and multiply by 100. Hence, the percentage means, a part per hundred. The word percent means per 100. It is represented by the symbol "%". The percentage can be found by dividing the value by the total value and then multiplying the result by 100. The formula used to calculate the percentage is: Formula = (value/total value) ×100%.

3. Garrett's ranking technique

The sample respondents were asked to rank the constrains faced by them in purchasing pesticides. These ranks were converted into percent position by using formula,
Percent position = 100 x (Rij - 0.5) / Nj
Were,
Rij = Rank given to the ith factor by the jth individual
Nj= Number of factors ranked by the jth individual

4. Result and Discussion

The product promotion tactics used by manufacturers and distributors, together with an effective supply chain, play a crucial role in the promotion of goods and services in a competitive market environment. The industry is home to a large number of pesticide businesses that compete with one another. In order to meet the new obstacles in the commercial environment, pesticide manufacturers have modified their marketing approaches. The Indian pesticide industry's marketing tactics have seen a tremendous shift during the past ten years. The businesses are extensively promoting their goods in order to gain market share.

4.1 Understanding the sources and awareness of pesticides

The most influential source is the Pesticide Retailer/Dealer shop (Score 77), indicating that farmers heavily rely on local dealers for pesticide information. Fellow farmers (Score: 66) and company sales representatives (Score: 60) also play key roles in influencing decisions, highlighting the importance of interpersonal trust and direct communication. Digital sources such as WhatsApp/Social Media (Score: 55) are emerging as notable tools, ranking 4th. Traditional media like radio, TV, newspapers, and magazines are less influential (Scores: 45 and 40), possibly due to limited targeting or engagement. Institutional sources like KVKs (Score: 32), government officers (29), agricultural universities (25), and mobile apps/websites (20) are the least effective, possibly due to limited reach or less direct interaction with farmers.(Table 4.1)

Table 1: Understanding the sources and awareness of pesticides

S. No.	Promotional activity/ Information source	Garrett's value	
		Avg. Score	Rank
1	Pesticide Retailer/Dealer shop	77	I
2	Fellow Farmer	66	II
3	Company Sales Representative	60	III
4	WhatsApp/ Social Media	55	IV
5	Posters/ Hoardings/ Banners	50	V
6	Advertisements on Radio and TV	45	VI
7	Advertisements in Newspapers/ Magazines	40	VII
8	Farmer Meeting/ Mela/ Exhibitions	36	VIII
9	Krishi Vigyan Kendra (KVK)	32	IX
10	Government Agricultural Officers/ Extension Workers	29	X
11	Agricultural University events/ Publication	25	XI
12	Mobile Apps/ Websites	20	XII

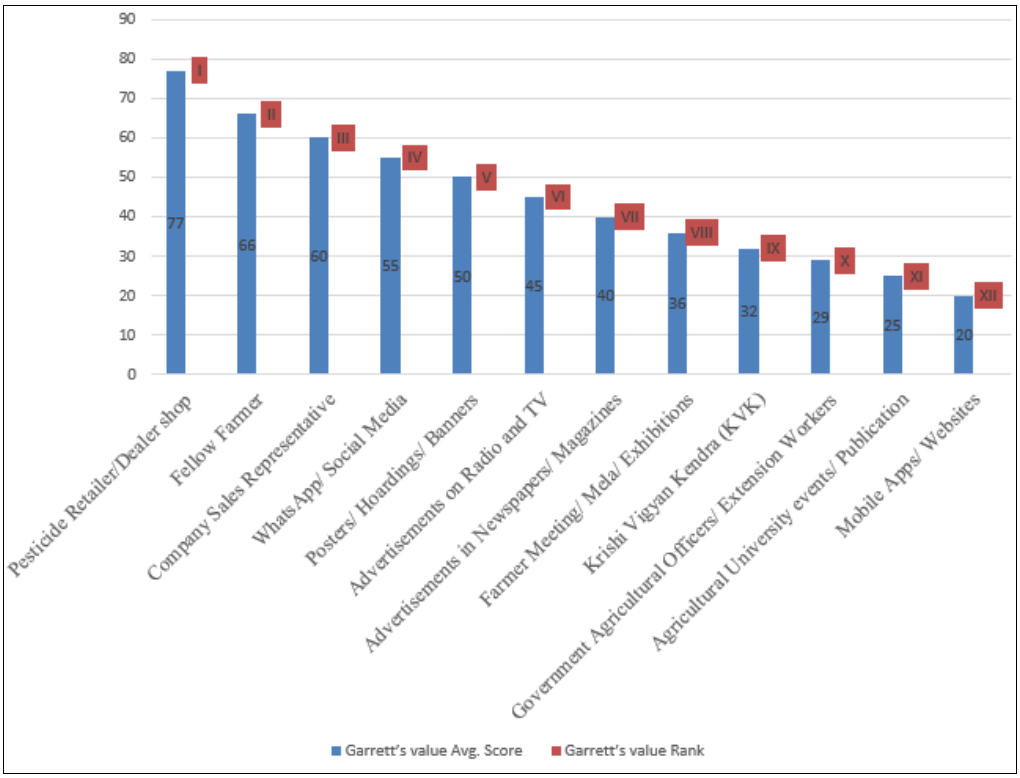

Fig 1: Understanding the sources and awareness of pesticides

4.2 Comparison of promotional strategies among companies based on unaided recall

The study aimed to evaluate the extent to which different pesticide companies are recalled by farmers based on the adoption of promotional strategies without any external prompting (unaided recall). Table 4.12 reveals notable differences in the effectiveness of promotional outreach among companies. UPL emerged as the most recalled company with the highest average score of 29.66, placing it at Rank I. This indicates that UPL's promotional efforts likely through consistent field presence, branding, or dealer engagement have significantly impacted farmers' memory and preference. A promotional strategy includes Farmer meeting, Personal contact, Field demonstration, Sample distribution, and Wall painting and Van campaign. Bayer Crop Science and Syngenta, with average scores of 24.16 and 23.66 respectively, followed closely, securing Ranks II and III. Their strong positions reflect effective communication strategies, possibly including demonstration activities and well-established product branding. FMC Corporation (21.00) and PI Industries (19.33) were placed at Ranks IV and V, suggesting moderate promotional penetration. Their recall level indicates they are known but not as dominantly remembered as the top performers. Mid-level performers like Rallis India (19.00) and BASF (18.83) followed, while Cortewa (18.16) and Sumitomo Chemicals (18.00), although present in the market, showed relatively lower unaided recall, occupying Ranks VIII and IX. Dhanuka Agritech (14.83) and HPM Chemicals & Fertilizers (11.16) were found to have the least unaided recall among all listed companies. This low recognition suggests a need for these companies to enhance visibility through more farmer-oriented promotional initiatives such as field demonstrations, personal contact programs, or local dealer involvement.

The results imply that recall of pesticide companies is strongly influenced by the visibility and relevance of their promotional strategies. Companies that invest more in on-ground, farmer-friendly promotion see better recall. Those with limited or less engaging strategies struggle to stay top-of-mind among the farming community. (Table 4.2)

Table 2: Comparison of promotional strategies used by input firms based on unaided recall.

S. No.	Company Name	Major Promotional strategies	Avg.	Rank
1	UPL	Wall painting, Sample distribution, Personal contact	29.66	I
2	Bayer crop science	Wall painting, Personal contact, Sample distribution	24.16	II
3	Syngenta	Personal contact, Farmer meeting, Field demonstration	23.66	III
4	FMC Corporation	Van campaign, Field demonstration, Farmer meeting/ Field visit	21	IV
5	PI industries	Personal contact, Field demonstration, Van campaign	19.33	V
6	Rallis India Ltd.	Farmer meeting, Personal contact, Field demonstration	19	VI
7	BASF	Farmer meeting, Personal contact, Field demonstration	18.83	VII
8	Cortewa	Personal contact, Farmer meeting, Wall painting	18.16	VIII
9	Sumitomo Chemicals India Ltd	Personal contact, Farmer meeting, Field demonstration	18	IX
10	Dhanuka Agritech Limited	Farmer meeting, Personal contact, Field demonstration	14.83	X
11	HPM Chemicals & Fertilizers Limited	Field demonstration, Personal contact, Farmer meeting	11.16	XI

4.3 Comparison of promotional strategies among companies based on aided recall

The present study evaluates the effectiveness of promotional strategies adopted by pesticide companies in Mungeli district, as perceived by farmers under aided recall conditions where farmers were prompted with company names. Table 4.13 provides insights into how effectively each company's promotions have reached and influenced the target audience. FMC Corporation secured the top rank (Avg. 30.00), indicating that its promotional efforts are the most recognized and remembered by farmers when prompted. This suggests a strong presence through active engagement methods like field visits, demonstration programs, or visible dealer support. UPL (Avg. 29.67) closely followed at Rank II, maintaining a robust recall among farmers, likely due to consistent branding and outreach strategies. Bayer Crop Science (Avg. 27.17) and Syngenta (Avg. 24.33) placed at Ranks III and IV respectively, reflecting successful promotional penetration and established brand presence. Rallis India (Avg. 23.67) and Sumitomo Chemicals (Avg. 22.83) took Ranks V and VI, indicating moderate recall, possibly benefiting from regional outreach and dealer influence. Cortewa (Avg. 22.67) and PI Industries (Avg. 21.5) were placed at Ranks VII and VIII, suggesting that their promotional efforts are recognized but less prominent compared to the top performers. BASF (Avg. 18.83), Dhanuka Agritech (Avg. 17.00), and HPM Chemicals & Fertilizers (Avg. 11.17) ranked lowest, indicating limited recall even with prompts. These companies may be facing challenges in outreach effectiveness or engagement visibility.

The data clearly shows that companies with high farmer engagement, consistent brand visibility, and strategic promotional efforts enjoy better aided recall. Farmers tend to remember those brands that maintain a frequent and interactive presence at the local level, such as through dealer support, field demonstrations, and personal contact. (Table 4.3)

Table 3: Comparison of promotional strategies used by input firms based on aided recall.

S. No.	Company Name	Major Promotional strategies	Avg.	Rank
1	FMC Corporation	Personal contact, Farmer meeting, Van campaign	30	I
2	UPL	Personal contact, Farmer meeting, Van campaign	29.67	II
3	Bayer crop science	Personal contact, Field demonstration, Farmer meeting	27.17	III
4	Syngenta	Personal contact, Farmer meeting, Field demonstration	24.33	IV
5	Rallis India Ltd.	Field demonstration, Farmer meeting, Personal contact	23.67	V
6	Sumitomo Chemicals India Ltd	Farmer meeting, Personal contact, Field demonstration	22.83	VI
7	Cortewa	Personal contact, Farmer meeting, Field demonstration	22.67	VII
8	PI industries	Personal contact, Farmer meeting, Field demonstration	21.5	VIII
9	BASF	Farmer meeting, Personal contact, Field demonstration	18.83	IX
10	Dhanuka Agritech Limited	Personal contact, Farmer meeting, Field demonstration	17	X
11	HPM Chemicals & Fertilizers Limited	Field demonstration, Personal contact, Farmer meeting	11.17	XI

4.4 Comparative analysis of pesticide companies based on unaided and aided recall of promotional strategies.

A comparative assessment of unaided and aided recall revealed significant variation in the visibility and brand retention of pesticide companies, reflecting the differential effectiveness of their promotional strategies. UPL emerged as a consistently strong performer, ranking first in unaided recall (Avg. 29.66) and second in aided recall (Avg. 29.67), indicating that its branding and farmer-centric outreach are deeply ingrained in farmers' memory even without external cues. FMC Corporation, however, displayed a contrasting pattern: while it ranked fourth under unaided recall (21.00), it moved to the top position under aided recall (30.00), suggesting that although spontaneous recall was weaker, its promotional presence is well-recognized when prompted, pointing to robust but less naturally retained branding. Bayer Crop Science and Syngenta consistently occupied middle to high ranks (II-IV) across both recall types, reflecting steady visibility likely supported by strong dealer networks and regular field-based interventions. In contrast, PI Industries slipped from Rank V in unaided recall (19.33) to Rank VIII in aided recall (21.50), implying a narrower reach and limited reinforcement of brand identity. Rallis India, Sumitomo Chemicals, and Cortewa improved in aided recall, highlighting latent awareness that surfaces with prompting but does not translate into strong spontaneous recall-possibly due to localized or less aggressive promotions. At the lower end, HPM Chemicals & Fertilizers (11.16-11.17) and Dhanuka Agritech (14.83-17.00) consistently recorded minimal recall in both conditions, underscoring weak promotional penetration and limited communication strategies.

Overall, the analysis indicates that unaided recall represents the inherent strength and natural visibility of a brand, while aided recall reflects latent awareness activated through cues. Companies like UPL and FMC, which combine consistent field-level presence with farmer-oriented strategies, demonstrate superior brand retention, whereas firms with fragmented or less intensive outreach face persistent challenges in achieving strong recall.

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