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Farmers' perception and expenditure share on bayer crop protection products in soybean cultivation in Buldhana district

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Abstract

This study explores how local farmers perceive and spend on Bayer CropScience products across Khamgaon, Nandura, and Malkapur talukas in Buldhana district, drawing insights from 90 surveyed growers. The results show that buying decisions come down to real-world performance and trust: product effectiveness came out on top (mean score 4.54), followed closely by easy market availability (4.34), brand reputation (4.29), and overall satisfaction (4.24). On the flip side, details like usage instructions, pack options, and packaging scored lowest, reflecting that growers lean far more on their local agro-dealers and personal field experience than on the fine print on the bottles. On the financial side, Bayer accounted for nearly a third (30.39%, or ₹3,70,880.75 out of ₹12,20,572.97) of the total crop-protection budget in the area, peaking in Nandura taluka at 33.42%. Looking across input categories, Bayer held its strongest ground in fungicides at 39.15%, followed by insecticides at 28.63% and herbicides at 19.40%, showing solid farmer confidence for tackling pests and diseases while leaving plenty of room to expand in weed control.

Keywords: Agrochemicals, bayer cropsience, buldhana district, expenditure share, farmer perception

Introduction

Crop protection chemicals insecticides, fungicides and herbicides form a core input in modern soybean cultivation, protecting yields against aggressive weeds, fungal diseases and destructive pests such as the girdle beetle. Bayer CropScience Limited, an Indian subsidiary of Bayer AG, is one of the leading players in India's crop protection and agribusiness sector, offering a wide portfolio of insecticides (Fame, Vayego, Alanto, Solomon), fungicides (Folicur, Buonos, Nativo) and herbicides (Whip Super, Sencor) for soybean and other field crops.

Maharashtra is among the highest consumers of crop protection chemicals in India, and Buldhana district, situated in the Vidarbha region, is a major soybean-growing area. However, farmers in the district often navigate a fragmented distribution network of dealers and cooperatives, where product choice is shaped by dealer advice, credit availability, and prior field experience as much as by the product itself. Understanding how farmers perceive Bayer's products, what factors drive their purchase decisions, and how much of their overall crop protection budget is allocated to the brand offers useful insight into brand performance and adoption patterns in this region.

The present paper draws on the following objectives of the study

1. To study farmers' perception for purchase of Bayer crop science products.
2. To work out the percentage share of the Bayer product in total expenditure by farmer.

Methodology

Area and period of study

The study was conducted in Buldhana district of Maharashtra, covering three talukas Khamgaon, Nandura and Malkapur with three villages selected in each taluka. Data pertains to the year 2025-26. Primary data were collected from 90 soybean farmers (30 per taluka) through personal interviews using a structured schedule.

Farmers' perception

Farmers' perception of Bayer CropScience products was assessed on a five-point Likert

scale (Strongly Disagree to Strongly Agree) across twelve parameters price, quality, quantity, packaging, effectiveness, product information, market availability, expiry date, trust, use instructions, satisfaction and willingness to recommend using the Mean Preference Score:

$$\text{Likert Mean Preference Score} = \Sigma (f \times w) / N$$

Where, f = Frequency of each response, w = Weight assigned to the response, N = Total number of respondents.

Percentage share of Bayer product in total expenditure

The share of Bayer products in farmers' total crop protection expenditure was worked out separately for insecticides, herbicides and fungicides, using the formula:

$$\text{Share percentage} = [\text{Expenditure on Bayer products by farmer} / (\text{Expenditure on other products by farmer} + \text{Expenditure on Bayer products by farmer})] \times 100$$

Results and Discussion

Farmers' perception for purchase of Bayer crop science products

The results reveal that 'Effectiveness' was the most highly rated

attribute, obtaining the highest mean score of 4.54 and securing Rank I; 82 of the 90 respondents either agreed or strongly agreed, indicating that farmers primarily associate Bayer products with superior performance and pest control. 'Available in market' ranked second (mean score 4.34), followed by 'Trust Bayer' (4.29, Rank III) and 'Satisfied' (4.24, Rank IV), suggesting that product performance, ease of market access and brand trust are the core drivers of farmers' positive perception. 'Quality' ranked fifth (4.08) and 'Recommend to other' sixth (3.88).

'Price' secured the seventh rank (3.61); while a majority were positive, a noticeable group remained neutral or disagreed, indicating price sensitivity among smallholders. Label-related parameters 'Use Instruction' (3.54, Rank VIII), 'Expiry Date' (3.52, Rank IX) and 'Product information' (3.36, Rank X) received moderate ratings, with a large share of neutral responses suggesting farmers rely more on prior experience or dealer advice than on reading chemical labels. 'Quantity' (3.32) and 'Packaging' (3.29) received the lowest scores, ranking eleventh and twelfth respectively, pointing to room for more varied and convenient pack sizes.

Table 1: Farmers' Perception for Purchase of Bayer Crop Science Products

Parameter	SD	D	N	A	SA	Total Score	Mean Score	Rank
Effectiveness	0	0	8	25	57	409	4.54	I
Available in market	0	1	6	44	39	391	4.34	II
Trust Bayer	0	0	13	38	39	386	4.29	III
Satisfied	0	1	13	39	37	382	4.24	IV
Quality	0	4	9	53	24	367	4.08	V
Recommend to other	0	0	16	69	5	349	3.88	VI
Price	0	14	24	35	17	325	3.61	VII
Use Instruction	0	0	50	31	9	319	3.54	VIII
Expiry Date	0	0	47	39	4	317	3.52	IX
Product information	0	1	64	17	8	302	3.36	X
Quantity	0	12	38	39	1	299	3.32	XI
Packaging	0	0	66	22	2	296	3.29	XII

Note: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree.

Percentage share of bayer product in total expenditure by farmer

Expenditure on crop protection products constitutes a major part of a farmer's overall input budget during the cropping season. The share of Bayer CropScience products in this expenditure, relative to all other agrochemical brands, was worked out separately for the three sampled talukas Khamgaon, Nandura and Malkapur and then for Buldhana district as a whole.

(a) Khamgaon taluka

Among the 30 surveyed farmers in Khamgaon taluka, total

agrochemical expenditure stood at ₹5,86,415.86, of which ₹1,76,037.90 was spent specifically on Bayer products a 30.02 per cent value share of the overall crop protection spend. Category-wise, Bayer performed strongest in fungicides, capturing 39.60 per cent of fungicide spending (₹79,488.00 out of ₹2,00,688.00). It secured a 26.20 per cent share in insecticides (₹73,449.90 out of ₹2,80,309.86) and a 21.91 per cent share in herbicides (₹23,100.00 out of ₹1,05,418.00), showing a consistent farmer preference for the brand across all three input segments.

Table 2: (a) Distribution of Share of Bayer Products in Total Expenditure by Farmers in Khamgaon Taluka

Product Category	Total Expenditure on all Products by Farmers	Total Expenditure on Other Brand Products by Farmers	Total Expenditure on Bayer Brand Products by Farmers	Share of Bayer Products in Total Expenditure (%)
Insecticide	280309.86	206859.96	73449.90	26.20
Herbicide	105418.00	82318.00	23100.00	21.91
Fungicide	200688.00	121200.00	79488.00	39.60
Total	586415.86	410377.96	176037.90	30.02

(b) Nandura taluka

In Nandura taluka, total agrochemical expenditure of the 30 surveyed farmers stood at ₹4,32,205.04, of which ₹1,44,460.70 was spent on Bayer products, giving the brand

a substantial 33.42 per cent value share the highest among the three talukas. Bayer performed strongest in fungicides, capturing 43.38 per cent of total spending (₹65,664.00 out of ₹1,51,384.00), followed closely by insecticides at 35.04

per cent (₹66,196.70 out of ₹1,88,894.04). Its herbicide share was comparatively lower at 13.71 per cent (₹12,600.00 out of ₹91,927.00), highlighting a clear reliance

on Bayer for pest and disease management among local growers, with less penetration in weed management.

Table 3: (b) Distribution of Share of Bayer Products in Total Expenditure by Farmers in Nandura Taluka

Product Category	Total Expenditure on all Products by Farmers	Total Expenditure on Other Brand Products by Farmers	Total Expenditure on Bayer Brand Products by Farmers	Share of Bayer Products in Total Expenditure (%)
Insecticide	188894.04	122697.34	66196.70	35.04
Herbicide	91927.00	79327.00	12600.00	13.71
Fungicide	151384.00	85720.00	65664.00	43.38
Total	432205.04	287744.34	144460.70	33.42

(c) Malkapur taluka

In Malkapur taluka, the 30 surveyed farmers together spent ₹2,01,952.07 on crop protection chemicals, of which ₹50,382.15 was allocated specifically to Bayer products, giving the brand a 24.95 per cent value share the lowest among the three talukas. Bayer secured its highest share in fungicides at 27.69 per cent (₹17,712.00 out of ₹63,972.00),

followed by herbicides at 25.20 per cent (₹11,200.00 out of ₹44,452.00) and insecticides at 22.96 per cent (₹21,470.15 out of ₹93,528.07). These results indicate a more balanced and steady adoption of Bayer CropScience inputs across all three chemical segments in Malkapur, compared with the fungicide-led pattern seen in Khamgaon and Nandura.

Table 4: (c) Distribution of Share of Bayer Products in Total Expenditure by Farmers in Malkapur Taluka

Product Category	Total Expenditure on all Products by Farmers	Total Expenditure on Other Brand Products by Farmers	Total Expenditure on Bayer Brand Products by Farmers	Share of Bayer Products in Total Expenditure (%)
Insecticide	93528.07	72057.92	21470.15	22.96
Herbicide	44452.00	33252.00	11200.00	25.20
Fungicide	63972.00	46260.00	17712.00	27.69
Total	201952.07	151569.92	50382.15	24.95

(d) Overall Buldhana District

Pooling all 90 surveyed farmers across the three talukas, total seasonal expenditure on crop protection chemicals in Buldhana district stood at ₹12,20,572.97, of which ₹3,70,880.75 was spent specifically on Bayer products a substantial 30.39 per cent value share at the district level. Across individual input categories, Bayer achieved its strongest presence in fungicides with a 39.15 per cent share (₹1,62,864.00 out of ₹4,16,044.00), followed by insecticides at 28.63 per cent (₹1,61,116.75 out of ₹5,62,731.97) and herbicides at 19.40 per cent (₹46,900.00 out of ₹2,41,797.00).

Comparing across talukas, brand adoption was highest in Nandura (33.42 per cent), followed by Khamgaon (30.02 per cent) and Malkapur (24.95 per cent). This pattern held consistently for fungicides and insecticides, where Nandura recorded the highest Bayer share and Malkapur the lowest, while for herbicides Malkapur recorded the highest Bayer share (25.20 per cent) and Nandura the lowest (13.71 per cent). Overall, these findings indicate strong district-wide adoption and brand equity for Bayer, particularly in disease and insect pest management, with herbicides representing the segment with the greatest scope for expanding market share across all three talukas.

Table 5: (d) Distribution of Share of Bayer Products in Total Expenditure by Farmers in Buldhana District (Overall)

Product Category	Total Expenditure on all Products by Farmers	Total Expenditure on Other Brand Products by Farmers	Total Expenditure on Bayer Brand Products by Farmers	Share of Bayer Products in Total Expenditure (%)
Insecticide	562731.97	401615.22	161116.75	28.63
Herbicide	241797.00	194897.00	46900.00	19.40
Fungicide	416044.00	253180.00	162864.00	39.15
Total	1220572.97	849692.22	370880.75	30.39

Conclusions

Farmers in Buldhana district hold a strongly positive perception of Bayer CropScience products, driven primarily by high field effectiveness, ready market availability and brand trust, while price, packaging aesthetics and label-related instructions receive comparatively lower, mixed ratings indicating reliance on personal experience and dealer guidance over printed details. Product adoption across the region shows that consistent retail availability, dependable quality and brand reputation are the critical determinants governing actual field use. Bayer CropScience commands a substantial 30.39 per cent value share of the total crop protection expenditure in the district, demonstrating its

strongest dominance in the fungicide segment, followed by insecticides, and recording its lowest penetration in herbicides, which highlights weed management as the principal segment with the greatest scope for expanding future market share.

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