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Role of social media in dissemination of herbicide related-information and its influence on farmers' purchase decisions: Evidence from Raipur District, Chhattisgarh

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Abstract

Herbicides have become indispensable for effective weed management in modern agriculture, and the rapid spread of smartphones and internet connectivity has begun to reshape the way farmers access information about such agro-inputs. However, empirical evidence on how social media content is actually consumed by farmers, and whether this engagement translates into herbicide purchase decisions, remains limited in the Chhattisgarh context. The present study examines (i) the frequency and type of herbicide-related social media content accessed by farmers, and (ii) the influence of social media engagement on farmers' herbicide purchase decisions in Abhanpur and Dharsiwa blocks of Raipur district, Chhattisgarh. Primary data were collected from 70 farmers and 30 agro-input retailers/wholesalers using pre-tested, structured interview schedules, and were analysed using frequency, percentage, weighted mean score (WMS) and multiple linear regression. The results show that 65.7 per cent of farmers never actively engaged with herbicide-related content on social media; among those who did, YouTube (48.6%) was the most preferred platform and advertisements (WMS = 4.83) the most frequently accessed content type, while agro-input businesses relied predominantly on WhatsApp (58.6%) for promotion. Expert advice (WMS = 4.58) and farmer reviews (WMS = 4.58) emerged as the strongest influences on purchase decisions, ahead of social media advertisements (4.50) and brand promotion (4.21), whereas discounts and offers exerted the least influence (1.67). Regression analysis revealed that farmers' education level significantly predicted their access to herbicide-related content ($\beta = -0.497$, $p < 0.001$), while engagement frequency did not ($p = 0.951$). Other farmers (45.7%) and retailers (40.0%) remained more trusted information sources than social media (11.4%). The findings suggest that social media currently functions mainly as a supplementary information and awareness channel rather than a primary driver of herbicide purchase decisions, and that credibility-building content - expert-endorsed and peer-validated - offers the greatest potential for strengthening its role as a marketing tool.

Keywords: Social media marketing, herbicide promotion, farmer perception, purchase decision, digital agriculture, weighted mean score

1. Introduction

Marketing in agriculture facilitates not only the availability of inputs but also the dissemination of knowledge about modern farming technologies (Kotler & Keller, 2022) ^[10]. Herbicides have become a critical component of contemporary weed management, reducing labour dependence and improving crop productivity, particularly as rural labour shortages intensify (Duke, 2012) ^[5]. The effective use of herbicides, however, depends heavily on farmers possessing accurate and timely information on product selection, dosage, application method and safety precautions.

The proliferation of Information and Communication Technology (ICT) has transformed conventional agricultural marketing into digital marketing, enabling agrochemical companies to communicate directly with farmers through internet-based platforms (Chaffey & Ellis-Chadwick, 2022) ^[4]. Social media in particular has emerged as an influential channel: platforms such as YouTube, WhatsApp, Facebook and Instagram allow two-way, interactive communication between companies, experts and farmers, unlike the one-way

flow typical of traditional media (Kietzmann *et al.*, 2011) ^[9]. Companies increasingly use these platforms to circulate demonstration videos, expert recommendations and farmer testimonials related to herbicide use.

In India, rising smartphone penetration and government programmes such as the Digital Agriculture Mission have widened farmers' access to digital advisory content (Ministry of Agriculture & Farmers Welfare, 2023), while the FAO (2022) has emphasised the potential of digital technologies to strengthen agricultural advisory services more broadly. Chhattisgarh, and Raipur district in particular, is a predominantly paddy-, wheat-, pulse- and vegetable-growing region where weed infestation is a major production constraint and herbicide dependence is rising. Despite growing digital access, whether farmers actually engage with herbicide-related social media content - and whether such engagement shapes their purchase behaviour - has not been empirically examined in this region.

Against this background, the present paper draws on a larger thesis-based investigation to specifically address two questions: what is the frequency and type of herbicide-related social media content accessed by farmers, and how does

social media engagement influence their herbicide purchase decisions? The paper is confined to these two dimensions; region-specific challenges and opportunities associated with social media marketing, treated elsewhere in the parent study, are outside its present scope.

Hence the present study tries to empirically investigate role of social media Dissemination Herbicide Related-Information and Its Influence on Farmers' Purchase Decisions in Raipur District, Chhattisgarh the objectives of the study were as follows:

1. Frequency and type of social media content accessed by farmers related to herbicides
2. Impact of social media engagement on farmers' herbicide purchase decisions

2. Materials and Methods

2.1 Study area

The study was conducted in Abhanpur and Dharsiwa blocks of Raipur district, Chhattisgarh - a district purposively selected for its predominance of paddy, wheat, pulse and vegetable cultivation, its considerable herbicide dependence for weed management, and its comparatively high smartphone and internet penetration relative to other districts of the state.

2.2 Sampling procedure

A total of 100 respondents were selected using convenience sampling, a non-probability technique adopted for its efficiency in reaching accessible and willing respondents. The sample comprised 70 farmers, selected to capture social media usage patterns, information sources and purchasing behaviour, and 30 agricultural input retailers/wholesalers, selected to capture promotional practices and perceptions of social media effectiveness. Farmers were interviewed during village field visits; retailers and wholesalers were interviewed at their business establishments.

2.3 Data collection

Primary data were collected through pre-tested, structured interview schedules administered via personal interview, using separate instruments for farmers and for retailers/wholesalers. Secondary data supporting the study were drawn from research journals, government and FAO reports, agrochemical company publications, and other relevant literature on digital agriculture and social media marketing.

2.4 Tools of analysis

Collected data were coded, tabulated and analysed in Microsoft Excel 2021 and IBM SPSS Statistics (Version 26). Descriptive techniques - frequency, percentage, mean, weighted mean score (WMS) and ranking - were used to summarise responses on social media usage, content type accessed, and factors influencing purchase decisions. A five-point Likert scale (Strongly Disagree = 1 to Strongly Agree = 5) underpinned the WMS computation:

$$WMS = \sum(f_i \times w_i) / N$$

Where f_i is the frequency of respondents in each response category, w_i the weight assigned to that category, and N the total number of respondents. In addition, a multiple linear regression (IBM SPSS, Analyze → Regression → Linear) was estimated to examine whether farmers' education level and social media engagement frequency predict their access to herbicide-related content, with model fit assessed via R and R^2 , overall significance via the ANOVA F-test, and individual predictor contribution via standardised coefficients (β) and t-statistics, at $\alpha = 0.05$.

3. Results and Discussion

3.1 Profile of respondents

Among the 70 sampled farmers, 41.4 per cent were above 50 years of age and 28.6 per cent were aged 36-50 years, indicating that the sample was dominated by experienced farmers; only 7.1 per cent were below 25 years. In terms of education, 27.1 per cent had completed secondary schooling while 21.4 per cent were illiterate and 18.6 per cent had only primary schooling - a distribution that has a direct bearing on farmers' capacity to access and interpret digital content, as reflected later in the regression results (Section 3.3.2). Paddy was cultivated by 88.6 per cent of respondents, followed by wheat (32.9%), pulses (31.4%) and vegetables (21.4%), underscoring the centrality of paddy-based weed management and hence herbicide use - in the study area.

3.2. Social media platforms used by agro-input businesses for promoting herbicides

WhatsApp was the dominant platform used by agro-input businesses to promote herbicide products, reported by 58.6 per cent of the 30 dealer respondents (Table 1), reflecting its ease of use, instant messaging and group-communication features. Facebook and YouTube followed at 17.2 per cent each, valued respectively for wider audience reach and for visual product demonstrations, while Instagram was used by only 3.4 per cent of businesses.

Table 1: Social media platforms used by agro-input businesses for promoting herbicide products (n = 30)

Social Media Platform	Frequency	Percentage (%)	Rank
WhatsApp	17	58.6	I
Facebook	5	17.2	II
YouTube	5	17.2	II
Others	6	20.7	III
Instagram	1	3.4	IV

Source: Primary data (2025-26).

3.3 Purpose of using social media by agro-input businesses

Product promotion and advertising was the leading purpose for which dealers used social media (66.7%), followed by customer communication and support (50.0%), sharing

product/technical information (40.0%), increasing sales (30.0%) and building customer trust (23.3%) (Table 2), indicating that dealers use these platforms chiefly as promotional and communication tools rather than for structured technical extension.

Table 2: Purpose of using social media by agro-input businesses for promoting herbicide products (n = 30)

Purpose	Frequency	Percentage (%)	Rank
Product promotion and advertising	20	66.7	I
Customer communication and support	15	50.0	II
Sharing product information and technical guidance	12	40.0	III
Increasing sales and business growth	9	30.0	IV
Building customer awareness and trust	7	23.3	V

Source: Primary data (2025-25).

3.4 Farmers' engagement with herbicide-related content

Despite growing smartphone access, actual engagement with herbicide-related social media content among farmers was low: 65.7 per cent of the 70 farmers reported never engaging

with such content (Table 3). Among those who did engage, 14.3 per cent did so 4-6 times a week and 10.0 per cent daily, indicating a small but active core of regular users, while only 1.4 per cent engaged occasionally.

Table 3: Frequency of farmers' engagement with herbicide-related content on social media (n = 70)

Frequency of Engagement	Farmers	Percentage (%)
Daily	7	10.0
4-6 times/week	10	14.3
1-3 times/week	6	8.6
Occasionally	1	1.4
Never	46	65.7
Total	70	100.0

Source: Primary data (2025-26).

3.5 Social media platforms used by farmers for herbicide-related information

YouTube was the most preferred platform for herbicide-related information (48.6%), attributable to its capacity for detailed video demonstrations and expert guidance, followed

by Instagram (37.1%), Facebook (31.4%) and WhatsApp (28.6%) (Table 4). Other platforms accounted for only 4.3 per cent, indicating a negligible role for alternative digital channels.

Table 4: Social media platforms used by farmers for accessing herbicide-related information (n = 70)

Social Media Platform	Frequency	Percentage (%)
YouTube	34	48.6
Instagram	26	37.1
Facebook	22	31.4
WhatsApp	20	28.6
Other Platforms	3	4.3

Source: Primary data (2025-26).

3.6 Type of herbicide-related content accessed

Among farmers who engaged with herbicide-related content, advertisements recorded the highest Weighted Mean Score (4.83) and secured Rank I, followed by company promotions (4.75) and expert advice (4.13) (Table 5). Practical,

experience-based content farmer reviews (2.79), usage tutorials (2.71) and demonstration videos (2.63) was accessed considerably less, indicating that current exposure is concentrated on commercial/promotional material rather than field-based practical content.

Table 5: Farmers' access to herbicide-related content through social media (n = 24 engaged respondents)

Type of Content	Daily	Weekly	Monthly	Occasionally	Never	WMS	Rank
Advertisements	21	2	1	0	0	4.83	I
Company Promotions	20	2	2	0	0	4.75	II
Expert Advice	13	3	6	2	0	4.13	III
Usage Tutorials	2	4	6	9	3	2.71	IV
Farmer Reviews	1	3	6	12	2	2.79	V
Demo Videos	0	0	10	9	5	2.63	VI

Source: Primary data (2025-26).

3.7 Factors influencing purchase decisions

Among the factors assessed, expert advice recorded the highest influence on purchase decisions (WMS = 4.58, Rank I), closely followed by farmer reviews (4.58, Rank II) and social media advertisements (4.50, Rank III) (Table 6). Brand promotion showed a moderate-to-high influence (4.21), whereas demonstration videos (2.00) and, especially, discounts and offers (1.67) exerted comparatively little influence. This pattern indicates that farmers weight technical

credibility and peer experience more heavily than price-based promotional incentives when deciding on herbicide purchases -consistent with Hoeffler and Keller's (2002) ^[8] argument that brand awareness and trust, rather than short-term incentives, chiefly drive purchase confidence, and with Wallace *et al.*'s (2009) ^[16] and Steffes and Burgee's (2009) ^[13] findings on the outsized influence of peer/expert recommendations relative to conventional advertising.

Table 6: Factors influencing farmers' herbicide purchase decisions (n = 24 engaged respondents)

Factors Influencing Purchase Decision	High	Moderate	Low	None	WMS	Rank
Social Media Advertisements	13	10	1	0	4.50	III
Farmer Reviews	18	2	4	0	4.58	II
Demo Videos	0	4	16	4	2.00	V
Expert Advice	18	3	2	1	4.58	I
Discounts & Offers	1	1	11	11	1.67	VI
Brand Promotion	10	10	3	1	4.21	IV

Source: Primary data (2026).

3.8 Multiple linear regression analysis

A multiple linear regression was estimated to test whether farmers' education level and social media engagement frequency predict their access to herbicide-related content (N = 70). The model showed a moderate positive correlation (R

= 0.495) and explained 24.5 per cent of the variance in access to herbicide-related content ($R^2 = 0.245$; Adjusted $R^2 = 0.222$) (Table 7), and was statistically significant overall, $F(2, 67) = 10.859$, $p < 0.001$ (Table 8).

Table 7: Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.495	0.245	0.222	0.833

Table 8: ANOVA (model significance)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.072	2	7.536	10.859	<0.001
Residual	46.500	67	0.694	—	—
Total	61.572	69	—	—	—

Coefficients indicated that education level was a statistically significant predictor of access to herbicide-related content ($B = -0.350$, $\beta = -0.497$, $t = -4.359$, $p < 0.001$), while social media engagement frequency was not ($B = -0.004$, $\beta = -0.007$, $t = -0.062$, $p = 0.951$), contributing negligible unique explanatory power once education was accounted for. The resulting regression equation was:

Access to herbicide-related content = 4.112 - 0.350 (Education level) - 0.004 (Engagement frequency)

This finding is notable: it suggests that how much a farmer accesses herbicide-related content is shaped more by underlying educational capacity to seek out and interpret information than by how frequently they log on to social

media a distinction with direct implications for how content should be designed (Section 5).

3.9 Most trusted source of information before purchase

When asked to identify their single most trusted source before purchasing herbicides, farmers ranked other farmers highest (45.7%), followed by retailers (40.0%), social media (11.4%) and experts (2.9%) (Table 9). This confirms that, notwithstanding social media's contribution to product awareness (Section 4.2), farmers' final purchase confidence still rests predominantly on personal experience and direct retailer interaction rather than on digital content.

Table 9: Most trusted source of information before purchasing herbicides (n = 70)

Primary Source	No. of Farmers	Percentage (%)
Other Farmers	32	45.7
Retailers	28	40.0
Social Media	8	11.4
Experts	2	2.9
Total	70	100.0

Source: Primary data (2025-26).

4. Summary

The findings on show that, although agro-input businesses actively promote herbicides via WhatsApp and farmers who engage with agricultural content prefer YouTube, actual farmer engagement with herbicide-related social media content remains low (65.7% never engage), and the content that is accessed skews heavily toward advertisements and company promotions rather than practical, experience-based material such as demonstration videos and farmer reviews. This is broadly consistent with Mangold and Faulds (2009) [11] and Kietzmann *et al.* (2011) [9], who note that organisations readily adopt social media for one-directional promotional messaging, even where the medium's

comparative advantage lies in two-way, experience-sharing communication (Boyd & Ellison, 2007) [1].

The study finds that engagement with social media per se is not what drives purchase decisions; rather, the credibility of the information source is decisive - expert advice and farmer reviews rank above social media advertisements and well above discounts or brand promotion. This aligns with Wallace *et al.* (2009) [16] and Steffes and Burgee (2009) [13] on the outsized influence of peer and expert endorsement relative to direct advertising, and reinforces Hoeffler and Keller's (2002) 8v view that trust-based brand equity, not price incentive, anchors purchase confidence. The regression results further show that farmers' education level, not the

frequency of social media use, meaningfully predicts how much herbicide-related content they access implying that raising engagement volume alone will not improve outcomes unless content is also made more accessible to less-educated farmers.

5. Limitations

The study is confined to Abhanpur and Dharsiwa blocks of Raipur district and is based on a convenience sample of 70 farmers and 30 retailers/wholesalers the findings should not be generalised to other districts or states. Responses reflect the subjective perceptions and experiences of respondents at a single point in time, and farmers' engagement patterns may shift with further technological change.

6. Conclusion

Social media has become a visible, though not yet decisive, channel in the marketing of herbicide products in Raipur district. Agro-input businesses use platforms such as WhatsApp, Facebook and YouTube chiefly for promotion, and farmers who do engage prefer YouTube for its demonstrative format; however, the majority of farmers do not actively engage with such content at all, and what they do access is dominated by advertisements rather than practical, farmer-oriented material. Purchase decisions remain anchored in expert advice and peer (farmer) reviews rather than in advertising or price incentives, and education level - rather than engagement frequency - is the stronger predictor of how much herbicide-related content a farmer accesses. Taken together, these findings suggest that social media currently operates as a supplementary awareness tool rather than a primary purchase driver, and that its marketing potential for herbicide promotion would be better realised by embedding credible, expert-backed and peer-validated content - rather than conventional advertising alone - into digital outreach strategies, alongside efforts to make such content accessible to farmers across educational levels.

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