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Operational constraints and strategic solutions in the utilization of social media for Agriculture in the North Coastal Zone of Andhra Pradesh

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ABSTRACT

Social media are modern-day digital communication means comprising various tools that allow interaction among people and information exchange worldwide. Owing to the importance of social media in agricultural extension service delivery, a study on the field challenges and operational constraints encountered by the farming community in the utilization of social media for agriculture, was conducted among a proportionate random sample of 120 farmers across twelve selected villages in Srikakulam and Vizianagaram districts of the North Coastal Zone of Andhra Pradesh. The investigation revealed that the structural bottlenecks restricting smooth information delivery vary distinctly across the zone. For physical infrastructure limitations, farmers were relying heavily on adjusting to poor network connectivity and data drops in rural tracts, which emerged as the top operational barrier (76.00%, Rank I). For content-related difficulties, farmers were struggling with unsuitable, generic, and unverified online information that completely lacked local adaptation (74.00%, Rank II). For interface navigation issues, the respondents were constrained by widespread digital illiteracy (68.00%, Rank III). For linguistic and timing barriers, farmers were hindered by language problems in accessing technical content (66.00%, Rank IV) and the non-availability of timely data during pest and disease outbreaks (63.00%, Rank V).

Key Words: *Andhra Pradesh, Digital illiteracy, Social media, Vernacular media*

Global agriculture has witnessed a paradigm shift, requiring extension functionaries to equip farmers with advanced management, group-mobilization and decision-making skills. However, the Indian agriculture sector-which employs approximately (45.8%) of the working population and contributes (18.2%) to the country's Gross Value Added (Economic Survey,2024-25) is severely strained by a public manpower shortage that leaves an operational deficit in the farmer-to-extension worker ratio (NITI Aayog, 2024). This shortfall creates timely information gaps, leaving smallholders isolated from immediate, expert-led field solutions. To bridge this divide, Information and Communication Technologies (ICTs) have become essential. The digital expansion has turned affordable smartphones and decentralized social media networks into vital utilities for sharing user-generated content, market trends and technical crop data across remote communities. Consequently, platforms like Facebook, YouTube and WhatsApp have transitioned from entertainment spaces into active digital extension networks where cultivators regularly post queries, share localized data and stream short-form visual content to solve urgent field challenges.

However, the field performance of unmoderated social media remains highly uneven across diverse rural ecosystems. In the cyclonically vulnerable tracts of the Srikakulam and Vizianagaram districts within the North Coastal Zone of Andhra Pradesh, smallholder success in staple crops(paddy) and cash crops (cashew, sugarcane) depends heavily on real-time advisory. In practice, these farmers routinely face acute operational friction, including fluctuating rural network connectivity, unverified online advice lacking regional calibration and distinct language barriers. Without a systematic investigation into these field hurdles, public digital policy framework design risks remaining speculative rather than actionable. Understanding these localized constraints is an essential prerequisite to transform unmoderated online

channels into safe, institutionally synchronized extension infrastructure. Hence, this study was undertaken to systematically analyze the constraints encountered by rural farmers when navigating social media platforms for agricultural outreach.

MATERIAL AND METHODS

The study was conducted in the North Coastal Zone of Andhra Pradesh, focusing systematically on the operational barriers impacting digital technology adoption. Four mandals out of the rural blocks of Srikakulam and Vizianagaram districts, namely Gara, Ponduru, Denkada and Bondapalle, were randomly selected. Ex post facto research design of social research was used for this study to assess the field constraints. Farmers were randomly selected from each of the three representative villages within these four mandals, thus making a total sample size of 120 respondents. The data was collected by a comprehensive structured interview schedule administered through personal face-to-face field interactions, supplemented by coordination with local Village Agriculture Assistants (VAAs) and analyzed data by employing suitable statistical tools.

RESULTS AND DISCUSSION

Rank I: Physical Infrastructure Limitations such as Poor network connectivity and data coverage drops in rural tracts (76.00%) From Table 1, it can be revealed that the primary structural bottleneck restricting the smooth integration of digital outreach channels was poor network connectivity and data coverage drops in rural tracts, which was ranked first by 76.00 per cent of the respondents. The possible reason for this constraint is that interior rural areas tend to have slower internet connections, frequent signal fluctuations, and fewer choices when it comes to reliable Internet Service Providers (ISPs). The physical digital divide remains highly concentrated in these coastal and remote farming pockets, which places people in such communities at a severe disadvantage when trying to receive real-time weather alerts or crop advisories. This finding strongly aligns with the empirical work of Kumar *et al*. (2026), who noted that despite extensive mobile penetration, poor network connectivity (68.88%) and inadequate rural digital infrastructure remain foundational structural barriers preventing effective social media usage in agricultural extension services across Andhra Pradesh.

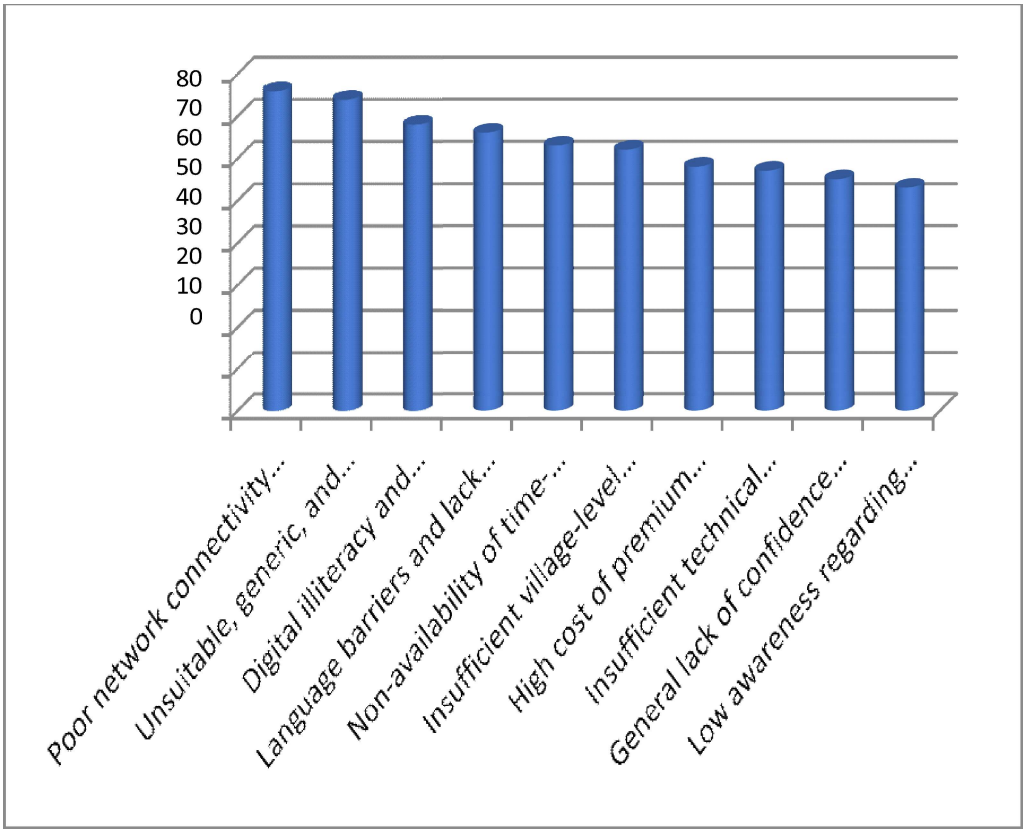

Fig. 1. Operational Constraints Encountered by the farmers in accessing Agriculture Extension through social media

Similarly, global digital extension evaluations by various researchers highlight that a lack of stable mobile network coverage serves as a critical entry-level pitfall that systematically excludes peripheral and low-income smallholder communities.

Rank II: Content-Related Difficulties (74.00%) like unsuitable, generic, and unverified information due to a large number of unmoderated online sources, which was ranked second by 74.00 per cent of the farmers. The possible reason for this challenge is that without localized adaptation to specific micro-climates or regional soil types, it becomes highly difficult for smallholders to find relevant, actionable information, which often leaves them vulnerable to technical errors or unscientific chemical applications. This observation corroborates the findings of recent agricultural communication studies, which emphasize that identifying relevant, reliable, and localized content is a major operational challenge across all categories of smallholders (Kumar & Sharma, 2022). Unmoderated digital feeds frequently create an "information overload" or spread unverified misinformation (77.59%), which directly compromises the field-level reliability, applicability, and quality of digital extension platforms.

Rank III: Digital Illiteracy and Interface Navigation (68.00%) Digital illiteracy and interface navigation complexities ranked third (68.00%) due to a lack of core technical information, practical application skills, or comprehension regarding the optimal utilization of digital tools and technology to complete a specific agronomical task on a smartphone. While some younger or progressive agricultural stakeholders using social media are highly versatile users who actively navigate platforms to locate real-time crop production guidelines (Rathod *et al.,* 2024), the broader consensus in rural digital adoption confirms that a significant portion of marginal farmers remain highly "insensitive to digital illiteracy" (Singh *et al.,* 2023). Many lack the fundamental experience required to navigate complex digital menus, clear device data storage, download specialized applications, or successfully evaluate hyperlinks.

Rank IV: Linguistic Barriers (66.00%) Linguistic barriers and a lack of localized vernacular content in the regional language (Telugu) ranked fourth (66.00%), which significantly prevents resource-poor farmers from decoding technical literature or navigating complex administrative menus. This outcome is heavily supported by previous regional assessments in Andhra Pradesh. For instance, (Reddy *et al.,* 2025) found that technical jargon and non-vernacular extensions often render communications unintelligible, showing that up to 60% of rural respondents struggle to extract key policy details or advisory data from leaflets and digital broadcasts published in standard, complex formats without local dialect adjustment. When digital tools fail to account for these localized language gaps, they inherently amplify ancestral and regional trade costs, limiting effective information transmission.

Rank V: Finally, the non-availability of timely information during sudden pest and disease outbreaks was ranked fifth (63.00%) by the respondents. The possible reason for this preference configuration is that during emergency field infestations, farmers

Table 1. Challenges Encountered When Accessing Agricultural Information from Social Media (n=120)

S. No.	Perceived Extension Bottleneck / Challenge	Frequency (f)	Percentage (%)	Final Rank
1	Poor network connectivity and data coverage drops in rural tracts	91	76	I
2	Unsuitable, generic and unverified information (location specific)	89	74	II
3	Digital illiteracy and interface navigation complexities	82	68	III
4	Language barriers and lack of localized vernacular content (Telugu)	79	66	IV
5	Non-availability of timely information during outbreaks	76	63	V
6	Insufficient village-level digital access infrastructure	74	62	VI
7	High cost of premium smartphones and cellular data packs	70	58	VII
8	Insufficient technical application skills among older cultivators	68	57	VIII
9	General lack of confidence and trust in unmoderated peer groups	66	55	IX
10	Low awareness regarding official government digital portals	64	53	X

require instantaneous, validated diagnostic replies to prevent severe yield losses, making unmoderated or delayed digital communication lines less dependable. This is consistent with the framework established by modern ICT case studies, which point out that traditional and delayed digital platforms often fail during sudden environmental or biological shocks. To counter this delay, advanced digital extension tools now actively emphasize immediate two-way interactive systems or automated diagnostic applications (like e-SAP or dedicated WhatsApp expert channels) to bridge the gap between emergency outbreak detection and real-time behavioral adjustments on the farm

Suggestions Given by the Respondents

Data regarding the strategic suggestions offered by the Farmers to mitigate these operational bottlenecks were compiled, evaluated and ranked based on frequency of response. Provision of localized and hyper-adapted agricultural information ranked 1 (80.00%) as the most important suggestion. Stakeholders emphasized that all technical crop advisories must be tailored specifically to local soil, climate, and pest conditions rather than being generic. This was followed by Delivery of digital extension content in the regional Telugu dialect (78.33%) Respondents noted that providing high-quality vernacular text and audio eliminates language barriers

Table 2. Suggestions given by the respondents to enhance social media outreach (n=120)

S. No.	Suggestions Given by Respondents	Frequency (f)	Percentage (%)	Rank
1	Provision of localized and hyper-adapted Agricultural information	96	80	I
2	Delivery of digital extension content in the Regional Telugu dialect	94	78.33	II
3	Establishment of institutionally moderated Social media networks	92	76.66	III
4	Improvement in internet connectivity	91	75.83	IV
5	Shifting information delivery toward short- Form visual content	88	73.33	V
6	Embrace the use of social media in the marketing of agricultural products to Minimize the cost of marketing	85	70.83	VI
7	Organizing formal digital literacy training camps	82	68.33	VII

and speeds up adoption. Establishment of institutionally moderated social media networks was the third major suggestion (76.66%). Respondents suggested that formalizing open digital groups monitored directly by KVKs, ANGRAU scientists, or Department officials will completely eliminate unverified advice and restore trust.

Other suggestions were Improvement in internet connectivity (75.83%), Shifting information delivery toward short-form visual content (73.33%), Embrace the use of social media in the marketing of agricultural products to minimize the cost of marketing (70.83%) and organizing formal digital literacy training camps (68.33%). Farmers strongly emphasized that upgrading rural cellular infrastructure and stabilizing data coverage speeds across interior tracts must be treated as a base line priority to ensure uninterrupted access to digital extension streams. Farmers recommended using video reels, short clips and pictorial graphics to bypass formal reading literacy barriers. Farmers also suggested hosting village-level cluster workshops at Rythu Bharosa Kendras (RBKs) to teach older and marginal farmers how to navigate complex mobile applications. Stakeholders recommended leveraging group networks for direct marketing and price discovery to eliminate middleman margins and reduce transaction costs.

CONCLUSION

This study highlighted that physical infrastructure limitations, farmers were relying heavily on adjusting to poor network connectivity and data drops in rural tracts, which emerged as the top operational barrier (76.00%, Rank I) followed by content-related difficulties, cultivators were struggling with unsuitable, generic, and unverified online information that completely lacked local adaptation (74.00%, Rank II).

To bridge the critical information gap, yield gap and technology gap will be necessary through timely delivery of information through social media channels. Extension functionaries should leverage the benefits of smart phones such as portability, flexibility of content, delivery capability and both way

communications to deliver low-cost but highly customized solutions to increase the income of farmers and reduce cost of production.

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