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PERCEPTION, INFORMATION NEEDS AND CONSTRAINTS OF EXTENSION PERSONNEL IN UTILIZING A DIGITAL AGRICULTURAL ADVISORY PORTAL

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ABSTRACT

As India's Digital Agriculture Mission integrates a rapidly multiplying set of portals and applications into a single farmer-facing digital ecosystem, understanding how the extension workforce perceives and copes with its own long-standing institutional platforms is essential to designing this integration well. This study examined the perception, further information needs and constraints of extension personnel in utilizing the TNAU Agritech Portal, a pioneering State Agricultural University e-extension platform in Tamil Nadu. Sixty extension officials purposively selected from all 12 blocks of Coimbatore district were interviewed using a pre-tested schedule, and data were analysed through percentage analysis. Respondents disseminated portal-derived information mainly orally (86.66%) and through training programmes (76.66%). A majority (61.67%) held a medium level of perception towards portal content; satisfaction was high for design and navigation but low for the practical utility of textual message content. Photographs of rare pest and disease symptoms (51.66%), expert contact details (46.66%) and linkage with social-networking tools (63.33%) were the most sought further needs, while irregular content updation (78.33%), lack of a proper information source (46.66%) and lack of location-specific content (45.00%) were the leading constraints. Regular content updation, farmer-facing awareness campaigns and inter-institutional linkage were the most-recommended remedies. These decade-old, farmer-adjacent concerns anticipate, and remain directly relevant to, the interoperability and content-currency challenges now confronting India's expanding AgriStack-based digital advisory ecosystem.

***Key words*:** e-Extension, Perception, Information needs, Constraints, Portal upgradation

Introduction

A digital advisory portal delivers value only to the extent that its intended users find it credible, adequate to their information needs, and free enough of practical constraints to be used routinely. Perception, need and constraint studies have therefore long formed a distinct strand of agricultural extension research, and this strand has taken on renewed importance as India's extension and advisory ecosystem has become substantially more crowded with digital options. A recent bibliometric analysis of ICT-based extension and advisory services identifies inclusive service delivery, climate-adaptive digital platforms and smart-agriculture integration as the fastest-growing research clusters in this field, with India contributing the largest share of the underlying literature even as low farmer awareness and delayed advisories continue to blunt the effectiveness of flagship platforms such as m-Kisan (Mukherjee *et al*., 2025). A parallel review of India's digital-agriculture landscape documents the scale of this expansion — platforms such as Kisan Sarathi alone have registered close to 2.4 crore farmers — alongside persistent barriers of limited digital literacy,

inadequate rural infrastructure and difficulty in localising content into regional languages (Sharma *et al*., 2025). A recent cross-country synthesis of ICT-based extension similarly concludes that while such platforms carry strong potential to widen the reach of advisory services, this potential is realised only where digital literacy, contextual relevance of content and last-mile institutional support are simultaneously in place — the same triad of conditions this study sets out to examine for a single institutional portal (Mulungu *et al*., 2025).

These barriers are compounded by a structural problem on the supply side. A review of India's e-governance architecture for agriculture found that of the portals it examined, six were separately engaged in farmer profiling and seven separately offered market information, indicating substantial functional duplication across a "plethora of applications launched within a short span of time", which leaves both extension functionaries and farmers unable to judge easily which platform is the more dependable one for a given purpose (Balkrishna *et al*., 2024). The Union Government's Digital Agriculture Mission, built around the interoperable AgriStack farmer-database and the broader India Digital Ecosystem of Agriculture (IDEA) framework, is explicitly intended to resolve this fragmentation by unifying farmer records, land data and advisory delivery, and had generated more than 84 million Farmer IDs at the time of writing. Whether such unification actually improves the experience of the front-line extension worker, however, depends on first understanding the perception, information gaps and constraints this workforce has long reported about the discipline-specific portals it already uses.

Tamil Nadu Agricultural University's e-Extension Centre, established in 2008, and its TNAU Agritech Portal (agritech.tnau.ac.in), launched the following year as a bilingual repository of more than three-and-a-half lakh pages for extension functionaries across the state's 385 blocks, is one such long-standing institutional platform. Recent NAAS-rated research on India's extension workforce continues to find that inadequate training, rather than lack of access, is the foremost constraint to effective ICT-tool use (Singh *et al*., 2026), a finding that closely echoes constraints reported by extension practitioners internationally (Yekinni *et al*., 2023) and by systematic reviews of ICT tools in agricultural extension more broadly, which flag weak integration with formal extension systems and uneven digital literacy as recurring limitations regardless of the specific platform involved (Gosavi and Singh, 2026). A recent bibliometric mapping of the agricultural-extension literature itself confirms that digital-platform studies are among the fastest-growing sub-fields globally, yet notes that empirical, platform-specific evaluations covering the complete perception-to-constraint pathway remain comparatively few relative to broad reviews and bibliometric overviews (Pundir *et al*., 2025) — precisely the gap the present study addresses.

Read together, this literature indicates that perception, information needs and constraints in digital agricultural extension are shaped jointly by individual-level factors — training, digital literacy and prior exposure — and by structural or institutional factors such as platform fragmentation, content localisation, and infrastructure (Yekinni *et al*., 2023; Sharma *et al*., 2025; Balkrishna *et al*., 2024; Sahoo *et al*., 2025; Gosavi and Singh, 2026; Mulungu *et al*., 2025). Despite this expanding body of work, few studies document, for a single well-defined institutional platform, the complete perception-to-constraint pathway — how users judge specific portal components, what further content they want, and what stops them using the platform more — in a form that can directly inform portal redesign. The present study, drawn from a Master's degree investigation into the reach of the TNAU Agritech Portal among extension officials of Coimbatore district, therefore examines:

(i) the method by which extension personnel disseminate portal-derived information to farmers,

(ii) their perception of the portal's content and specific components,

(iii) their further information needs, and

(iv) the constraints they face in using the portal and their suggestions for its upgradation.

Materials and Methods

The study was conducted in Coimbatore district of Tamil Nadu, covering all 12 agricultural blocks of the district, purposively selected for its high ICT penetration in agriculture and for hosting Tamil Nadu Agricultural University. An ex-post facto research design was used, as the perceptions and experiences under study had already accrued through prior portal use (Singh, 2008). A sample of 60 extension personnel — Assistant/Deputy Directors of Agriculture and Horticulture (n = 22) and Agricultural/Horticultural Officers (n = 38) — was purposively selected from the Departments of Agriculture, Horticulture, Seed Certification and Agricultural Marketing. Primary data were collected during 2011–12 through a well-structured, pre-tested interview schedule administered by personal interview, comprising separate sections on dissemination method, perception, further information needs, and constraints and suggestions.

Table 1: Method of dissemination of portal information to farmers by extension personnel (n = 60).

Method of dissemination	Number	Per cent
Oral	52	86.66
Training programmes	46	76.66
Telephone calls	12	20.00
SMS	6	10.00
Printouts	3	5.00
e-mail	2	3.33
Note: Multiple responses obtained		

Perception, defined as the process by which meaning is drawn from experience with a stimulus (Taneja, 1989), was measured on a three-point continuum of highly satisfied, satisfied and not satisfied for nine specific portal components — home-page attractiveness, background colour and appearance, message content, information adequacy, photographs, audio, video, hyperlinks and navigation — scored 3, 2 and 1 respectively and summated into a Perception Index, with respondents classified into low, medium and high categories using the cumulative frequency method. The method of disseminating portal-derived information to farmers, further information needs, and constraints together with suggestions for upgradation were each elicited through open, multiple-response checklists developed for the study and were analysed using simple percentage analysis, following the widely used constraint-analysis approach in extension research.

Results and Discussion

Dissemination of portal information to farmers

Oral communication (86.66%) and training programmes (76.66%) were by far the dominant channels through which extension personnel passed portal-derived information on to farmers, with telephone calls, SMS, printouts and e-mail used only marginally. This heavy reliance on interpersonal and group channels rather than on digital re-transmission mirrors the broader observation that, even where mobile and social-media tools are technically available to India's extension workforce, oral and training-based dissemination continues to anchor last-mile delivery unless deliberately supplemented by structured digital outreach (Gosavi and Singh, 2026).

Perception towards portal content

A majority of respondents (61.67%) held a medium level of overall perception towards the portal, with roughly equal minorities at the low (23.33%) and high (15.00%) ends. Component-wise perception, presented in Table 3, helps explain this middling overall picture.

Design-related components — home-page attractiveness (85.00% highly satisfied) and background colour and appearance (80.00%) — drew the strongest approval, as did information adequacy (63.33%). By contrast, half the respondents (50.00%) were not satisfied with the message component, covering reading ease, accuracy, orderliness, completeness and practical utility of the text, and multimedia elements such as audio (70.00% only moderately satisfied) and video (58.33% only moderately satisfied) went largely unwatched for want of time. The component-wise distribution is depicted in Fig. 1.

Table 2: Overall perception of extension personnel towards portal content (n = 60).

Perception category	Number	Per cent
Low	14	23.33
Medium	37	61.67
High	9	15.00

This pattern — good visual design and adequate topical coverage, but markedly weaker satisfaction with the practical, actionable quality of written content and multimedia — is best explained not as a design failure but as a currency-and-relevance failure: home-page appearance and layout, once built, remain satisfactory indefinitely, whereas message content, audio and video demand continuous authorship effort to stay accurate and locally relevant, effort that a decade-old, centrally maintained SAU portal was structurally less able to sustain than its one-time design investment. This distinction is consistent with the broader critique that Indian digital-agriculture platforms have prioritised breadth of coverage and multiplicity of features over the depth, currency and localisation of individual advisories (Balkrishna *et al.*, 2024; Sharma *et al.*, 2025), and with cross-country evidence that ICT-extension platforms deliver on their potential only where content relevance is actively and continuously maintained rather than assumed to persist

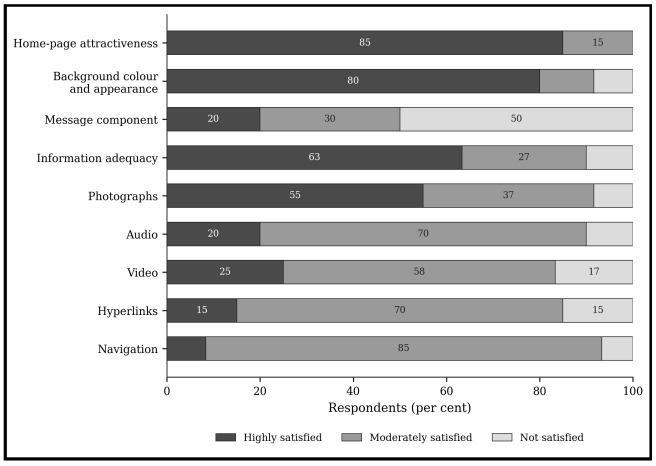


Fig. 1: Perception of extension personnel on specific components of the TNAU Agritech Portal (n = 60).

Table 3: Perception of extension personnel on specific components of portal content (n = 60).

Component	HS	MS	NS
Home-page attractiveness	85.00	15.00	-
Background colour and appearance	80.00	11.66	8.33
Message component	20.00	30.00	50.00
Information adequacy	63.33	26.66	10.00
Photographs	55.00	36.66	8.33
Audio	20.00	70.00	10.00
Video	25.00	58.33	16.66
Hyperlinks	15.00	70.00	15.00
Navigation	8.33	85.00	6.66

HS: Highly satisfied(%); MS: Moderately satisfied(%); NS: Not satisfied(%)

once published (Mulungu *et al*., 2025). Practically, this justifies prioritising a lightweight, frequently updated content-authoring workflow for message text and multimedia over further investment in interface or navigation design, which the present respondents already judged adequate.

Further information needs

Photographs of rare or newly emerging pest and disease symptoms (51.66%) and direct contact details of subject-matter experts (46.66%) were the two most widely felt gaps, followed by area-specific, block-level information (36.66%). Respondents' desire for expert contact-ability and hyper-local advisories anticipates, in miniature, exactly the kind of personalised, location-linked advisory service that the AgriStack farmer- and land-record layer is now designed to enable at national scale (Balkrishna *et al*., 2024).

Nearly two-thirds of respondents (63.33%) wanted the portal linked with social-networking tools, and over half (53.33%) wanted SMS-based alerts — demands that, well over a decade before WhatsApp-based advisory groups and app-push notifications became commonplace

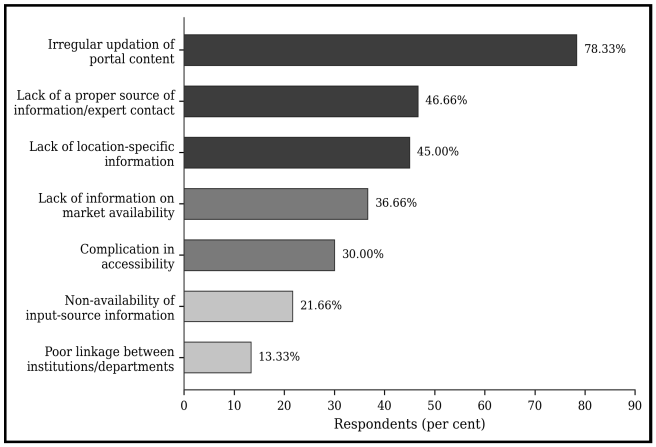


Fig. 2: Constraints faced by extension personnel in utilizing the TNAU Agritech Portal (n = 60).

Table 4: Further information needs of extension personnel from the portal (n = 60).

Further information/content need	No.	%
Photographs of rare/new pest and disease symptoms	31	51.66
Contact address and phone numbers of subject-matter experts	28	46.66
Area-specific (block-wise) information	22	36.66
More detailed information on specific technologies	19	31.66
Details on availability of input sources (seed, fertilizer, pesticide)	13	21.66
More detail on value addition of produce	12	20.00
Frequently asked questions	10	16.66
More success/failure stories	9	15.00
Details of relevant institutions and laboratories	6	10.00

No.: Number; %: Percent; *Note: Multiple responses obtained.*

in Indian extension practice, effectively forecast the mobile- and social-platform-centred direction that ICT-based extension and advisory services have since actually taken (Mukherjee *et al*., 2025).

Constraints and suggestions for portal upgradation

Irregular updation of content was, by a wide margin, the leading constraint (78.33%), followed by a lack of a dependable information source or expert contact (46.66%) and a lack of location-specific content (45.00%), as shown in Fig. 2.

Poor inter-institutional linkage, though the least-cited constraint here (13.33%), is precisely the structural problem that recent reviews identify as endemic across India's digital-agriculture platforms as a class, where separately maintained portals duplicate farmer-profiling and market-information functions instead of drawing on a common backend (Balkrishna *et al*., 2024). That the two content-side constraints (irregular updation; lack of location-specific information) together outrank the two access-side constraints (complication in accessibility; non-availability of input-source information) is itself a valid and testable point: it indicates that, for this cadre, the

Table 5: Further ICT facilities suggested for portal enhancement (n = 60).

Facility to be introduced	No.	%
Linkage with social-networking tools	38	63.33
Alerts through SMS	32	53.33
Multimedia advisory tools	27	45.00
Interactive Voice Response System (IVRS)	16	26.66
Discussion forums	13	21.66
RSS feed	5	8.33
Maps and navigation aids	4	6.66

No.: Number; %: Percent; *Note: Multiple responses obtained.*

Table 6: Constraints faced by extension personnel in utilizing the portal (n = 60).

Constraint	No.	%
Irregular updation of portal content	47	78.33
Lack of a proper source of information/expert contact	28	46.66
Lack of location-specific information	27	45.00
Lack of information on market availability	22	36.66
Complication in accessibility	18	30.00
Non-availability of input-source information	13	21.66
Poor linkage between institutions/departments	8	13.33

No.: Number; %: Percent; *Note: Multiple responses obtained.*

binding limitation on portal utility was editorial capacity rather than technical access — a distinction with direct design implications, since expanding hardware or bandwidth access would not have resolved the workforce's principal complaint. This reading is corroborated by the finding that inadequate training and institutional support, more than lack of access to hardware, remain the binding constraints on effective ICT-tool use among India's extension workforce today (Singh *et al.*, 2026), and by cross-country evidence that ICT-extension interventions under-deliver precisely where content-maintenance capacity, rather than device or network access, is the scarce resource (Mulungu *et al.*, 2025).

Regular content updation (70.00%) and farmer-facing awareness creation (60.00%) were the two most-recommended remedies, mirroring the constraints reported above. That respondents also asked, more than a decade ago, for inter-institutional linkage (20.00%) and linkage with input-supply companies (15.00%) shows that today's push toward an interoperable, single-window digital-agriculture ecosystem is addressing a need this frontline workforce had already identified from direct experience, well before AgriStack and the India Digital Ecosystem of Agriculture framework were conceived (Balkrishna *et al.*, 2024).

Table 7: Suggestions offered by extension personnel for portal upgradation (n = 60).

Suggestion	No.	%
Regular updation of content	42	70.00
Awareness creation among farmers	36	60.00
More information of practical utility	21	35.00
Area-specific (block-wise) information	19	31.66
DMI messages in Tamil	15	25.00
Inter-institutional linkage	12	20.00
Linkage with corporate input companies (seed, fertilizer, machinery)	9	15.00
Online banking and credit facilities	7	11.66

No.: Number; %: Percent; *Note: Multiple responses obtained.*

Conclusion

Extension personnel in Coimbatore district continued to rely predominantly on oral communication and training programmes, rather than digital re-transmission, to pass portal-derived information on to farmers, and held only a medium overall perception of the TNAU Agritech Portal — satisfied with its design and topical breadth but dissatisfied with the practical utility of its written content. Their most-felt needs were for rare-pest photographs, direct expert contact, and social-media and SMS-based linkage, while irregular content updation, weak information sourcing, and poor inter-institutional linkage were their principal constraints. Because these same three structural problems — content currency, dependable expert linkage, and fragmented institutional data — are exactly what India's Digital Agriculture Mission and its AgriStack-based IDEA framework are now attempting to resolve at national scale (Balkrishna *et al.*, 2024), this decade-old, single-district dataset carries a continuing diagnostic value: it shows that the constraints reported by working extension functionaries were, if anything, ahead of the policy response rather than incidental to a particular period. As with any single-district cross-section collected in 2011–12, these findings should be read as a historical baseline; a contemporary replication that captures perceptions of today's mobile-application and AI-enabled advisory layer, alongside the legacy portal, would help establish whether unification under the Digital Agriculture Mission has in fact resolved the credibility and content-currency concerns this workforce raised.

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Declarations

Competing interests: The authors declare that they have no competing interests.

Ethical consideration: Informed consent was obtained from all respondents prior to interview, as per standard practice for the parent M.Sc. investigation from which this analysis is drawn.

References

Balkrishna, A., Singh S.K., Pathak R. and Arya V. (2024). E-governance paradigm in the Indian agricultural sector. *Discover Agriculture*, **2(1)**, 2.

Dhillon, M. (2025). Global research on digital platforms in rural knowledge transfer during 2003–2025: A bibliometric analysis. *Indian J. Extension Educ*. **62(1)**, 135-141.

Fogg, B.J., Marshall J., Osipovich A., Varma C. and Fang N. (2001). What makes web sites credible? A report on a large quantitative study. Proc. SIGCHI Conf. *Human Factors Comput. Syst*. **(CHI 2001)**, 61-68.

Gosavi, D.P. and Singh S.K. (2026). A systematic review of ICT tools in agricultural extension: Trends and challenges. *Int. J. Agric. Ext. Soc. Dev*., **9(4)**, 303-315.

Kothari, C.R. (1990) Research Methodology: Methods and Techniques. New Age International Publishers, New Delhi.

Mukherjee, S., Padaria R.N., Burman R.R., Velayudhan P.K., Mahra G.S., Aditya K., Sahu S., Saini S., Mallick S., Quader S.W., Shravani K., Ghosh B. and Bhat A.G. (2025). Global trends in ICT-based extension and advisory services in agriculture: A bibliometric analysis. *Front. Sustain. Food Syst*. **9**, 1430336.

Mulungu, K.H., Kassie M. and Tschopp M. (2025). The role of information and communication technologies-based extension in agriculture: application, opportunities and challenges. *Inform. Technol. Dev.*, **31(4)**, 1117-1146.

Press Information Bureau (PIB) (2024). Digital Agriculture Mission: Tech for Transforming Farmers' Lives. Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi.

Pundir, S., Raj S. and Raahalya S. (2025). Agricultural extension system: A bibliometric analysis. *Int. J. Agric. Ext. Soc. Dev*. **8(10)**, 452-460.

Sahoo, S., Parasar B. and Jayasingh D.K. (2025). Towards digitally enabled extension services: ICT training directions in coastal Odisha. *Indian J. Extension Educ*. **61(4)**, 66-71.

Sharma, S., Rana P., Samriti and Sharma S. (2025) Digital agriculture in India: A review of ICT interventions for sustainable farming. *Int. J. Agric. Ext. Soc. Dev*. **8(11)**.

Singh, A.K. (2008). Tests, Measurements and Research Methods in Behavioural Sciences. Bharati Bhawan Publishers and Distributors, New Delhi.

Singh, S. (1983). Research Methodology in Social Sciences. Himalaya Publishing House, New Delhi.

Singh, S., Doharey R.K., Meena N.R., Singh R. and Singh A. (2026). Analysis and prioritization of constraints affecting ICT tools adoption among KVK personnel. *Indian J. Extension Educ*. **62(3)**, 305-308.

Singh, S.P., Yadav R.N., Singh D.K., Prakash S. and Tripathi P. (2026a). Awareness and utilization of ICT tools among KVK-linked progressive farmers in Western Uttar Pradesh. *Indian J. Extension Educ*. **62(4)**, 109.

Taneja, R.P. (1989). Dictionary of Education. Amol Publications, New Delhi.

Yekinni, O.T., Owolabi A.O. and Obaniyi K.S. (2023). Extension practitioners' perception and constraints on ICT use in Southwestern Nigeria. *SAGE Open*, **13(4)**.