



# Profile Characteristics of Extension Personnel and their Relationship with Utilization of a State Agricultural University's Digital Advisory Portal

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**Abstract**—State agricultural universities (SAUs) in India were early adopters of web-based agricultural advisory portals, and understanding what drives their continued use by front-line extension personnel remains important as the country scales up the Digital Agriculture Mission and its AgriStack farmer-database ecosystem. This study examined the profile characteristics of extension personnel and their relationship with utilization of the TNAU Agritech Portal, one of the pioneering State Agricultural University e-extension platforms in India. An ex-post facto design was adopted among 60 purposively selected Assistant/Deputy Directors and Agricultural/Horticultural Officers drawn from all 12 blocks of Coimbatore district, Tamil Nadu. Data were collected using a pre-tested interview schedule and analysed through percentage analysis, simple correlation and multiple regression. Majority of the respondents were middle-to-old aged graduates with more than fifteen years of service and medium job satisfaction. Training undergone, attitude towards e-media, awareness of agricultural websites, internet usage and portal credibility showed positive and significant correlation with utilization, whereas experience in job showed a significant negative association. The twelve profile characteristics together explained 45.30 per cent of the variance in utilization. The findings identify capacity building and content credibility as priority levers for portal utilization and offer baseline evidence useful for designing the next generation of digital advisory platforms.



**Keywords**—Digital extension, e-Governance, ICT, Utilization pattern, Extension personnel, Agricultural advisory portal, Profile characteristics

## I. INTRODUCTION

Extension personnel constitute the crucial link between the agricultural research system and the farming community, and the effectiveness of technology transfer depends substantially on how well these functionaries themselves access and use the digital knowledge infrastructure placed at their disposal. As information and communication technology (ICT) has moved from the margins to the centre of extension practice, research interest in ICT-based extension and advisory services (EAS) has grown

correspondingly: a recent bibliometric analysis of 525 Scopus-indexed publications between 1999 and 2024 shows steady growth in this literature from 2005 onward, with India recording the highest number of publications (446) of any country, even though the highest citation impact still accrues to research from the United States (Mukherjee et al., 2025). Within India, ICTs ranging from radio and Kisan Call Centres to smartphone applications and artificial intelligence-enabled advisories are reported to have substantially reshaped how extension information reaches its users, with platforms such as Kisan Sarathi alone having

registered close to 2.4 crore farmers and 746 institutions (Sharma et al., 2025).

This transformation has accelerated further with the Union Government's Digital Agriculture Mission, which is building an interoperable "India Digital Ecosystem of Agriculture" (IDEA) around AgriStack farmer and land-record databases, and which had generated more than 84 million Farmer IDs by the time of writing. Yet a review of India's e-governance architecture for agriculture cautions that a large number of portals and applications have been launched within a short span, with considerable functional overlap in farmer profiling and market-information services, so that determining which of them are genuinely useful remains a challenge for both functionaries and farmers (Balkrishna et al., 2024). Amid this rapidly expanding national digital layer, the discipline-specific portals built more than a decade ago by individual State Agricultural Universities (SAUs) continue to function as the first point of technical contact for block-level extension officers. Understanding what makes these functionaries actually use such a portal therefore has continuing relevance: it is this frontline usage behaviour, and its determinants, that any newer unified or AI-enabled advisory platform will eventually have to reproduce or improve upon.

Tamil Nadu Agricultural University (TNAU) was among the first SAUs in India to institutionalise this effort, establishing an exclusive e-Extension Centre in 2008 with support from the National Agricultural Development Programme, and launching the TNAU Agritech Portal ([agritech.tnau.ac.in](http://agritech.tnau.ac.in)) in 2009 as a bilingual repository of more than three-and-a-half lakh web pages spanning agriculture, horticulture, agricultural engineering, forestry, fisheries, animal husbandry, agricultural marketing, sericulture and seed certification. The portal was designed principally for field extension officials located across 385 blocks and district headquarters of the state, and it remains functional today alongside the Centre's other e-governance initiatives.

Although a growing body of recent work has documented constraints and awareness levels around ICT-tool adoption among India's extension workforce (Singh et al., 2026; Singh et al., 2026a) and among extension practitioners elsewhere (Yekinni et al., 2023), the profile-level determinants of utilization of a State Agricultural University's own long-standing digital portal by its extension cadre remain comparatively under-documented, particularly for legacy portals that continue to operate beneath the newer national digital-agriculture layer. Against this background, the present study, drawn from a Master's degree investigation into the reach of the TNAU Agritech

Portal among extension officials of Coimbatore district, examines (i) the profile characteristics of extension personnel in the study area, and (ii) the association and relative contribution of these characteristics to utilization of the portal.

## II. REVIEW OF LITERATURE

Empirical evidence bearing on the profile determinants of digital-portal utilization by extension personnel is reviewed below under two sub-heads, drawing principally on studies published since 2023 so as to situate the present findings within the current state of the field.

### A. Profile characteristics of extension personnel

Singh et al. (2026a), studying 160 KVK-linked progressive farmers in Western Uttar Pradesh, found that education, income and farm size positively influenced ICT-tool adoption, whereas advancing age depressed it, with overall awareness of ICT tools at 69.52 per cent against actual utilization of 62.60 per cent. Sahoo et al. (2025), surveying 248 public extension workers across coastal Odisha, reported that both senior and junior functionaries were comfortable with foundational tools such as computers and mobile phones, but that a hierarchy-linked competence gap persisted for advanced tools such as AI interfaces and drones: junior officers had greater exposure to newer technology yet weaker proficiency in basic digital documentation, while senior officers most needed training in troubleshooting, cybersecurity and common productivity tools. Singh et al. (2026), applying Garrett's ranking technique to 142 Krishi Vigyan Kendra personnel, identified lack of training opportunities as the foremost constraint to ICT-tool adoption, ahead of psychological barriers and insufficient technical knowledge, underscoring how strongly a workforce's training exposure interacts with its demographic profile in shaping digital engagement. Dhillon (2025), in a bibliometric review of 251 publications on digital platforms in rural knowledge transfer (2003–2025), noted that despite India's scale of investment in digital agriculture, India-authored high-impact research specifically profiling the digital competencies of its own extension personnel remains comparatively scarce — a gap the present study addresses for a State Agricultural University cadre.

### B. Utilization of digital advisory platforms and its correlates

Mukherjee et al. (2025), in a bibliometric analysis of 525 Scopus-indexed publications (1999–2024) on ICT-based extension and advisory services, identified inclusive service delivery and gender-aware utilization patterns as among the fastest-growing thematic clusters in this literature, with

India contributing the largest share of publications globally. Sharma et al. (2025) found that despite the scale reached by platforms such as Kisan Sarathi, which has registered close to 2.4 crore farmers, the intensity of utilization continues to be constrained more by uneven digital literacy and weak content localisation than by lack of platform availability. Gosavi and Singh (2026), in a systematic review of ICT tools in agricultural extension, concluded that the effectiveness of any given tool is "highly contingent on contextual factors such as infrastructure, digital literacy, and institutional support," and that tools already embedded in existing advisory routines are utilized far more than stand-alone or emerging tools. Balkrishna et al. (2024) further showed that functional overlap among India's many farmer-facing e-governance portals — with several separately performing farmer-profiling and market-information functions — itself works against sustained utilization, since users often cannot tell which of several competing platforms is authoritative for a given purpose.

Taken together, these studies show education, training exposure and institutional/infrastructural context to be recurrent correlates of ICT and digital-portal utilization among extension personnel, even as the platforms themselves have evolved substantially since the TNAU Agritech Portal's 2009 launch. The present analysis extends this literature by quantifying, for a specific State Agricultural University portal, the relative contribution of profile characteristics to utilization through correlation and multiple regression.

### III. METHOD

The study was conducted in Coimbatore district of Tamil Nadu, purposively selected for its high penetration of information and communication technologies in agriculture and for hosting the headquarters of Tamil Nadu Agricultural University. All 12 agricultural blocks of the district — Anamalai, Annur, Karamadai, Kinathukadavu, Madhukkarai, Perianaickenpalayam, Pollachi North, Pollachi South, Sarkarsamakulam, Sultanpet, Sular and Thondamuthur — were covered. An ex-post facto research design was adopted, since the utilization behaviour under

study had already occurred and could only be examined after the fact (Singh, 2008). A sample of 60 extension personnel was purposively selected across two functional categories: Assistant/Deputy Directors of Agriculture and Horticulture (ADAs/ADHs,  $n = 22$ ) and Agricultural/Horticultural Officers (AOs/HOs,  $n = 38$ ) drawn from the Departments of Agriculture, Horticulture, Seed Certification and Agricultural Marketing. Primary data were collected during 2011–12 using a well-structured, pre-tested interview schedule administered through personal interviews.

Twelve independent variables — age, education, experience in job, job satisfaction, awareness of ICT tools and services, training undergone, possession of modern electronic gadgets, attitude towards e-media, awareness of agricultural websites, internet usage, mobile usage and portal credibility — were studied against utilization pattern of the TNAU Agritech Portal as the dependent variable. Age and education were scored following Asokhan (2006) and Kalaivani (1999) respectively; job satisfaction was measured using a seven-item continuum adapted from Vijayakumar (2009); attitude towards e-media and portal credibility were measured using scales adapted from Nataraju (1991); and the remaining variables were operationalised specifically for the study on multi-point continua. Each variable was summated into a composite score and respondents were classified into low, medium and high categories using the cumulative frequency method. The dependent variable, utilization pattern, was computed from frequency-of-use and purpose-of-use scores and expressed as a Utilization Index, similarly classified into low, medium and high categories. Data were analysed using percentage analysis, cumulative frequency, Karl Pearson's simple correlation and multiple linear regression (ordinary least squares) to determine the association and relative contribution of the independent variables to utilization.

### IV. RESULTS

#### A. Profile characteristics of extension personnel

The distribution of respondents according to their profile characteristics is presented in Table 1.

**Table 1: Distribution of extension personnel according to their profile characteristics (n = 60)**

| Variable    | Category            | Number | Per cent |
|-------------|---------------------|--------|----------|
| Age (years) | Young ( $\leq 35$ ) | 3      | 5.00     |
|             | Middle (35–45)      | 29     | 48.33    |
|             | Old ( $> 45$ )      | 28     | 46.67    |
| Education   | B.Sc. (Ag.)         | 45     | 75.00    |

| Variable                                         | Category                        | Number | Per cent |
|--------------------------------------------------|---------------------------------|--------|----------|
|                                                  | B.Sc. (Ag.) + additional course | 4      | 6.66     |
|                                                  | M.Sc. (Ag.)                     | 9      | 15.00    |
|                                                  | M.Sc. (Ag.) + additional course | 1      | 1.67     |
|                                                  | Ph.D.                           | 1      | 1.67     |
| <b>Experience in job</b>                         | Up to 14 years                  | 17     | 28.33    |
|                                                  | 15–20 years                     | 20     | 33.33    |
|                                                  | Above 20 years                  | 23     | 38.34    |
| <b>Job satisfaction</b>                          | Low                             | 10     | 16.70    |
|                                                  | Medium                          | 33     | 55.00    |
|                                                  | High                            | 17     | 28.30    |
| <b>Training undergone – technical</b>            | None                            | 7      | 11.67    |
|                                                  | Up to 2 trainings               | 17     | 28.33    |
|                                                  | More than 2 trainings           | 36     | 60.00    |
| <b>Training undergone – computer</b>             | None                            | 6      | 10.00    |
|                                                  | Up to 2 trainings               | 38     | 63.33    |
|                                                  | More than 2 trainings           | 16     | 26.67    |
| <b>Possession of electronic gadgets – home</b>   | Low                             | 17     | 28.34    |
|                                                  | Medium                          | 27     | 45.00    |
|                                                  | High                            | 16     | 26.66    |
| <b>Possession of electronic gadgets – office</b> | Low                             | 32     | 53.33    |
|                                                  | Medium                          | 25     | 41.67    |
|                                                  | High                            | 3      | 5.00     |
| <b>Attitude towards e-media</b>                  | Less favourable                 | 9      | 15.00    |
|                                                  | Favourable                      | 14     | 23.33    |
|                                                  | Most favourable                 | 37     | 61.67    |
| <b>Awareness of agricultural websites</b>        | Up to 2 websites                | 7      | 11.67    |
|                                                  | 3–5 websites                    | 39     | 65.00    |
|                                                  | More than 5 websites            | 14     | 23.33    |
| <b>Utilization of agricultural websites</b>      | Up to 2 websites                | 32     | 53.33    |
|                                                  | 3–5 websites                    | 22     | 36.67    |
|                                                  | More than 5 websites            | 6      | 10.00    |
| <b>Internet ownership</b>                        | Office only                     | 12     | 20.00    |
|                                                  | Both office and personal        | 48     | 80.00    |

| Variable           | Category            | Number | Per cent |
|--------------------|---------------------|--------|----------|
| Portal credibility | Less credible       | 21     | 35.00    |
|                    | Moderately credible | 30     | 50.00    |
|                    | Highly credible     | 9      | 15.00    |

Extension personnel in the study area were predominantly middle-aged to old (48.33% and 46.67% respectively), graduates at the basic B.Sc. (Agri.) level (75.00%), and experienced, with 38.34 per cent having served for more than 20 years. Job satisfaction was medium for a majority (55.00%). A most-favourable attitude towards e-media was reported by 61.67 per cent, awareness of three to five

agricultural websites by 65.00 per cent, and moderate portal credibility by half the respondents (50.00%), with over a third (35.00%) rating the portal as only "less credible".

Awareness and frequency of use of specific ICT tools and services are presented in Table 2.

Table 2: Awareness and frequency of use of ICT tools and services by extension personnel (n = 60)

| Particulars              | Aware (%) | Daily (%) | Weekly (%) | Monthly (%) | Never (%) |
|--------------------------|-----------|-----------|------------|-------------|-----------|
| Mobile telephony         | 100.00    | 63.33     | 25.00      | 3.33        | 8.33      |
| Websites and portal      | 100.00    | 53.33     | 45.00      | 1.66        | -         |
| e-mail                   | 100.00    | 60.00     | 20.00      | 15.00       | 3.33      |
| e-courses                | 13.33     | -         | -          | -           | 13.33     |
| e-books                  | 18.33     | -         | -          | 6.66        | 11.66     |
| IVRS (Kisan Call Centre) | 46.66     | -         | 1.66       | 5.00        | 40.00     |
| Video conferencing       | 51.66     | 5.00      | 15.00      | 16.66       | 15.00     |
| Touch-screen kiosks      | 15.00     | -         | -          | 3.33        | 11.66     |
| Social networking tools  | 35.00     | 11.66     | 6.66       | 10.00       | 6.66      |

Note: Frequency of use computed among the aware sub-group; multiple responses obtained; "-" indicates nil response.

All respondents were aware of mobile telephony, websites/portal and e-mail, whereas awareness of e-courses (13.33%), touch-screen kiosks (15.00%) and e-books (18.33%) remained low. Awareness of video conferencing (51.66%), IVRS/Kisan Call Centre (46.66%) and social networking tools (35.00%) was moderate.

#### B. Utilization pattern of the digital advisory portal

The frequency and purpose of portal use, along with the composite utilization index, are presented in Table 3.

Table 3: Distribution of respondents according to utilization pattern and utilization index of the portal (n = 60)

| Particulars                        | Number | Per cent |
|------------------------------------|--------|----------|
| Frequency of use                   |        |          |
| Regularly                          | 21     | 35.00    |
| Occasionally                       | 34     | 56.67    |
| Rarely                             | 5      | 8.33     |
| Purpose of use (multiple response) |        |          |

| Particulars                      | Number | Per cent |
|----------------------------------|--------|----------|
| Reference and report preparation | 12     | 20.00    |
| Enhancing knowledge              | 36     | 60.00    |
| Advice to farmers                | 42     | 70.00    |
| Utilization Index                |        |          |
| Low                              | 18     | 30.00    |
| Medium                           | 34     | 56.67    |
| High                             | 8      | 13.33    |

More than half the respondents (56.67%) used the portal only occasionally, and a similar proportion (56.67%) fell in the medium utilization-index category, with just 13.33 per cent classified as high users. Advising farmers (70.00%)

and enhancing personal knowledge (60.00%) were the dominant purposes of use, while report preparation accounted for only 20.00 per cent. The links most frequently consulted, in rank order, are given in Table 4.

Table 4: Frequently accessed portal links in rank order (n = 60)

| Link                             | Number | Per cent | Rank |
|----------------------------------|--------|----------|------|
| Dynamic Market Information (DMI) | 48     | 80.00    | I    |
| Crop protection                  | 43     | 71.66    | II   |
| Daily newspaper information      | 36     | 60.00    | III  |
| Special technologies             | 31     | 51.66    | IV   |
| Crop production                  | 23     | 38.33    | V    |
| Schemes and services             | 20     | 33.33    | VI   |
| Recent updates                   | 19     | 31.66    | VII  |
| Success stories                  | 12     | 20.00    | VIII |
| Banking and credit               | 11     | 18.33    | IX   |

Dynamic Market Information and crop-protection advisories dominated portal use.

Simple correlation coefficients between the twelve independent variables and utilization pattern are presented in Table 5.

### C. Association and contribution of profile characteristics to utilization

Table 5: Correlation of profile characteristics with utilization of the portal (n = 60)

| Variable                                 | Correlation "r" value |
|------------------------------------------|-----------------------|
| Age (X1)                                 | -0.176 NS             |
| Education (X2)                           | 0.172 NS              |
| Experience in job (X3)                   | -0.310*               |
| Job satisfaction (X4)                    | 0.323*                |
| Awareness of ICT tools and services (X5) | 0.287*                |
| Training undergone (X6)                  | 0.235**               |

| Variable                                     | Correlation "r" value |
|----------------------------------------------|-----------------------|
| Possession of modern electronic gadgets (X7) | 0.030 NS              |
| Attitude towards e-media (X8)                | 0.457**               |
| Awareness of agricultural websites (X9)      | 0.450**               |
| Internet usage (X10)                         | 0.414**               |
| Mobile usage (X11)                           | 0.076 NS              |
| Portal credibility (X12)                     | 0.225**               |

\*Significant at 5% level; \*\*Significant at 1% level; NS – Non-significant

Multiple regression analysis was carried out to assess the relative contribution of the twelve variables to utilization pattern; results are presented in Table 6.

Table 6: Multiple regression analysis of profile characteristics with utilization pattern (n = 60)

| Variable                                     | Partial regression coefficient | Standard error | 't' value |
|----------------------------------------------|--------------------------------|----------------|-----------|
| Age (X1)                                     | -0.116                         | 0.043          | -1.228 NS |
| Education (X2)                               | -0.371                         | 0.231          | -1.608 NS |
| Experience in job (X3)                       | -0.243                         | 0.678          | -0.358 NS |
| Job satisfaction (X4)                        | 0.107                          | 0.048          | 2.238*    |
| Awareness of ICT tools and services (X5)     | 0.704                          | 0.317          | 2.222*    |
| Training undergone (X6)                      | 0.318                          | 0.127          | 2.507**   |
| Possession of modern electronic gadgets (X7) | -0.093                         | 0.039          | -2.386*   |
| Attitude towards e-media (X8)                | -0.407                         | 0.199          | -2.048*   |
| Awareness of agricultural websites (X9)      | 0.236                          | 0.089          | 2.672**   |
| Internet usage (X10)                         | -0.167                         | 0.136          | 0.474**   |
| Mobile usage (X11)                           | -0.010                         | 0.078          | -0.134 NS |
| Portal credibility (X12)                     | 0.178                          | 0.108          | 0.225**   |

$R^2 = 0.453$ ;  $F = 3.967^{**}$ ; \*Significant at 5% level; \*\*Significant at 1% level; NS – Non-significant

## V. DISCUSSION AND CONCLUSION

The age and experience profile recorded here — a predominantly middle-aged to old, experienced workforce — is broadly consistent with the pattern reported more recently for KVK-linked and university-affiliated extension functionaries, where advancing age has continued to depress engagement with newer digital tools even as formal educational qualification improves adoption (Singh et al., 2026a). The moderate-to-low portal credibility reported by over a third of respondents resonates with the broader observation that the proliferation of Indian government digital-agriculture platforms, each launched in quick succession, has made it difficult for users to judge which portals merit sustained trust (Balkrishna et al., 2024). More

than a decade after these data were collected, the uneven awareness gradient across ICT-tool types (Table 2) still mirrors what recent NAAS-rated studies of India's extension workforce report: tools already embedded in day-to-day advisory routines are adopted readily, while stand-alone or emerging tools such as AI-based applications and IoT-linked sensors see markedly lower uptake, primarily on account of inadequate training rather than lack of access (Gosavi and Singh, 2026; Singh et al., 2026).

The predominance of occasional over regular use, and the concentration of use around advising farmers and enhancing personal knowledge (Table 3), reflect the heavy administrative workload of ADAs and ADHs and a tendency among older, more experienced officials to

consult only the links relevant to their own charge. The dominance of Dynamic Market Information and crop-protection advisories among frequently accessed links (Table 4) is consistent with contemporary evidence that price-discovery and pest/disease-advisory content remain the most consistently used categories of digital agricultural information even as newer AI-based recommendation layers are introduced (Sharma et al., 2025).

Training undergone, attitude towards e-media, awareness of agricultural websites, internet usage and portal credibility showed positive and highly significant correlation with utilization pattern (Table 5), while job satisfaction and awareness of ICT tools and services were positively and significantly correlated at the five per cent level. Experience in job showed a significant negative association, suggesting that more experienced officials continued to rely on conventional, face-to-face methods of technology dissemination rather than the portal. These directional patterns — favourable attitude and website familiarity reinforcing use, while seniority in service works against it — are consistent with recent regression evidence from KVK-linked users, where education raised, and advancing age depressed, ICT-tool utilization (Singh et al., 2026a), and with the broader finding that training remains the single most decisive lever for closing digital-extension adoption gaps in India (Singh et al., 2026).

The twelve variables together explained 45.30 per cent of the variation in utilization pattern ( $R^2 = 0.453$ ; Table 6), with the overall regression significant at the one per cent level ( $F = 3.967^{**}$ ). Job satisfaction and awareness of ICT tools and services contributed positively and significantly at the five per cent level, while training undergone, awareness of agricultural websites and portal credibility contributed positively and significantly at the one per cent level. Possession of modern electronic gadgets and attitude towards e-media showed a significant negative contribution once other variables were held constant, indicating that these two characteristics operate mainly through their association with other predictors rather than as independent drivers. Practically, this places capacity building (training) and information-source credibility among the strongest, most actionable levers available to portal managers, consistent with more recent, larger-sample evidence that inadequate training is consistently ranked the foremost constraint to ICT-tool adoption among India's extension and KVK personnel (Singh et al., 2026), and with the observation that a fragmented, fast-multiplying set of digital-agriculture platforms makes credibility-building an ongoing institutional task rather than a one-time design choice (Balkrishna et al., 2024).

This analysis of a decade-old but still instructive baseline dataset shows that a predominantly middle-aged, graduate, experienced extension workforce used the TNAU Agritech Portal mainly to advise farmers and update its own knowledge, at a largely medium level of intensity. Training undergone, favourable attitude towards e-media, awareness of agricultural websites, internet usage and portal credibility were the strongest positive correlates of utilization, while seniority in service worked against it; together, the profile variables explained under half the variance in utilization, leaving considerable room for institutional and design-side factors. That training and credibility continue to surface as the dominant levers in more recent, nationally-scaled studies of India's extension cadre (Singh et al., 2026; Gosavi and Singh, 2026) suggests these are structural features of digital-extension adoption rather than artefacts of this particular sample or period, and that they deserve explicit attention as legacy university portals are progressively integrated into the Digital Agriculture Mission's unified digital ecosystem. Because the data reported here are drawn from a single-district, 2011–12 cross-section, they should be read as a historical baseline rather than a current snapshot; replication that captures today's mix of portal, mobile-application and AI-enabled advisory channels would help verify whether these correlates still hold as the digital-extension landscape continues to evolve.

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