***Original Research Article***

**A STUDY ON UTILIZATION OF INFORMATION TECHNOLOGY ENABLED SYSTEMS (ITES) IN AGRICULTURE AND PROBLEMS FACED IN UTILIZING ITES AMONG FARMERS IN KRISHNAGIRI DISTRICT OF TAMILNADU, INDIA**

**ABSTRACT**

Information Technology (IT) enabled extension systems are acting as a key agent for changing agrarian situation and farmers’ lives by improving access to information and sharing knowledge. In today’s world of competition, information is the key word to success. Use of internet has given the globe a shrinking effect. Hence, the present investigation was designed to study the socio – personal and psychological characteristics of farmers, to analyse utilization behaviour of respondents on Information Technology Enabled Systems (ITES). The present study was conducted in Krishnagiri district of Tamil Nadu, India. The research design adopted for the present study was ex-post facto since the phenomenon had already taken place. A sample size of 120 farmers were selected for this study using digital literacy test. A well-structured and pre-tested interview schedule was used for data collection. Appropriate statistical tools were used to analyse the data. The most of the ITES were perceived as good by the respondents especially Extension agency contact, information seeking behaviour, information needs in farming practices, dwelling ownership of ICT gadgets, training undergone in ICT, extent of utilization of ICTs in adoption of practices. It may be due to the fact that the above mentioned ITES are easily accessible and user friendly and also to meet out the information needs and rendering effective advisory services.The adoption and efficacy of digital technologies in agriculture are significantly influenced by the use of ITES. Farmers' use of ITES may have a big influence on productivity and decision-making since they rely less on these systems to obtain critical information. This insight may be used to create tailored treatments that increase relinquishment, improve the efficacy of technology and ultimately improve producers' lives.

**Keywords**: Information Technology Enabled Systems, Utilization pattern.

**1. INTRODUCTION**

India is currently the world’s second-largest telecommunications market with a subscriber base of 1.19 billion (of which mobile telephone connections are1169.50 million and landline telephone connections are 22.11 million). Based on the reports of International Telecommunication Union (ITU, 2018), the overall teledensity in the country is 91.22%. While the rural tele-density is currently 58.89%, the urban teledensity stands at 160.57% at the end of September, 2018. Information Technology Enabled Systems (ITES) essentially facilitate the creation, management, storage, retrieval, and dissemination of any relevant data, knowledge, and information that may have been already been processed and adapted. In the last few decades, ITES have provided immense opportunities for the social and economic development of rural people, and some technologies have surpassed others. Mobile telephony is one such technology that has developed significantly in the past few years, and the subscription rate in developing countries has gone up from 22 per 100 inhabitants in 2005 to 91.8 per 100 inhabitants in 2015. Mobile technology goes beyond geographic, socioeconomic, and cultural barriers and this large increase in mobile subscriptions, along with the recent roll out of 3G and 4G technology, can play a big role in the development of rural people. USSD (Unstructured Supplementary Service Data), IV RS (Interactive Voice Response System), and Pull SMS (short message service) are value added services which have enabled farmers and other stakeholders not only to receive broadcast messages but also to get web based services on their mobile without having an internet. Semi-literate and illiterate farmers are also targeted to be reached by voice messages.

The adoption and efficacy of digital technologies in agriculture are significantly influenced by the use of ITES. Growers' use of ITES may have a big influence on crop productivity and decision-making since they rely less on these systems to obtain critical information. Examples of these services include request pricing, rainfall updates, agricultural advice, and online trading platforms. However, a variety of factors, such as farmers' digital literacy, internet accessibility, perceived system benefits, and training status, influence how and to what degree they employ these technologies. In order to improve system design, relate barriers and make sure that these tools successfully satisfy the needs of the agricultural community, it is crucial to comprehend how growers engage with and utilize these ITES. This insight may be used to create tailored treatments that increase relinquishment, improve the efficacy of technology and ultimately improve producers' lives. The objectives of the study were to study the utilization behaviour of farmers on selected ITES and problems associated with utilising the ITES.

**2.REVIEW OF LITERATURE**

1. Anbalagan and Mohanapriya (2024) carried out research in the Madurai and Dindigul districts, focusing on how agri-startups are facilitating technology transfer. They discovered that while 81.3 per cent of farmers felt that these startups were instrumental in promoting new technologies and understanding market needs, only 12.7 per cent expressed high satisfaction with the actual transfer of useful technologies. The limited impact was largely due to poor after-sales service and insufficient demonstration efforts.
2. Abbas et al. (2024) conducted a study in Villupuram district to assess the usage of mobile phone technologies in agricultural extension services. Their research revealed that only 13 per cent of farmers were aware of mobile-based government advisory services, highlighting a significant information gap in digital extension delivery. The study emphasized the need for targeted awareness campaigns, improved content delivery mechanisms, and stronger involvement from extension workers to bridge the digital divide among rural farming communities.
3. Priyanka and Sundaramari (2024) evaluated the impact of mobile-disseminated agricultural services on farmers’ attitudes in Dindigul district. They found that 43.3 per cent of farmers had a favorable attitude toward mobile advisories, with education, mass media exposure, and innovativeness positively influencing adoption levels. The study suggests that tailoring mobile advisory content to the literacy levels and information needs of farmers could enhance utilization.
4. Sabarish et al. (2024) explored the effectiveness of agri-startups in facilitating technology transfer among farmers in Madurai and Dindigul districts. While 81.3 per cent of farmers acknowledged the role of startups in promoting awareness of modern technologies and markets, only 12.7 per cent expressed high satisfaction with the actual transfer and usability of these technologies. The study identified weak after-sales support and a lack of field-level demonstrations as major barriers to adoption, underscoring the need for agri-tech firms to offer end-to-end support.
5. Sownthariya et al. (2023) investigated the constraints faced by maize farmers in Perambalur and Cuddalore districts in using smartphones to access agricultural information. Their results showed that 70.8 per cent of farmers cited high maintenance costs of smartphones, 66.7 per cent faced issues with expensive data, and 57.5 per cent had limited digital literacy. Additionally, the absence of localized content and crop-specific advisory tools further discouraged technology use. This study strongly advocates for localized, cost-effective, and easy-to-use ICT tools that consider farmers' practical limitations.
6. Palanisamy and Bharadwaj (2018) analyzed the usage of mobile phone-based SMS services, particularly Reuters Market Light, in Erode district. The study reported that around 75 per cent of farmers had a medium level of utilization, with small and marginal farmers exhibiting lower usage rates due to trust issues and limited understanding of technical messages. The authors recommended simplification of content, use of regional languages, and more interactive communication formats to increase effectiveness.

**3. METHODOLOGY**

The research design adopted for the present study was ex-post facto since the phenomenon had already taken place. According to Kerlinger (1973), ex-post facto research is a systematic empirical enquiry in which the researcher does not have direct control over dependent variables because either their manifestation has already occurred or they are not inherently manipulated. Keeping this in view, the adaptability of the proposed design with respect to the type of variables under consideration, size of respondents and phenomenon to be studied, the ex-post facto was selected as an appropriate research design. The main focus of this investigation was to know the utilization of information technology enabled systems and the problems faced during usage of ITES.

The study was conducted in Krishnagiri District of Tamilnadu, India was purposively selected. The taluk was considered as the second stage in selecting the study area. Maximum area criterion was considered in the selection of the taluk. Krishnagiri district has seven taluks namely Krishnagiri, Hosur, Pochampalli, Uthangarai, Shoolagiri, Bargur, and Denkanikottai. Uthangarai taluk and Pochampalli taluk were randomly selected. The selection of blocks from Uthangarai and Pochampalli taluks are, Uthangarai and Mathur blocks were selected using a random sampling technique. A list of villages for the selected Uthangarai block and Mathur block was collected from the office of the Joint Director of Agriculture; there are 35 revenue villages in Uthangarai block. Out of total villages, five villages were selected. The selected villages are Singarapettai, Athipadi, Uthangarai, Pavakkal, and Periyathallapadi. The selected villages from Mathur blocks were Samalpatti, Kunnuthur, Anandur, Mathur, and Gerigapalli. These villages from the blocks were selected based on the registered farmer’s list obtained from the state department of agriculture for getting SMS services. While selecting the farmers for this study, scores of digital literacy test and ownership of android smart mobile phones, and registration for receiving mobile based SMS services through State Department of Agriculture and Krishi Vigyan Kendras at regional level were considered as criteria for identifying the appropriate sample.

**4. RESULTS AND DISCUSSION**

**4.1. Utilization behaviour of farmers on selected Information Technology Enabled Systems**

To study the utilization behaviour of farmers on selected ITES data were collected and discussed under following headings

**4.1.1. Overall utilization behaviour of ITES**

## Table1: Distribution of respondents according to their Overall utilization behaviour of ITES (n=120)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Category** | **Frequency** | **Percent** |
|  | Low | 39 | 32.50 |
|  | Medium | 57 | 47.50 |
|  | High | 24 | 20.00 |
|  | Total | 120 | 100.00 |

To know about the overall utilization of ITES data were collected and are presented inTable.1. It could be seen from the table 1 that nearly half of the respondents had medium level of utilization behaviour followed by low and highlevels of utilization behaviour. Hence, it could be concluded that the respondents were found to be with medium level of ITES utilization behaviour. It may be due to the good perception, accessibility and user ability of the respondents on various ITES.

## 4.1.2. Frequency of Utilization of ITES

## Table 2: Distribution of respondents according to their frequency of utilization of ITES

## (n=120)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Category** | **Utilization** | | **Frequency of Utilization** | | | | | | | |
| **Yes** | **No** | **Frequently** | | **Often** | | **Sometimes** | | **Never** | |
| **No.** | **Percent** | **No.** | **Percent** | **No.** | **Percent** | **No.** | **Percent** |
|  | **Web portals/Web sites** | | | | | | | | | | |
|  | TNAU AGRITEH  Portal | 96 | 24 | 65 | 54.17 | 22 | 18.33 | 09 | 07.50 | 24 | 20.00 |
|  | AGRISNET | 63 | 57 | 47 | 39.17 | 14 | 11.67 | 02 | 01.66 | 57 | 47.50 |
|  | DACNET | 12 | 108 | 09 | 07.50 | 02 | 01.67 | 01 | 00.83 | 108 | 90.00 |
|  | Agropedia | 21 | 99 | 16 | 13.33 | 04 | 03.33 | 01 | 00.83 | 99 | 82.50 |
|  | e-Krishi | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | AGMARKNET | 68 | 52 | 36 | 30.00 | 25 | 20.83 | 07 | 05.83 | 52 | 43.34 |
|  | e-Choupal | 00 | 120 | 00 | 00.00 | 00 | e00.00 | 00 | 00.00 | 120 | 100.00 |
|  | IFFCOAgri  Portal | 25 | 95 | 14 | 11.67 | 07 | 05.83 | 04 | 03.33 | 95 | 79.17 |
|  | ikisan | 77 | 43 | 51 | 42.50 | 22 | 18.33 | 04 | 03.33 | 43 | 35.84 |
|  | AgriwatchPortal | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 |
| **II** | **VKCs and Telephony** | | | | | | | | | | |
|  | Village Knowledge Centre (VKC)  –MSSRF | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 |
|  | Village Resource Centres  (VRCs)  –ISRO | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 00.00 |
|  | Community  Information Centres(CICs) | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 00.00 |
|  | Common Service Centres(CSCs) | 08 | 112 | 00 | 00.00 | 06 | 05.00 | 02 | 01.67 | 112 | 93.33 |
|  | Farmers Call  Centre(Kisan Call Centre) | 98 | 22 | 79 | 65.84 | 13 | 10.83 | 06 | 05.00 | 22 | 18.33 |
|  | IFFCO Kisan  Sanchar Limited (IKSL) | 04 | 116 | 00 | 00.00 | 00 | 00.00 | 04 | 03.33 | 116 | 96.67 |
|  | Mobile Advisory  Services by KVKs of ICAR | 60 | 60 | 33 | 27.50 | 22 | 18.33 | 05 | 04.17 | 60 | 50.00 |
|  | Mobile advisory services of state department of  agriculture | 65 | 55 | 41 | 34.17 | 21 | 17.50 | 03 | 02.50 | 55 | 45.83 |
| **III** | **Mobile Apps** |  |  |  |  |  |  |  |  |  |  |
|  | Nithra  Agriculture | 52 | 68 | 34 | 28.33 | 11 | 09.17 | 07 | 05.83 | 68 | 56.67 |
|  | Cattle Expert  System Tamil (TNAU) | 36 | 84 | 25 | 20.83 | 05 | 04.17 | 06 | 05.00 | 84 | 70.00 |
|  | Paddy Expert  System (TNAU) | 25 | 95 | 11 | 09.17 | 13 | 10.83 | 01 | 00.83 | 95 | 79.17 |
|  | Sugarcane Expert System Tamil(TNAU) | 11 | 109 | 01 | 00.83 | 03 | 02.50 | 07 | 05.83 | 109 | 90.83 |
|  | Banana Expert  System Tamil (TNAU) | 21 | 99 | 05 | 04.17 | 06 | 05.00 | 10 | 08.33 | 99 | 80.25 |
|  | m-ICE | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | IFFCO Kisan | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | Kisan Suvidha | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | TNAUapp | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | M-Kisan | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | Farm-o-pedia | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | Crop Insurance  app | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | Agri Market | 00 | 120 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 | 120 | 100.00 |
|  | Uzhavanapp | 95 | 25 | 74 | 61.67 | 18 | 15.00 | 03 | 02.50 | 25 | 20.83 |
|  | eNAM | 36 | 84 | 25 | 20.83 | 05 | 04.17 | 06 | 05.00 | 84 | 70.00 |

Frequency of usage was classified into four categories viz., frequently, sometimes, and often and never. To find out the frequency of usage of ITES by the respondents data were collected and presented in Table. 2. It could be revealed that some of the frequently utilized ITES are Farmers call centre, Uzhavan app, TNAU AGRITECH portal, I Kisan, AGRISNET, Mobile Advisory Services of state department of Agriculture, Nithra Agriculture, Mobile Advisory Services by KVKs of ICAR, Cattle Expert System Tamil, e NAM, Drones, Agropedia, Irrigate via smartphone, IFFCO Agri portal, Paddy Expert System, DACNET, Banana Expert System, and Sugarcane Expert System (TNAU).

Some of the respondents often utilized the ITES namely, AGMARKNET, TNAU AGRITECH PORTAL, i Kisan, Mobile Advisory Services by KVKs of ICAR, Mobile Advisory Services of state department of Agriculture, Uzhavan App, AGRISNET, Farmers call centre, Paddy expert system, Nithra Agriculture, IFFCO Agri portal, Irrigate via smartphone, Drones, Common Service Centres, Banana Expert System Tamil (TNAU), Cattle Expert System Tamil (TNAU), e NAM, Agropedia, Sugarcane Expert System Tamil (TNAU), DACNET.

Another group of respondents occasionally utilized the ITES namely, Irrigate via smartphone, Banana Expert System Tamil ( TNAU), YNAU AGRITECH portal, AGMARKNET, IFFCO Framers call centre, Cattle Expert System, eNAM, Mobile Advisory Services by KVKs of ICAR, IFFCO Agri portal, Drones, IFFCO Kisan Sanchar Limited (IKSL), i Kisan, Uzhavan App, Common Service Centre, AGRISNET, DACNET, Agropedia, Paddy Expert System (TNAU). Hence, it could be concluded that most of the Information Technology Enabled Systems utilized by the respondents mainly Mobile Advisory Services provided by the State Department of Agriculture and Uzhavan App. It may be due to the fact that majority of the respondents had awareness and positive perception towards the SMS services of State Department of Agriculture and Uzhavan App.

**4.2. Problems faced by the respondents in utilizing the ITES**

This section includes the general (Table 3) problems faced by the respondents during the usage of Information technology enabled systems. The general problems were classified into twelve categories with three point continuum. The relevant data were collected and presented.

**Table 3. Distribution of respondents according to their general problems faced in using ITES**

(n=120)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Problems** | **Frequency** | | | | | |
| **Always** | | **Sometimes** | | **Never** | |
| **No** | **Percent** | **No** | **Percent** | **No** | **Percent** |
|  | Lack of confidence in operating IT | 25 | 20.83 | 68 | 56.67 | 27 | 22.50 |
|  | Erratic power supply | 57 | 47.50 | 34 | 28.33 | 29 | 24.17 |
|  | Low network connectivity | 45 | 37.50 | 37 | 30.83 | 38 | 31.67 |
|  | Lack of awareness of benefits of IT | 78 | 65.00 | 22 | 18.33 | 20 | 16.67 |
|  | Lack of skill in handling IT | 96 | 80.00 | 15 | 12.50 | 09 | 07.75 |
|  | Low digital literacy | 85 | 70.83 | 33 | 27.50 | 02 | 01.67 |
|  | Lack of repairing facilities and centres in villages | 50 | 41.66 | 60 | 50.00 | 10 | 08.83 |
|  | Negative attitude towards IT | 23 | 19.16 | 20 | 16.67 | 77 | 64.17 |
|  | Poor finance | 66 | 55.00 | 35 | 29.17 | 19 | 15.83 |
|  | Lack of training and practical exposure towards IT | 101 | 84.17 | 11 | 09.16 | 08 | 06.67 |
|  | High cost of repairing IT | 16 | 13.33 | 24 | 20.00 | 80 | 66.67 |
|  | Sufficient use of regional specific language | 71 | 16 | 35 | 29.17 | 14 | 11.67 |

With respect to the general problems faced by the respondents it was found that 66.67 per cent of them never reported that High cost of repairing ITs, Negative attitude towards ITs (64.17 per cent), Low network connectivity” (31.67 per cent), erratic power supply (24.17 per cent),lack of confidence in operating ITs” ( 22.50per cent), lack of awareness of benefits of ITs (16.67 per cent), poor finance (15.83 per cent), insufficient use of regional specific language (11.67 per cent), Lack of repairing facilities and centres in the village (08.83 per cent), Lack of skill in handling ITs (07.75 per cent), Lack of training and practical exposure towards ITs (06.67 per cent), Low digital literacy (01.67 per cent).Sometimes some of the respondents have faced the problems like lack of confidence in operating ITs ( 56.67 per cent), Lack of repairing facilities and centres in the village(50.00 per cent), Low network connectivity” (30.83 per cent), poor finance and insufficient use of regional specific language (29.17 per cent), erratic power supply (28.33 per cent), Low digital literacy (20.00 per cent), High cost of repairing ITs (18.33 per cent), lack of awareness of benefits of ITs (16.67 per cent), Negative attitude towards ITs (80.00 per cent), Lack of skill in handling ITs (09.16 per cent), Lack of training and practical exposure towards ITs (06.67).

Further it was also found that the respondents faced obstacles namely, Lack of training and practical exposure towards ITs (84.17 per cent), Lack of skill in handling ITs (80.00 per cent), Low digital literacy (70.83 per cent), lack of awareness of benefits of ITs (65.00 per cent), insufficient use of regional specific language (59.16 per cent), poor finance (55.00 per cent), erratic power supply (47.50 per cent), Lack of repairing facilities and centres in the village(41.66 per cent), Low network connectivity” (37.50 per cent), lack of confidence in operating ICTs ( 20.83 per cent), Negative attitude towards ITs (19.16 per cent), High cost of repairing ICTs (13.33 per cent).Hence it could be concluded that 66.67 per cent of the respondents never reported “High cost of repairing ITs” as the problem and (64.17 per cent) of them never faced difficulties of Negative attitude towards ITs and centres in the village. Sometimes, some of them faced the problems like “lack of confidence in operating ITs” (56.67 per cent) and “Lack of repairing facilities and centres in the village” (50.00 per cent). Further, the respondents always faced problems regarding “Lack of training and practical exposure towards ITs” (84.17 per cent) and “Lack of skill in handling ITs” (80.00 per cent). In the modern era of new technological innovations and dawn of communication breakthrough, operating and utilising the different ICT tools and various ITES are found to be easy and simple for younger generation. Most of the respondents are found to be digitally literate farming community, accessibility, operational skill, and ability to understand the digital aspects seems to be easy.

**5. CONCLUSION:**

The study on the utilization behaviour of farmers concerning ITES reveals that the majority of respondents (47.50%) exhibit a medium level of ITES utilization. A smaller proportion of respondents show low (32.50%) and high (20.00%) utilization behaviours. This suggests that while many farmers are engaging with ITES to some extent, there is room for further engagement and improvement in utilization. In terms of frequency, several ITES platforms, particularly mobile-based services, are utilized frequently by respondents. Notably, the Farmers Call Centre (65.84%), Uzhavan App (61.67%), and TNAU AGRITECH Portal (54.17%) were the most frequently used platforms. Other services such as Mobile Advisory Services from the State Department of Agriculture (34.17%) and Nithra Agriculture (28.33%) also saw frequent use. On the other hand, systems like the Sugarcane Expert System (TNAU) (0.83%) and Banana Expert System (4.17%) had minimal usage, indicating less engagement or awareness in these particular areas.

The findings suggest that a significant proportion of farmers exhibit a medium level of ITES utilization, with a preference for systems that are easily accessible and offer practical benefits, such as the Uzhavan App and Mobile Advisory Services from the State Department of Agriculture. This reflects a strong awareness and positive perception towards these systems, which are user-friendly and provide valuable, localized information. The varied frequency of usage across different ITES indicates that farmers are selective in their use of technology, prioritizing those that align closely with their agricultural practices and needs. These results highlight the importance of ensuring that ITES are tailored to meet the specific requirements of farmers, while also ensuring accessibility and ease of use.

Regarding general problems 66.67 per cent of them never reported that High cost of repairing ITs, Negative attitude towards ITs (64.17 per cent), Low network connectivity” (31.67 per cent), erratic power supply (24.17 per cent),lack of confidence in operating ITs” (22.50per cent). Sometimes some of the respondents have faced the problems like lack of confidence in operating ITs ( 56.67 per cent), Lack of repairing facilities and centrs in the village(50.00 per cent), Low network connectivity” (30.83 per cent), poor finance and insufficient use of regional specific language (29.17 per cent), erratic power supply (28.33 per cent) and low digital literacy (20.00 per cent). Further it was also found that the respondents faced obstacles namely, Lack of training and practical exposure towards ITs (84.17 per cent), Lack of skill in handling ITs (80.00 per cent), Low digital literacy (70.83 per cent), lack of awareness of benefits of ITs (65.00 per cent), insufficient use of regional specific language (59.16 per cent), poor finance (55.00 per cent), erratic power supply (47.50 per cent), Lack of repairing facilities and centers in the village(41.66 per cent).

Disclaimer (Artificial intelligence)

We**( J.MEENAMBIGAI &D.LOKESHWARAN )** hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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