**Constraints Faced by Paddy Growers in Using Information and Communication Technologies**

**ABSTRACT**

Paddy farmers' decision-making and productivity might be improved by the use of information and communication technologies (ICTs) in agriculture. Nevertheless, farmers face a number of obstacles that prevent efficient use of the many digital instruments that are available.

**Aims:** A study on “Constraints faced by paddy growers in using ICTs” was conducted in Kaithal and Fatehabad district of Haryana, India.

**Study Design:** Exploratory research design of the study.

**Place and Duration of Study:** Department of Extension Education and Communication Management, I.C. College of Community Science, Choudhary Charan Singh Haryana Agricultural University, Hisar, between October 2020 to December 2024.

**Methodology:** This study was conducted in Haryana with a sample size of 240 paddy growers from six villages (40 from each village). Three villages from the Kalayat block and three villages from the Tohana block were selected randomly. The constraints faced by the paddy growers were studied. The Henry Garret Ranking Technique was adopted, as the preference of particular constraints of each category was different from respondent to respondent.

**Results:** The result showed that in technical constraints rank 1st was given to ‘clarification of the message is difficult, if any doubt arises’ with Garrett score- 8782 for the Kaithal paddy growers and ‘reliability of the content cannot be understood’ rank 1st was given by the Fatehabad paddy growers with Garrett score- 9207. In terms of financial constraints rank 1st was given to ‘high cost of ICT gadgets like smartphones, computers *etc*.’ with Garrett scores- 9080 and 9155 in both Kaithal and Fatehabad paddy growers. In terms of personal constraints, the top rank was given to ‘insufficient training and practical exposure towards ICTs’ with a Garrett score- 9251 and 9124 respectively for Kaithal and Fatehabad paddy growers. In terms of social constraints the top score was given to ‘farmers getting confused with a lot of information obtained from the ICT with a Garrett score-8922 and 9286 for Kaithal and Fatehabad paddy growers, respectively.

**Conclusion:** Perceived constraints faced by the paddy growers in the study area were clarification of the message is difficult if any doubt arises, the reliability of the content cannot be understood, high cost of ICT gadgets like smart phones, computers, *etc,* insufficient training and practical exposure towards ICTs.

***Keywords:*** *Technical, financial, personal and social constraints, ICT gadgets and practical exposure.*

1. **INTRODUCTION**

 Nearly half of India's national Gross Domestic Product comes from agriculture, which dominates the country's economy. The growth of India's agricultural and related industries is essential to its success (Kumar and Vijayakuma, 2015). Rice is one of the crop which is cultivated by farmers throughout a year in different seasons. So they need updated and timely information for decision making in their farm (Kungumaselvan and Theodore, 2022). In the majority of less developed nations, agricultural growth is crucial for both feeding expanding people and promoting economic development (Adegbidi *et al.*, 2012). ICT enhances market activity, facilitates the exchange of pertinent information and increases profitability (Lokeswari, 2016). Approximately 70% of people in Haryana work in agriculture. Wheat and rice are the principal crops (Kumar, 2023). The person in the center of agricultural output, which is the primary occupation in rural areas is typically referred to as a "farmer" (Ajayi *et al.,* 2018). The use of ICT is an essential pillar of agricultural extension and in this present scenario of a rapidly changing world (Rahman *et al.,* 2023). Recently, the development of farm management information systems (FMIS) has increased. Although many argue that the use of FMIS can enhance decision making, we still do not fully understand the impact of these systems on the individual and farm levels. The use of FMIS and information facilitated members in sharing information formally and informally, thereby increasing decision making efficiency and informal mutual adjustment among employees. Likewise, the participative management of employees emerged (Kim et al., 2023; Kumar et al., 2021; Kumar, 2023).

 Information is essential for enabling these farmers to raise their standard of living. Crucial knowledge about planting, enhancing soils, negotiating the greatest price for their produce and preventing crop pests and diseases all help farmers make better decisions (Armstrong and Gandhi, 2012). Agricultural improvement will reduce poverty and hence enhance people's livelihoods (Chandrasekaran and Yalakonda, 2022). ICT use in agriculture is therefore becoming increasingly significant and pervasive in the modern era (Anand *et al.,* 2020). These circumstances include "high rates of illiteracy, inadequate technology infrastructure and a need for smartphone-based technology that very few smallholder farmers in the developing world can take advantage (Alant and Bakare, 2021). ICT tools are essential for filling up knowledge gaps in agriculture. These tools include social media, internet-based platforms, mobile phones, and agricultural apps (Aker, 2011). Several ICT projects have been introduced in India to improve the distribution of information to farmers, including e-Choupal, Kisan Call Centers and mobile apps like Kisan Suvidha and IFFCO Kisan (Chandra *et al.,* 2019). Agricultural automation is limited due to a lack of mechanization infrastructure, as well as a lack of awareness and training. Most farmers lack the necessary expertise to operate farm machinery and most farmers cannot afford or hire those tools due to their high cost (Sigdel *et al.,* 2022). Social constraints play a critical role in the adoption of ICT among farmers. Factors such as literacy levels, cultural norms, and social capital influence the ability and willingness of farmers to engage with new technologies (Satapathy *et al.,* 2024). Paddy cultivation is a labor-intensive crop that requires prompt and accurate interventions, and the districts of Kaithal and Fatehabad in Haryana are well-known for their significant involvement in this practice (Kumar *et al.*, 2020). ICTs can help paddy farmers deal with issues including pest infestations, water management, and volatile market pricing but their use in rural regions is still quite low (Meera *et al.,* 2019).

 Paddy farmers in Kaithal and Fatehabad face several obstacles to the successful adoption and application of ICTs. Access to technology is hampered by socioeconomic factors such as poor literacy rates, a lack of digital literacy and financial difficulties (Singh *et al.,* 2020). The problem is made worse by infrastructure issues like poor internet connectivity, spotty cell network coverage, and restricted access to electricity (Dasgupta *et al.,* 2011). However, creating focused solutions requires an awareness of the particular difficulties experienced by paddy farmers in particular situations (Hazarika and Subramanian, 2020).

1. **MATERIAL AND METHODS**

The study was conducted in the Kaithal and Fatehabad districts of Haryana, India under the Department of Extension Education and Communication Management, I.C. College of Community Science, CCS Haryana Agricultural University, Hisar, Haryana, India. As per the research problem, rice is grown in 18 districts of Haryana state. Out of the 18 districts under rice productivity, the Kaithal and Fatehabad districts were selected randomly because it has a high area under rice cultivation. Kaithal district is also divided into seven community blocks. Out of them Kalayat block was selected randomly for the present study. Fatehabad district is administratively divided into seven community blocks. Out of them Tohana block was selected randomly. A list of all villages in the selected block *i.e.,* Tohana and Kalayat, was procured from the block headquarters. From each of the selected blocks, three sample villages were selected with a random sampling technique. Akanwali, Kullan and Bosti villages were randomly selected from the Tohana block and Kailram, Chausala and Balu villages were randomly selected from the Kalayat block. For the present study, a total sample of 240 paddy growers was taken by random sampling method (40 paddy growers from each village) for the final data collection and implementation of the objectives of the present study. The interview schedule was used to collect the required information from the respondents. After collecting the data from 240 respondents, they were transferred to the work table and tally sheet then processed, analyzed and subjected to randomly selected. The data were interpreted in the light of the objectives of the study. Henry Garrett's rank was used to explore the paddy growers' constraints.

**Henry Garret Ranking Technique**

 Henry Garret Ranking Technique was used to prioritize the constraints faced by the paddy growers in using ICTs. As per this method, the paddy growers had been asked to assign the rank for all constraints and the outcomes of such ranking have been converted into score value with the help of the following formula:

$$Percent position=\frac{100(R\_{ij}-0.5)}{N\_{j}}$$

Where,

$R\_{ij}$= Rank given for the ith constraint by jth paddy growers

$N\_{j}$= Number of constraints ranked by the jth paddy growers

 The percent position was then transformed into Garret score values using the Garret Ranking Conversion Table, as indicated in the Garret Ranking Table. To get the Garret mean score for each constraint, the Garret scores from the total number of respondents for that specific constraint were then added up and divided by the number of respondents. Similarly, the Garret mean scores for all the constraints were determined. Each limitation was assigned a final rank based on the Garret mean score derived from all respondents. The limitations that are deemed most significant are those with the greatest mean Garret ratings. Thus, the rank highlighted the constraints faced by the paddy growers in using ICTs *i.e.,* technical, financial, personal and social constraints.

**Calculating Garrett Ranking**

**Table 1- Percent position value and Garret score value of financial constraints**

|  |  |  |  |
| --- | --- | --- | --- |
| **100 (Rij- 0.5)/ Nj** | **Calculated percent value** | **Percent position value** | **Garret score value** |
| 100 (1-0.5)/3 | 16.67 | 16.69 | 69 |
| 100 (2-0.5)/3 | 50 | 50.00 | 50 |
| 100 (3-0.5)/3 | 83.33 | 83.31 | 31 |

**Table 2- Percent position value and Garret score value of technical constraints**

|  |  |  |  |
| --- | --- | --- | --- |
| **100 (Rij- 0.5)/ Nj** | **Calculated percent value** | **Percent position value** | **Garret score value** |
| 100 (1-0.5)/10 | 5 | 5.51 | 81 |
| 100 (2-0.5)/10 | 15 | 15.44 | 70 |
| 100 (3-0.5)/10 | 25 | 25.48 | 63 |
| 100 (4-0.5)/10 | 35 | 34.25 | 58 |
| 100 (5-0.5)/10 | 45 | 45.97 | 52 |
| 100 (6-0.5)/10 | 55 | 54.03 | 48 |
| 100 (7-0.5)/10 | 65 | 65.75 | 42 |
| 100 (8-0.5)/10 | 75 | 74.52 | 37 |
| 100 (9-0.5)/10 | 85 | 85.75 | 29 |
| 100 (10-0.5)/10 | 95 | 95.08 | 18 |

**Table 3- Percent position value and Garret score value of financial constraints**

|  |  |  |  |
| --- | --- | --- | --- |
| **100 (Rij- 0.5)/ Nj** | **Calculated percent value** | **Percent position value** | **Garret score value** |
| 100 (1-0.5)/3 | 16.67 | 16.69 | 69 |
| 100 (2-0.5)/3 | 50 | 50.00 | 50 |
| 100 (3-0.5)/3 | 83.33 | 83.31 | 31 |

**Table 4- Percent position value and Garret score value of personal constraints**

|  |  |  |  |
| --- | --- | --- | --- |
| **100 (Rij- 0.5)/ Nj** | **Calculated percent value** | **Percent position value** | **Garret score value** |
| 100(1- 0.5)/9 | 5.56 | 5.55 | 81 |
| 100(2- 0.5)/9 | 16.67 | 16.66 | 69 |
| 100(3- 0.5)/9 | 27.78 | 27.15 | 62 |
| 100(4- 0.5)/9 | 38.89 | 38.06 | 56 |
| 100(5- 0.5)/9 | 50 | 50.00 | 50 |
| 100(6- 0.5)/9 | 61.11 | 61.94 | 44 |
| 100(7- 0.5)/9 | 72.22 | 72.85 | 38 |
| 100(8- 0.5)/9 | 83.33 | 83.31 | 31 |
| 100(9- 0.5)/9 | 94.44 | 94.49 | 19 |

**Table 5-Percent position value and Garret score value of Social Constraints**

|  |  |  |  |
| --- | --- | --- | --- |
| **100 (Rij- 0.5)/ Nj** | **Calculated percent value** | **Percent position value** | **Garret score value** |
| 100 (1-0.5)/5 | 10 | 10.06 | 75 |
| 100 (2-0.5)/5 | 30 | 30.61 | 60 |
| 100 (3-0.5)/5 | 50 | 50.00 | 50 |
| 100 (4-0.5)/5 | 70 | 69.39 | 40 |
| 100 (5-0.5)/5 | 90 | 90.83 | 24 |



**Table 6: Garrett ranking conversion table (The conversion of orders of merits into units of amount of “scores”)**

1. **RESULTS AND DISCUSSION**
	1. ***Technical constraints faced by paddy growers in using ICT tools***

 The result from Table 7 showed that in technical constraints rank 1st was given to ‘clarification of the message is difficult, if any doubt arises’ (Garrett score- 8782) to the Kaithal paddy growers followed by ‘reliability of the content cannot be understood’ (Garrett score-8758) rank 2nd, ‘lack of feedback’ (Garrett score- 7210) rank 3rd, ‘quick response for the queries is difficult’ (Garrett score- 6377) rank 4th, ‘poor & inadequate network connectivity’ (Garrett score- 6249) rank 5th, ‘no relevant information is received’ (Garrett score- 5814) rank 6th, ‘difficult to find the origin of the information generated’ (Garrett score- 4760) rank 7th, ‘frequency of broadcasting and time of broadcasting is not convenient’ (Garrett score- 4362) rank 8th, ‘high threats of the virus’ (Garrett score- 3909) rank 9th and ‘difficult to follow the hyperlinks’ (Garrett score- 3305) rank 10th.

 Rank 1st was given to ‘reliability of the content cannot be understood’ (Garrett score- 9207) to the Fatehabad paddy growers followed by ‘clarification of the message is difficult, if any doubt arises’ (Garrett score-8336) rank 2nd, ‘lack of feedback’ (Garrett score- 6953) rank 3rd, ‘quick response for the queries is difficult’ (Garrett score- 6883) rank 4th, ‘poor & inadequate network connectivity’ (Garrett score- 6466) rank 5th, ‘no relevant information is received’ (Garrett score- 5740) rank 6th, ‘difficult to find the origin of the information generated’ (Garrett score- 5208) rank 7th, ‘high threats of virus’ (Garrett score- 4162) rank 8th, ‘frequency of broadcasting and time of broadcasting is not convenient’ (Garrett score- 4033) rank 9th and ‘difficult to follow the hyperlinks’ (Garrett score- 2652) rank 10th. This is in line with the findings of Baruah and Mohan (2018) who concluded that mean score leaning towards 4, with factors such as ICT tools are complicated to use, Poor internet/ phone connectivity, Inadequate availability of ICT services to rural farmers.

**Table 7: Technical constraints faced by paddy growers in using information and communication technology tools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Constraints** | **Kaithal (n1=120)** | **Fatehabad (n2=120)** |
| **Total Garrett Score** | **Garrett MS** | **Rank** | **Total Garrett Score** | **Garrett MS** | **Rank** |
|  | Poor and inadequate network connectivity | 6249 | 52.08 | V | 6466 | 53.88 | V |
|  | Clarification of the message is difficult, if any doubt arises | 8782 | 73.18 | I | 8336 | 69.47 | II |
|  | No relevant information is received | 5814 | 48.45 | VI | 5740 | 47.83 | VI |
|  | High threats of virus | 3909 | 32.58 | IX | 4162 | 34.68 | VIII |
|  | Reliability of the content cannot be understood | 8758 | 72.98 | II | 9207 | 76.73 | I |
|  | Quick response for the queries is difficult | 6377 | 53.14 | IV | 6883 | 57.36 | IV |
|  | Difficult to find the origin of the information generated | 4760 | 39.67 | VII | 5208 | 43.40 | VII |
|  | Lack of feedback | 7210 | 61.03 | III | 6953 | 57.94 | III |
|  | Frequency of broadcasting and time of broadcasting is not convenient | 4362 | 36.35 | VIII | 4033 | 33.61 | IX |
|  | Difficult to follow the hyperlinks | 3305 | 27.54 | X | 2652 | 22.10 | X |

* 1. ***Financial constraints faced by paddy growers in using ICT tools***

An overview of Table 8 indicated that in financial constraints rank 1st was given to ‘high cost of ICT gadgets like smart phones, computers *etc*.’ (Garrett score- 9080 and 9155) for Kaithal and Fatehabad paddy growers respectively followed by ‘no subsidies available to buy ICT tools’ (Garrett score-6079 and 8266) rank 2nd and ‘inadequate infrastructure facilities for maintenance of ICT tools’ (Garrett score- 3363 and 6079) rank 3rd, respectively. The findings of the current study align with those of Ajayi et al. (2018) who showed that infrastructure and rural poverty ranked highest (92.00%) on the list of constraints faced by farmers, respectively followed by illiteracy (91.30%) and unstable power supply (81.30%). Communication policy of government ranked least (66.70%) among the constraints as opined by the farmers.

**Table 8: Financial constraints faced by paddy growers in using information and communication technology tools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Constraints** | **Kaithal (n1=120)** | **Fatehabad (n2=120)** |
| **Total Garrett Score** | **Garrett MS** | **Rank** | **Total Garrett Score** | **Garrett MS** | **Rank** |
|  | High cost of ICT gadgets like smart phones, computers *etc*. | 9080 | 75.67 | I | 9155 | 76.29 | I |
|  | Inadequate infrastructure facilities for maintenance of ICT tools | 3363 | 28.03 | III | 6079 | 50.66 | III |
|  | No subsidies available to buy ICT tools | 6079 | 50.66 | II | 8266 | 68.88 | II |

* 1. ***Personal constraints faced by paddy growers in using ICT tools***

 Results portrayed in Table 9 indicated that in personal constraints rank 1st was given to ‘insufficient training and practical exposure towards ICTs’ with a Garrett score of- 9251 and 9124 respectively for Kaithal and Fatehabad paddy growers followed by rank 2nd was given to ‘lack of skills in operating ICT tools’ (Garrett score-8431 and 8364), rank 3rd given to ‘difficult to operate the ICT tools’ (Garrett score-7699 and 7457), rank 4th given to ‘no user friendly softwares & programs’ (Garrett score-7079 and 6739), rank 5th given to ‘lack of time to spend on ICT’ (Garrett score-6220 and 6612), rank 6th given to ‘difficult to read the content’ (Garrett score-5340 and 5335), rank 7th given to ‘lack of awareness about ICTs’ (Garrett score-5050 and 5015), rank 8th given to ‘difficulties in understanding standard language’ (Garrett score-4054 and 4967), rank 9th given to ‘low educational level’ (Garrett score-4476 and 4507). Specifically, Anand et al. (2020) found that majority of the farmer were facing the problem of insufficient power supply with mean of 2.84 was ranked first followed by connection of internet was poor or slow (2.83), lack of knowledge (2.82), lack of confidence in using ICT tools (2.79), and lack of training programme (2.71).

**Table 9: Personal constraints faced by paddy growers in using information and communication technology tools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Constraints** | **Kaithal (n1=120)** | **Fatehabad (n2=120)** |
| **Total Garrett Score** | **Garrett MS** | **Rank** | **Total Garrett Score** | **Garrett MS** | **Rank** |
|  | Difficult to operate the ICT tools | 7699 | 64.16 | III | 7457 | 62.14 | III |
|  | Insufficient training and practical exposure towards ICTs | 9251 | 77.09 | I | 9124 | 76.03 | I |
|  | Lack of awareness about ICTs | 5050 | 42.08 | VII | 5015 | 41.79 | VII |
|  | Lack of skills in operating ICT tools | 8431 | 70.26 | II | 8364 | 69.70 | II |
|  | Low educational level | 4476 | 37.30 | IX | 4507 | 37.56 | IX |
|  | No user friendly softwares & Programs  | 7079 | 58.99 | IV | 6739 | 56.16 | IV |
|  | Lack of time to spend on ICT | 6220 | 51.83 | V | 6612 | 55.10 | V |
|  | Difficult to read the content | 5340 | 44.50 | VI | 5335 | 44.46 | VI |
|  | Difficulties in understanding standard language | 4054 | 33.78 | VIII | 4967 | 41.39 | VIII |

* 1. ***Social constraints faced by paddy growers in using ICT tools***

 It is evident from Table 10 that in social constraints rank 1st was given to ‘farmers get confused with a lot of information obtained from the ICT’ (Garrett score-8922 and 9286) for both Kaithal and Fatehabad paddy growers followed by rank 2nd given to ‘insufficient servicing centers of ICTs in villages’ (Garrett score-8325 and 8570), rank 3rd given to ‘lack of location-specific information’ (Garrett score-7689 and 7759), rank 4th given to ‘no special policies and schemes for ICT’ (Garrett score-7229 and 6833), rank 5th given to ‘different cultural background’ (Garrett score-6715 and 6432), respectively.

**Table 10: Social constraints faced by paddy growers in using information and communication technology tools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Constraints** | **Kaithal (n1=120)** | **Fatehabad (n2=120)** |
| **Total Garrett Score** | **Garrett MS** | **Rank** | **Total Garrett Score** | **Garrett MS** | **Rank** |
|  | Insufficient servicing centers of ICTs in villages | 8325 | 69.38 | II | 8570 | 71.42 | II |
|  | No special policies and schemes for ICT | 7229 | 60.24 | IV | 6833 | 56.94 | IV |
|  | Farmers get confused with a lot of information obtained from the ICT | 8922 | 74.35 | I | 9286 | 77.38 | I |
|  | Different cultural background | 6715 | 55.96 | V | 6432 | 53.60 | V |
|  | Lack of location specific information | 7689 | 64.08 | III | 7759 | 64.66 | III |

**Conclusion:**

 The study revealed that perceived constraints faced by the paddy growers were assessed by discussing with farmers in the farming system. The result showed that the top rank for technical constraints was given to ‘clarification of the message is difficult, if any doubt arises’ (Garrett score- 8782) for the Kaithal paddy growers and ‘reliability of the content cannot be understood’ was scored by the Fatehabad paddy growers (Garrett score- 9207). In terms of financial constraints the top rank was given to ‘high cost of ICT gadgets like smartphones, computers *etc*.’ (Garrett scores- 9080 and 9155) for Kaithal and Fatehabad paddy growers. Regarding personal constraints to the top rank was secured by ‘in sufficient training and practical exposure towards ICTs’ with (Garrett score- 9251 and 9124) by both Kaithal and Fatehabad paddy growers. In terms of social constraints the 1st rank was given to ‘farmers get confused with a lot of information obtained from the ICT’ (Garrett score-8922 and 9286) for Kaithal and Fatehabad paddy growers.

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