Digital Competency in Agriculture Sector- An outlook in Indian Context

ABSTRACT

To become aware with how various digital tools are used in Indian agriculture and related industries nowadays. The information was gathered from various academic works and earlier research. The present study was confined in Southern Gangetic Zone of Bihar State during the year 2021-22. The present investigation was carried out in Southern Gangetic Zone for the study Two aspirational districts (NITI Ayog, 2018) namely Gaya, Banka and two non-aspirational district namely Patna, Bhagalpur. The findings indicated that the majority of farmers had gained significant knowledge about and were interested about adopting digital technology on their farms. The variables level of education, landholding, participation in extension activities, and scientific orientation were found to have positive and significant relationships with the attitude of farmers towards the use of digital tools, whereas other variables like age, farming experience, social participation, and cosmopoliteness were found to have non-significant relationships with the attitude of farmers towards the use of digital tools. Farmers working in digitalized environments still need a strong background of agricultural basics Government should invest time and money in spreading the word about the advantages of digitization. The importance of digital technologies in agriculture was highlighted in the report. This article discusses the various ways that digital tools can be applied, from crop planning to eventual crop purchases by farmers.

Keywords- Digital competency, digital tool, agriculture, ICTs and Mobile smartphones etc.

Introduction

The usage system has been impacted by the digitization of economic processes, which has additionally significantly affected the approaches used to economic transformation in rural areas. There are efficient methods for forecasting, analytics, and strategic decision-making. It goes without saying that the spread of digital technology will have an effect on how each aspect of market relations functions to some extent. The digitalization of the economy will also lead to the emergence of new markets, the majority of which will be networked and place a greater emphasis on the end user as an individual. Personnel training is becoming an increasingly important task under the situations of spread of digital technologies, the development of

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information infrastructure, and increased importance for a minimum set of digital competencies for farmers in the most of economic activity.

Digital competence is an evolving concept

Digital competence is the most modern term describing technology-related skills. The ability to use digital technologies has been referred to by a variety of terms in recent years, including ICT tools, technical skills, information technology skills, 21st century skills, information literacy, digital literacy, and digital skills. Both concepts are often interchanged, as in the cases of digital literacy and competency (as an example, Adeyemon, 2009; Krumsvik, 2008). Some of the terms, like "Internet skills," are short and only apply to a significant subset of digital technology, while others, like "media literacy skills" or "digital literacy," cover a wider range of media and literacy. The broad variety of terms reflects not only the quick growth of technologies but also several academic fields, including computer science or library studies (Arnone& Reynolds, 2009; Jones-Kavalier & Flannigan, 2008). Moreover, modifications to society and culture brought about by new technology have an impact on terms. It is anticipated that both the range and the content will continue to change: In their article on policy, Alamutka, Punie, and Redecker (2008) suggest that because new technologies are always evolving and are being utilized in society, the approaches be dynamic and regularly updated. Suggested to the OECD's recommendations that countries make an effort to identify and conceptualise the essential set of skills and competences, and then incorporate them into educational standards, numerous national programmes are attempting to define national standards.

"A combination of abilities, knowledge, and attitudes relevant to the situation" is how the term "competency" is defined (European Union, 2006). As an outcome, digital competency entails the effective and efficient use of digital technology for access to information and storage, interaction techniques, and programme and data processing (Desjardins et al., 2015). The confident and critical use of digital technology for job, school, home, etc. is another aspect of digital competency (European Union, 2006).

Digital Competency

A set of expertise and skills known as "digital competency" are necessary to carry out a certain work using digital technology (Rasmussen et al. 2018). According to the literature, a

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person's level of digital competency increases with their breadth of experience, aptitude, and confidence to complete a task (Desjardins et al., 2015). As a result, the GTCU paradigm views both usage frequency and usage confidence as key measures of digital competency (Desjardins et al., 2001).

Information and Communication Technology (ICT)

ICT includes all of the ways that people, businesses, and organizations use digital technology to make decisions. ICT refers to any device that can technologically store, retrieve, manipulate, transmit, or receive data in a digital form.

Information and Communication Technology (ICT) is defined by the World Bank as “any device, tool, or application that permits the exchange or collection of data through interaction or transmission”. It “includes anything ranging from radio to satellite imagery to mobile phones or electronic money transfers” (Anonymous, 2011c).

Radio, television, mobile, computer and network hardware and software, satellite systems, and other forms of communication, as well as the many services and applications associated to them, such videoconferencing and distance learning, are all included under the broad term "ICT" (Nandeesha, 2016).

ICT in Agriculture

Everyday decisions are made by farmers in a variety of risky and uncertain scenarios. They will need to make these decisions based on the information at hand at the moment. For smallholder farmers in developing nations, access, effectiveness, and cost of agricultural information remain significant barriers to increasing agricultural output (Muriithi et al., 2009). The dissemination of information to farmers using ICTs can help them make better, more informed decisions at this time. The need for information is greatest in the context of globalizing agriculture. Both industrial-scale producers and smallholders, who still produce a sizable part of the world's food, require knowledge to develop their job (Anonymous, 2011b).

ICTs can benefit in removing different agriculture-related barriers. The first issue is the dearth of extension facilities. Second, there is the issue of farming-related illiteracy. Thirdly, small farmers have limited ability to compete with large farmers. Fourthly, there is a growing

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divide between modern and traditional technology. Finally, farmers lack access to the most recent information.

By obtaining and disseminating timely and reliable information on weather, inputs, markets, and pricing; feeding information into research and development projects; educating farmers; bridging producers and consumers; and through a variety of other means, ICT can help us meet the demand for food (Anonymous, 2011b). ICT services give farmers essential access to the knowledge, information, and technology they need to increase production and, as a result, the standard of their life and means of subsistence. 2016 (Nandeesha).

Research Methodology

The present study was confined in Southern Gangetic Zone of Bihar State during the year 2021-22. The present study was confined in Southern Gangetic Zone for the study Two aspirational districts (NITI Ayog, 2018) namely Gaya, Banka and two non-aspirational district namely Patna, Bhagalpur were selected purposively on the basis of highest Digital media users and easier accessibility in southern Gangetic plains in Bihar. 100 farmers were selected for the study. The interviews followed a semi-structured interviewing technique with open questions about how farming practices have changed as a result of the introduction of digital equipment, the altered skills and knowledge requirements, and the methods used to acquire the required skills and knowledge. The information gathered from the chosen respondent throughout the course of the inquiry was entered and tabulated in the excel worksheet, and then the data was appropriately analyzed in accordance with the goals of the study. Also, tabulated data was analyzed using statistical techniques, which were then used to interpret the data to arrive at the conclusions. using the mean, frequency, and percentage statistical approaches.

Correlation co-efficient (r):

To know the relationship between two variables, the correlation test is employed frequently. Between the independent and dependent variables, correlation is used. The response variable (dependent variable) Y and the independent variables X1, X2, X3, and X4 were correlated in the study. To demonstrate that there is a correlation between two variables, a change in one variable is accompanied by a change in another variable, and

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there is a clear relationship between the two. A variety of two variables are concurrently measured using the correlation.

The correlation coefficient (r) is the measure of the level of proximity of the linear relationship between the dependent and independent variables. The correlation equation between:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n(\sum x^2) - (\sum x)^2]\,[n(\sum y^2) - (\sum y)^2]}}$$

r value is always in the range of -1 and +1. When "X" is negative, the positive value of "r" shows a tendency for "X" and "Y" to rise together. For the significance test, the value of the "X" interval is correlated with a small "Y" value.

For the significance test, the "r" table is in degrees of freedom (n-2) with half of the following formula.

Table 1: Categories Used in Qualitative Analysis

Main Category	Definition
(a) Digitalization at the farm	So many explanations as to what digital technology was implemented at the farm and why.
(b) Changes of farming practice	So several explanations of how the introduction of digital technology to the farm affected farming methods and labour processes (new tasks, ceased tasks, qualitative change of tasks, changes concerning the relationship to Farming).
(c) Knowledge requirements	There are many descriptions of the knowledge and abilities needed to operate the new digital technology on the farm, as well as descriptions contrasting the competencies needed before and after digitalization.
(d) Learning modes	There are many different ways to describe how the skills needed to use digital agricultural technology have been or are being acquired.

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Result and discussion

1. **Knowledge and learning requirement on Digitalization in Agriculture**

Table No. 2- Distribution of respondent according to their knowledge and learning requirement on Digitalization in Agriculture N=100

S. No.	Category	Frequency	Percentage
1	Digitalization at the farm	62	62
2	Changes of farming practice	67	67
3	Knowledge requirements	72	72
4	Learning modes	75	75

Changes Induced by Digitalization-

The majority of farmers discussed in-depth and with interest about the digital technology they employ on their operations. In non-aspirational districts like Patna and Bhagalpur, the changes brought on by digitalization were closely linked to a new and desired way of working on their farms. Everyday tasks on digitalized farms were said to be less physically taxing and to necessitate less time in the farm field. The interviewees concurred that maintaining and cleaning the machines, which are digital technology employed at the farms, is also a part of their normal employment.

Knowledge Requirements-

Farmers who work in digitalized environments nevertheless need a solid understanding of agricultural fundamentals, such as the needs for seeds and fertilizer, signs of illness in crops, etc.

Learning Modes

The majority of farmers reported that their initial (need-based training) education had either not covered or had only barely touched upon the knowledge and skills necessary to use digital instruments on their farms. The farmers that participated in this study were all traditional farmers with a minimum of one vocational farming certificate.

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Information needs of the farmers

Just 40% of farmer families nationwide had access to information regarding contemporary agricultural inputs and methods, according to an NSS poll of farmers. Other Progressive Farmers was the most often used information source for these households, followed by Input Dealers (Mittal and Tripathi, 2009).

Table 3: Sources of agricultural information used by farmers

S.No.	Source	Per cent of households
1	Other progressive farmers	16.7
2	Input dealers	13.1
3	Radio	13.0
4	Television	9.3
5	Newspaper	7.0
6	Extension worker	5.7

Source: Mittal and Tripathi (2009)

Irrespective of their location and crop types, Mittal and Tripathi (2009) stated that the general categories of information needed were the same for all of them. These categories of information included know-how, which gives a farmer essential knowledge like what to plant and which seed varieties to use; contextual information like weather; best cultivation practises in the area; and market information like prices, demand indicators, and logistical information. It was discovered that weather, plant protection, seed diversity, and market pricing ranked highest on the importance scale for small farmers. Around 70% of farmers in Rajasthan and Uttar Pradesh said market pricing were the most crucial factor, while over 90% said knowledge on seed was their top priority. Despite the fact that farmers were equally interested in other information categories, such as the best farming practises, crop selection, etc., only a small sample gave them priority (Mittal and Tripathi, 2009).

Table 4- Correlation between the selected personal, socioeconomic and psychological characteristics of the respondents and their attitude towards the use of digital tools

Sr.No.	Independent Variables	Correlation co-efficient
1	Age	0.0075NS

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2	Level of Education	0.485**
3	Landholding of Farmers	0.439**
4	Farming experience	0.075NS
5	Innovativeness	0.011NS
6	Social participation	0.063NS
7	Extension participation	0.189*
8	Cosmopoliteness	0.052NS
9	Scientific orientation	0.264**

**Significant at the 0.01 level, *Significant at the 0.05 level, NS = Non-Significant

Relationship between different characteristics of the farmers with their attitude towards use of digital tools

The factors level of education, landholding, participation in extension programmes, and scientific orientation were found to have positive and significant relationships with the attitude of farmers towards the use of digital tools, whereas other variables like age, farming experience, social participation, and cosmopoliteness were found to have non-significant relationships with the attitude of farmers towards the use of digital tools (Table 4). The fact that literate farmers are able to locate, understand, interpret, evaluate, and use information in aspirational districts in an appropriate manner may be one of the likely explanations for having a positive and significant relationship between these variables and attitude of farmers towards use of tools (NITI Ayog, 2016). Gaya, Banka and two non-aspirational district namely Patna, Bhagalpur. More the education more will be the knowledge about digital tools resulted in favorable attitude towards use of digital tools. Size of landholding, extension participation and scientific orientation provides the economic and extension base for farmers to practice new agricultural technologies disseminated through digital tools for achieving maximum profit and agricultural production. Providing additional digital services for technology transfer in the local tongue and making these tools even more user-friendly and effective will encourage people to adopt a favourable attitude towards using digital technologies. Need- and interest-based programmes, as well as initial hand-holding support from the government for the farming sector, were required as part of necessary policy measures.

Conclusion

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Farmers must permanently adopt modern farming technologies in order for farmers to use the new technology for digitalization. Government should invest time and money in spreading the word about the advantages of digitization. The slow development of e-agriculture is hampered by poor connectivity in rural regions, hefty service fees, and a lack of basic computer literacy and understanding. Farmers will be better able to evaluate the services provided by agriculture research institutions if they have a solid understanding of digital technology.

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