



Farmers' perceptions of ICT use regarding agricultural crop production in district Mansehra (A case study of Himalayan region, Khyber Pakhtunkhwa-Pakistan)

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Abstract

ICT in agriculture is a rising field concentrating on the improvement of agriculture and rural growth. Keeping in view the importance of agriculture for our economy and in order to better understand the use & effectiveness of ICT in mountain agriculture extension system in Pakistan, the focus of the this research study is "To analyze famer's perceptions of ICT use for better communication regarding agricultural crop production in district Mansehra, Khyber Pakhtunkhwa-Pakistan". For the purpose of data analysis, a sample size of 188 was selected randomly in the area. Five point Likert scale, percentages, and in majority of cases scores/ranks were used. It was observed that majority of the respondents were having farming (64%) as a major source of livelihood in the study area. Results also reveal that majority of the respondents (57%) in the study area were small farmers (less than 5 acres of land). Findings further suggest that majority of the farmers believed that that they are using ICT tools as source of information in agricultural practices with Television (26%) and Radio (24%) mostly used for this purpose. Moreover, findings indicate that various services like weather related information and Climate Change adaptation services, as the most needed services in the study area can further be strengthened through ICT. It is recommended that an ICT centre, comprising of FM Radio facility, call center and SMS service facility may be established in the area for a greater coverage regarding advisory services to the farmers in the Himalayan region of Pakistan.

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Introduction

Agriculture accounts for about 22% of the provincial GDP comprising equally of crops production and livestock. Besides providing 44% employment to the labor force, almost 80% of the population relies on agriculture for their income. There are two distinct farming systems .In areas such as Swat and parts of Buner, there are extensive areas of flat valley bottom that have reasonable water supply from rain and snow, as well as surface and groundwater irrigation. In these areas about two thirds of crop land is under irrigation during *Kharif* (summer) season and half of crop land under irrigation during Rabi (winter) season. In other parts, particularly in much of Shangla and Dir, agro climatic conditions are harsher. Rainfall can be as low as 100 mm per year and most irrigation canals only provide water seasonally with groundwater playing an important role (Agriculture Policy Khyber Pakhtunkhwa, 2015-2025).

As far as the area and location of Mansehra district is concerned, it is one of the districts in northern zone of the Khyber Pakhtunkhwa Province in Pakistan. It consists of three tehsils i.e. Balakot, Oghi and Mansehra. The location of the district is from 34° – 14' to 35° – 14' nor latitudes and 72° – 49' to 74° – 08' easy longitudes. The total area of district is 4,579 square kilometer (Ayesha, 2012). More over Mansehra district is a gate way to the northern valleys, especially to the Himalayan region in Pakistan.

Information and communication technology (ICT) in agriculture is a rising field which focuses on the improvement of agriculture and rural growth. It includes uses of inventive approaches to utilize ICT in rural areas. The progression in ICT can be used for giving precise, opportune, pertinent information and administration to the farmers, and thus accelerating helpful and more productive agriculture.

The core objectives of the Agriculture Extension services are the dissemination of agricultural innovative technologies to the farmers, motivating them for its adoption, which can be achieved through

the better use of communication between relevant stakeholders. The existing extension and communication strategies being used in Khyber Pakhtunkhwa Province has many limitations with respect to the use of more advanced technologies for better communication between the relevant stakeholders as compared to the rest of the Provinces in Pakistan. Given the increased interest and agriculture as a source of livelihood in Khyber Pakhtunkhwa, there is a dire need to take stock of innovative initiatives in agriculture extension for using modern practices like use of ICT in facilitating the dissemination of agricultural information using for the overall agricultural development in the Province. Moreover, the communication link between farmers and the agriculture extension departments seems very poor for ultimate benefit and growth of agricultural sector. The current study will therefore, assess the farmers' perceptions regarding the use of Information and Communication Technologies (ICT) in Agriculture Extension of the selected district in Khyber Pakhtunkhwa for sustainable agricultural development.

Research methodology

Universe of the study

District Mansehra, as the gateway to the Himalayan region in Pakistan was considered as the universe of the study. The population of the study comprises of the total number of farmers in the district.

Selection of sample

The current study used the multi stage sample technique to draw the required sample size for the information collection. A sample is called a multistage sample when it is selected in various stages, the sample units at each stage being sub-sampled from the large units selected at the previous stage. Cochran (1977) adopted the said technique in is study.

Data Collection and Information Tools

Data was collected while keeping in view objectives of the study. For the purpose of creating a more clear picture of the study both primary and secondary data was also collected. For primary data collection, a well-

structured interview schedule was prepared. Different items were included regarding the multiple variables based on objectives and the nature of respondents, reply of the items based on the scale provided to them.

Data Collection Tools

An interview schedule was prepared according to objectives of the study. This interview schedule was pre-tested by interviewing 30 farmers in the study area i.e. 10 farmers per Tehsil. Open ended as well close ended questions were used to gather the useful information of the respondents. Five Likert scale in majority of the questions was used to record response of the respondents.

Data Analysis

The collected data was analyzed using Special Package for Social Sciences (SPSS) ver. 20. Similarly frequencies, percentages, and diagrams were also

used to describe demographic characteristics of farmers. A 5-point Likert scale was mostly used to measure the perception of farmers' on use of ICT in Agricultural Extension and its ultimate role in agricultural crop production. Results of the 5-Likert scale were analyzed through Ranking/Scoring; a descriptive statistical method to know about the effectiveness of ICT gadgets mostly used in agricultural extension services.

Results and discussion

Distribution of farmers regarding their income sources

Income plays an important role in decision making like the farmers with more sources of income, resultantly having better income will be mostly like to decide and go for the use of technologies in their farming practices, while on the other hand farmers with poor financial position will have no choice to use the latest technologies in farming.

Table 1. Ranking of various ICT tools as per their Use and Effectiveness in to disseminate information's regarding Weather Forecasting.

Present use & effectiveness			Future use & effectiveness		
Rank	Tool	Score	Rank	Tool	Score
1	Printed material	396	1	Mobile Phone	888
2	TV	280	2	TV	811
3	Computer Via Internet	275	3	Computer Via Internet	758
4	Radio	267	4	Radio	754
5	Mobile Phone	251	5	Printed material	576

The same was also found by Howell and Habron (2016), who suggested that farmers with good income are more diverted towards the use of technologies i.e. ICT as compared to the farmer with poor income will definitely be not in a position to go for the advanced technologies. The collected data was categorized into three main categories and presented in Fig.1.

The data as per Fig.1 below table show that 64% respondents in the study area belonged to the category of farming, as their major source of income, followed by farming and business category (25%) while least respondents (11%) were belonged to the category farming & service. The studies conducted by

IFAD in 2002 concluded that as besides the farming, other sources of income are majorly contributing towards improving the overall livelihood conditions of the farmers and as like the farmers with more channels of income coming, will be likely to have more options of using ICT and other latest technologies in their farming practices.

Land holding wise distribution

Pakistan is the agriculture based country but the agriculture land is totally unevenly distributed by looking at the statistics that 88 percent of the land is having by 12 percent of people (Ayesha, 2012). The study conducted by Farooq *et al.*, (2007) who

concluded that the person having higher land occupation are considered as most effective person in gathering data due to the fact that there will be more chance of getting variety of response from the person and also these persons will be having strong decision power to adopt latest technologies in their farming practices. Similarly size of the land holding is also a crucial factor for considering the study as it is directly relating to the decision power of the farmer. There are two aspects of the factor, and the first one is that the

farmer having more lands and thus having better financial position to take risks for adopting latest technologies in the field of agriculture as stated by Gunga, 2008.

The other aspect is that farmers having more lands will have more decision power and exposure to adopt the latest agriculture technologies into his farming practices as stated by Chaudhry, 2006. The present study land holding distribution is given in Table 2.

Table 2. Ranking of various ICT tools as per their Use and Effectiveness in to disseminate information's regarding Climate Change Adaptation (Present &Future).

Present use & effectiveness			Future use & effectiveness		
Rank	Tool	Score	Rank	Tool	Score
1	Mobile Phone	480	1	Mobile Phone	890
2	TV	400	2	TV	856
3	Radio	394	3	Radio	748
4	Computer Via Internet	272	4	Computer Via Internet	578
5	Printed material	91	5	Printed material	547

The data presented as per Fig.2 clearly indicate that majority of the farmers (57%) in the study area were small i.e having less than 5 acres of land, while least numbers of the farmers were large farmers as having more than 15 acres of land.

(ICT) for improving the overall productivity through channelizing information sources is highly important like Steinen *et al.*, (2007) studied the role of ICT in enhancing the overall productivity in agricultural sector and concluded that the inclusion of ICT in agricultural sector cannot be ignored to enhance the agricultural productivity and improve the rural livelihood. Results are depicted in Fig. 3 below.

Distribution of respondents regarding ICT as a source of information in agriculture

Use of Information and Communication Technology

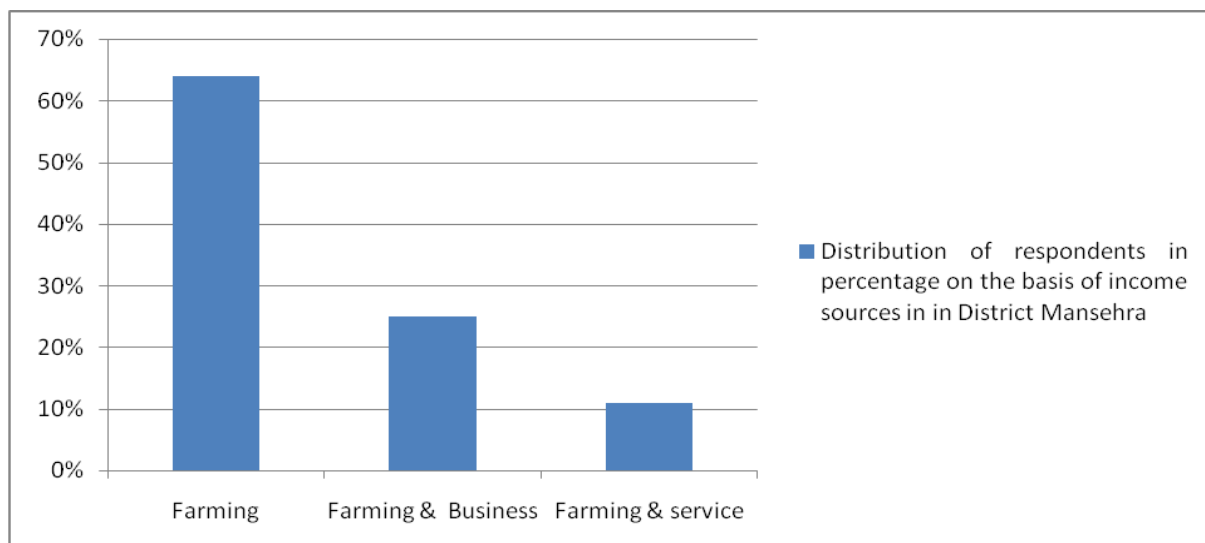


Fig. 1. Distribution of respondents regarding of income sources.

The above mentioned figure clearly shows the awareness about ICT in the study area. The results reveal that 82 % of the respondents in the study area are using ICT as a source of information, while only 18 % are not relying the use of ICT in their

agricultural practices. The findings are consistent with the study of Steinin *et al.*, 2007, who found a significant relationship of ICT with agricultural productions.

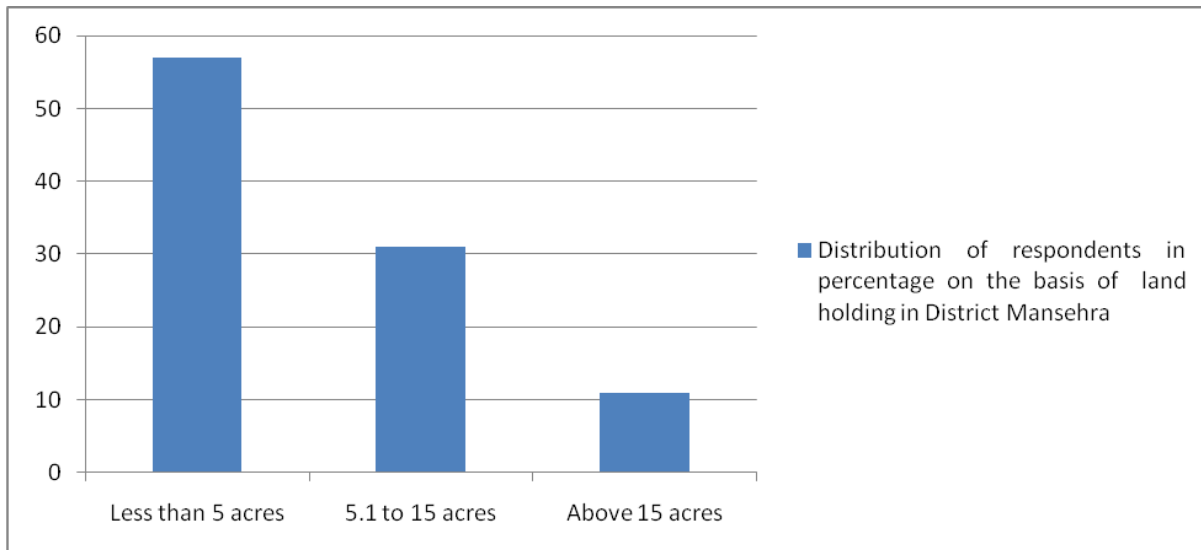


Fig. 2. Distribution of respondents regarding land holding.

The results as per Fig. 4 depict that amongst the various ICT tools, 26 % respondents still agreed that Radio was mostly used as a source of information in agricultural practices, followed by Television (24%) and mobile phone (16%). The results are very much

consistent with the findings of Omotayo *et al.* (1997), who concluded that Radio was found fruitful in dissemination of information's in the field of agriculture.

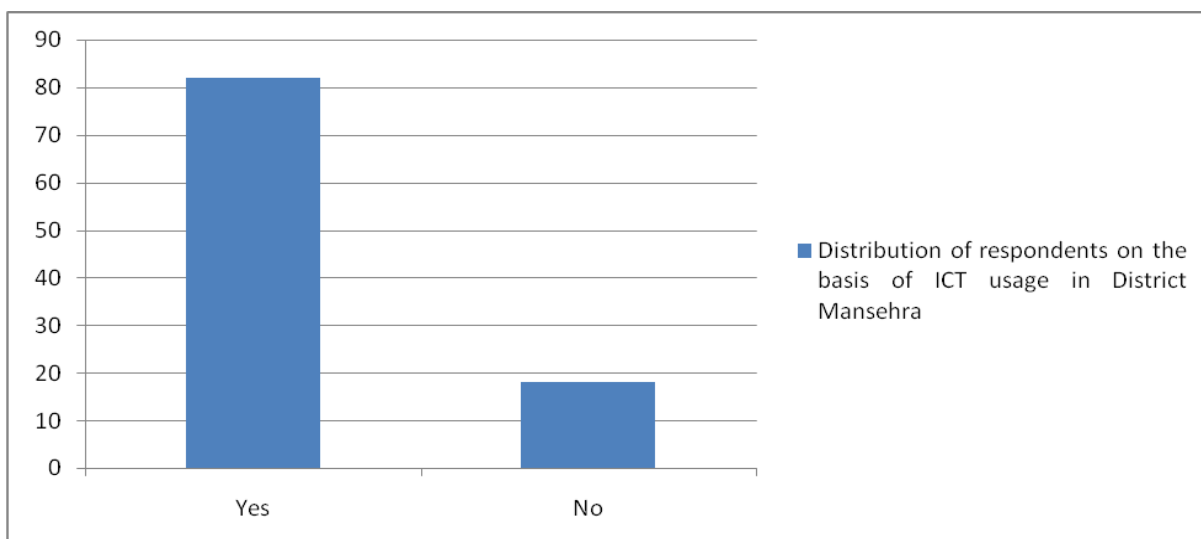


Fig. 3. Distribution of respondents regarding ICT as a source of information in agriculture.

Use of ICT in Weather Forecasting

Farmer's perceptions were taken concerning the present and perspective use and effectiveness of ICT

in the services of weather forecasting to farming communities in district Mansehra. The results show that at present, sharing of information's regarding

weather updates to the farming community by the agricultural extension department, Government of Khyber Pakhtunkhwa through using ICT tools is very low; however the farmers were hopeful for its use and effectiveness in future. As per use and effectiveness of ICT tools in district Mansehra, the Printed material with 396 score was ranked on top for its use in weather forecasting services, TV with 280 score was

at 2nd rank and computer with 275 score was considered at 3rd rank while in future the mobile phone was found on top rank with 888 score, TV with 811 score on 2nd rank and computer is on 3rd rank with 758 score.

The findings have been found consistent with the study conducted by Balaji and Craufud (2011).

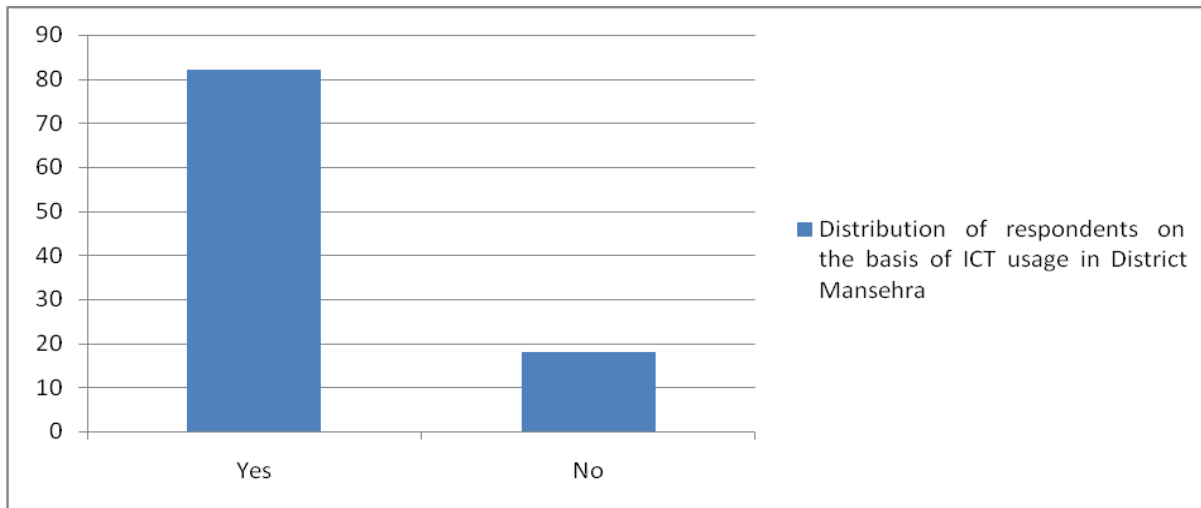


Fig. 4. Distribution of respondents regarding ICT as a source of information in agriculture.

Use of ICT in Climate Change Adaptation

Like the global climatic changes and its effects on agricultural crops, Pakistan is also taking necessary steps by updating various research technologies to cope the adverse effects of the climate change on agricultural crops. The department of agriculture

extension, Khyber Pakhtunkhwa, especially concerning the three selected district is making all its necessary actions to transfer all related research technologies through ICT and other means to the farming communities.

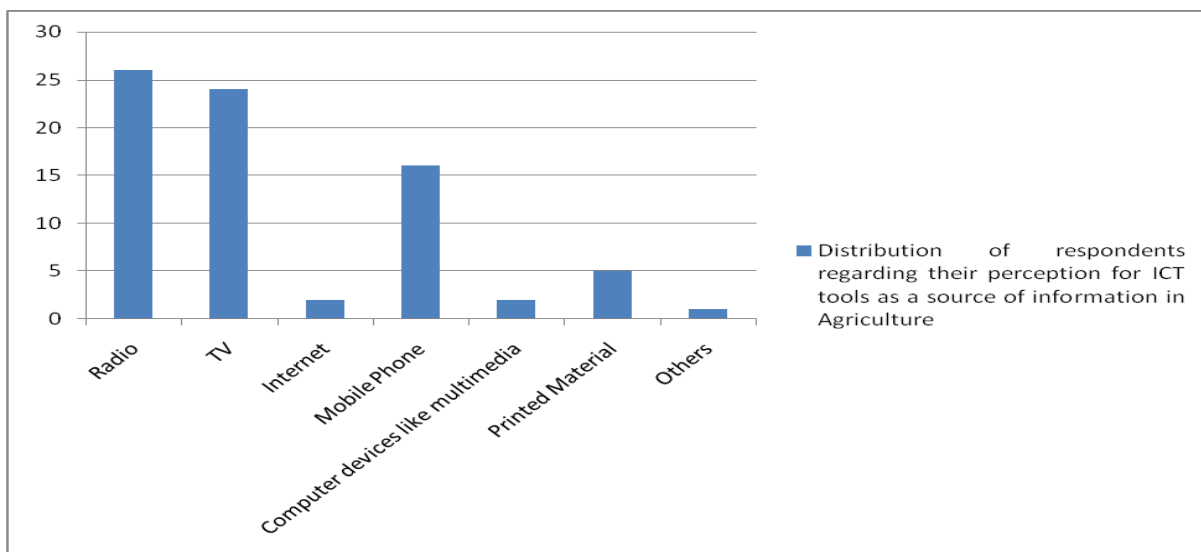


Fig. 5. Distribution of respondents regarding their perception for ICT tools as a Source of information in agriculture.

In this regard farmer's perceptions were recorded to assess the present and future use and effectiveness of ICT in climate change adaptation. Results are depicted in Table 2.

The table shows that in district Mansehra, mobile phone with 480 score mostly used for transfer of information's related to climate change adaptation, TV with 400 score was found at 2nd rank and radio with 394 score was placed at 3rd rank while in future the mobile phone was found on top rank with 890 score, TV with 856 score on 2nd rank and radio was on 3rd rank with 748 score. The findings of above table have been found consistent with the study conducted by Meera *et al.*, (2011).

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