

# EFFECTS OF ICT USAGE IN AGRICULTURE SECTOR: A STUDY AMONG FARMERS IN DHULIKHEL, NEPAL

Gaurav Shrestha<sup>1</sup> and Dr. Sandeep Kautish<sup>2</sup>

<sup>1</sup>PG Scholar, Lord Buddha Education Foundation, Kathmandu, Nepal

<sup>2</sup>Dean (Academics), Lord Buddha Education Foundation, Kathmandu, Nepal

## Abstract

Although there is a high potential in improving livelihood of farmers through the use of ICT, the use of ICT is poor in developing countries, including Nepal. Only few studies have been conducted to understand the use of ICT tool and its effect on farmers. Therefore, this study aims to understand the effects of ICT in agriculture among farmers living in sub-urban town, Dhulikhel, Nepal. This is a quantitative study conducted among 201 participants. Participants were selected randomly and were interviewed using a structured questionnaire. Data were cleaned in Microsoft Excel and analyzed using SPSS software. Chi-square test, t-test and ANOVA tests were applied for the analysis. The study showed that only 39% had heard of ICT tools and the main source of information are radio and television. Similarly, 71% of the respondents had ICT tools. The mostly owned ICT tool was mobile phones. There was a significant association between respondent's age and gender with knowledge of ICT tools. However, the study did not show association between respondent's education and knowledge of ICT tools. The study showed a significant association between demographic variables (age, gender and education) with ICT tools possession as well as with the attitude towards ICT. The biggest barrier to the use of ICT tool was lack of knowledge on ICT tools and the main facilitating factor reported was easy access to use ICT tools. Given that the participants had low level of ICT knowledge it is recommended to increase ICT awareness among people by using different media like mobile phones, radio and televisions. It is also suggested to build required infrastructures to increase people's access to ICT tools.

**Keywords:** ICT, Agriculture, ICT Tools in Agriculture, Knowledge of ICT.

## 1 Introduction

Information and Communication Technologies are the different kinds of technological devices. These are the devices that help to connect people via different medium to exchange information among people and within computers (Kharel, 2018). The technology has advanced a lot in recent world. Every sector has been touching, researched and overtaken by technology. Agricultural sector has been progressively introduced with technology. For most developed countries, using technology in agriculture is not a new thing. From choosing land, monitoring the weather to cultivation has all been observed via the technology. The new inventions have been a key factor of any nation's economic growth. In most developed countries, the main reason for the economic growth is because of the new innovations. Many developed countries like United Nation, Germany, Denmark, Finland, Norway, Singapore, and Japan are ranked leading the technological world (Parkey, 2012). However, on the developing and undeveloped nations, things are still same as they are struggling to grow their economic needs via agriculture. These countries are lacking the technological equipment's to progress through the agricultural benefits. They are very far behind the innovation process and are facing difficulties in terms of structure, lacking scientific and technological equipment's and the units of organisation.

## 1.1 Background

This is very true for the country like Nepal. Nepal is a developing country where about 65.6% of population are involved in agriculture for their livelihood and has been backing almost 33% in Gross Domestic product. This is the second biggest sector of export. However, the utilization in compared to past has decreased significantly. If we compare it with the man land ratio, it has increase from 5.6 percentage in 1961 to 10.5 in 2011. The farm size is just around 0.7 hector per house hold. This signifies, the area of land that that used to feed the whole family has decrease significantly (Gautam, 2018).

It's time for Nepal now to develop its technology across the agricultural sector. It has been biased through the world that the technology hasn't been distributed equally all over. Most of the poorest countries are still dependent on the manual labour. There are hardly any infrastructures available and the available are hard to be accessed. Only rich peoples can afford to it, who have large area of land. The poorer ones are still the same without the technological access. The one of the main reasons behind the unequal access for the accessing information can be because of the cultural and language differences and skills to use it. If the country does not start learning them, then the majority of the human in under developed countries will be left poorer which will leave them biased from the recent progress in technological development which could have help them to uplift their living standard.

## 1.2 Objectives

The aim of this study is to understand effects of ICT in agriculture among farmers living in sub-urban town, Dhulikhel, Nepal. This is an important as most people in Nepal are dependent in agriculture. There has been change in agriculture over the years due to technologies. Evidence show that the use of information and technology have improved livelihood of farmers. Therefore, it is important to understand farmer's knowledge and use of technologies to reap maximum benefits from using ICT tools in agriculture.

The objectives of the research are

- To assess farmers' knowledge of ICT in agricultural in Dhulikhel.
- To assess the effects of ICT, use in Agriculture.
- To suggest future directions in using ICT in Agriculture.

## 1.3 Research Questions

- RQ.1. Is there a statistically significant relationship between demographic variables and farmer's knowledge on ICT?
- RQ.2. Is there a statistically significant relationship between demographic variables and farmer's access to ICT tools?
- RQ.3. Is there a statistically significant relationship between farmer's demographic variables and farmer's attitude on ICT?

## 1.4 Problem statement

There may persist different kind of agricultural demand which can challenge the current need in food supply chain (Food and Agriculture organisation of the United Nations, 2016). ICTs supports the risk management practices by collecting, processing, distributing and exchanging information. The availability of relevant and timely information to farmers will contribute in agriculture production. Although there is a high potential in improving livelihood of farmers through the use of ICT, the government has not put enough effort in promoting ICTs. Adequate support from government and service provider is essential to allow farmers to reap benefits from ICT tools.

Different organizations have developed mobile apps to distribute information on market price and disease pest control, however, they are not yet accessible to all farmers. Reliable ICT infrastructures like Internet and telecom towers for using mobile phones are concentrated in urban centers (Thapa, 2019). This is not equally distributed among rural areas. The farmers cultivating in those parts of the country are still lacking the benefits. They have not still been able to rejoice the benefit they could get after the good use of ICT tools and applications due to minimal information access to them. Furthermore, the language of the content in the applications are mainly in English, farmers with no or less education will gain no benefit from it.

Given the benefits of using ICT in agriculture, it is utmost important to take steps to promote ICT in agriculture to improve farmers' economy and living status.

### 1.5 Research Hypothesis

- H1. Farmers' demographic variables has significant role towards knowledge of ICT on agriculture.
- H2. Farmers' access to tools is predominant in agricultural sector.
- H3. Farmers' demographic variables have significant role towards their attitude on using ICT in agriculture.

### 1.6 Scope of the research

This study will be confined to Dhulikhel, a sub-urban area in Central Nepal. The result of this study will be descriptive. The numbers and percentages will be presented in graphs, tables or charts. The main reason behind doing the research will be to find out the following things:

- i. understand farmers access to information and communication technology
  - a. study farmers knowledge on different types of ICT tools,
  - b. find out the time of access of ICT tools to the farmers
  - c. find out the source if any help is taken to access the ICT tools
- ii. evaluate ICT efficiency
  - a. find out which ICT tools is used for gaining agricultural information if any,
  - b. find out the type of agricultural information accessing with use of ICT
  - c. find out the importance of using ICT tools
  - d. study the constraint of using ICT tools

### 1.7 Significance of the research

The use of ITs in agricultural activities increase farmer's access to up-to-date information in agriculture, thereby empowering them to take decisions to increase agriculture production and improve their livelihood. Different apps providing such information are out there in the market, but it is unknown whether these apps are used by farmers and to what extent. Therefore, this study aims to explore the farmers' knowledge, attitude and use of ICT in agriculture. This will provide the related stakeholders and policy makers to plan and develop strategies to design and disseminate appropriate ICT tools to farmers.

## 2 LITERATURE REVIEW

Research on agricultural ICT has taken a whim across the world as many programs and comments are circulated throughout the world. Technological revolution has been a key factor in agricultural development and continuous flow of the information has been a priority to all agricultural researchers, trainers, extension worker, farmers and students in their immediate environment (Bisallah, 2014). ICT has been an important tool to circulate the information among the wide range of groups. It has help people understand the crisis and help then build a strong connection among one another (OLADELE, 2015). It has also been an important tool in withstanding the global food

crisis and reducing the poverty level. The strategies implemented via the ICT technologies has helped boost the production in mass level or even for the local rural farmers. However accurate, complete, dynamic, concise information should be communicated for the successful implementation (Adewale Joel & Ojo Adigun, 2013).

In today's technological world, without information, it's like being handicap. Without the flow gain of knowledge information, the country cannot prosper. The main challenge is not storing or producing information but getting people to use it. The information should be acquiring in right time and in right place to get effective use of it. Same goes for the technology in agriculture where ICT plays the vital role. It is the responsibility and challenge of managing the digital information technology generated by the growing applications of the personal computer, internet and mobile telephone in modernized agricultural development in the country. However, the rural part of the nations is always neglected due to the high illiteracy and can be also because of infrastructural condition. The reason of the research is to find out the influential attributes that needs to be considered while implementing ICT in agricultural information. Suitable ICT alternative and priority of multiple attributes were found out from multi criteria decision making (MCDM) method called Analytic Hierarchy Process. Similarly, the level of ICT usage was found from farmers' survey of four Village Development Committees of Gulmi District. Based on the findings from MCDM process and farmers' survey, an implementation framework was proposed for using ICT in agriculture information dissemination in Gulmi district (Bohara, 2014).

## **2.1 Knowledge of ICT tools**

There is no doubt that the ICT has been playing a major role to take the agricultural sector to a new height. The continuous flow of useful information to the related personals has helped to initiate a good culture in farming industry. This has helped to boost the production of agricultural sector and reduce the poverty in developing countries. However, the urban areas are able to get benefited with these technologies, but the rural part of the country are still lacking way behind (Sobalaje & Adigun, 2013). A study conducted in Boluwaduro; Nigeria showed that the infrastructure had been the major concern in flow of the information between the farmers living in rural areas than of the framers in urban areas. A multistage sampling technique was used, where six villages were randomly chosen which were majorly known for yam production. Here, the education level was another factor that bounded them of using the ICT tools. The research recommends that the better infrastructure like continuous electricity should be provided to enables the yam farmers to make use of Information and Communication Technologies. Similarly, better policies, awareness programs, workshops and seminar should be conducted to embark the prospect of ICTs to overcome the challenges posed by the impediments to the use of ICTs in the Local Government. Similarly, Neelesh Pandey (2017) urge the different ICT communication devices or application are necessary to educate the farmers. His study aims to show the importance of communication technology in agricultural sector. He states that the application such as mobile phones can be a great help to famers in changing their attitude toward the ICT tools (Pandey, 2017).

## **3 RESEARCH AND METHODOLOGY**

### **3.1 Introduction**

The research design and methodology are an approach that is needed to be implemented to be able to obtain valuable data for the purpose of research based on the domain area. To be able to do that effectively, research approach and strategy alongside data collection techniques would be discussed in length. The timeframe and ethics that comes with data collection will all be discussed in details. To start with the research approach, there is a need to critically identify the type of research so as to know the most suitable approach. The qualitative research usually follows the deductive approach wherein the quantitative research follows the deductive method. The comparison between these two methods are shown below:

## 3.2 Research Methodology

Research methodology is the path through which researchers need to conduct their research. It shows the path through which these researchers formulate their problem and objective and present their result from the data obtained during the study period. Writing research is a tough task when we don't have knowledge on it. Here, we can define our dissertation with the help of research onion. The research onion was developed by (Saunders, et al., 2016) in order to describe the stages through which the researcher must go through while developing an effective methodology.

## 3.3 Research design, approach, and strategy

### 3.3.1 Research Design

Research design can be considered as the structure of research it is the "Glue" that holds all of the elements in a research project together, in short it is a plan of the proposed research work. Different scientist has defined research design in various ways. Some of the definitions are A research design is the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy and procedure, or the Research design is the plan, structure and strategy and investigation concaved so as to obtain ensured to search question and control variance (Akthar, 2016).

Below is the research design for "Effects of ICT usage in Agriculture Sector: A study among farmers in Dhulikhel, Nepal":

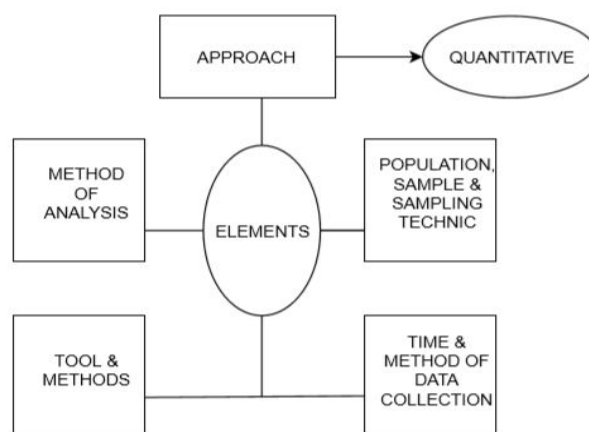


Figure 5: Research Design: Effects of ICT usage in Agriculture Sector: A study among farmers in Dhulikhel, Nepal

This is a quantitative study aiming to assess the effect of ICT use among farmers in agriculture.

### 3.3.2 Research Approach

There are basically two different types of research approaches. One is quantitative and the other is qualitative. According to Saunders the first approach which is deductive uses the experimental data gathering method to prove the validity of an effectively existing hypothesis whereas the second approach goes for building up a hypothesis based data analysis (Saunders, et al., 2016). Quantitative research is a research approach aimed at testing theories, determining facts, demonstrating relationships between variables, and predicting outcomes. Quantitative research uses methods from the natural sciences that are designed to ensure objectivity, generalizability and reliability (Leung, 2012). The research on "Effects of ICT usage in Agricultural Sector: A study among farmers in

Dhulikhel, Nepal” uses quantitative research approach. The empirical data were collected from the literature review and the structured questionnaires aiming to assess knowledge, attitude and practice of using ICT in agriculture by farmers and the District Agriculture Officer.

### 3.3.3. Research Strategy

For every researcher it is important to the structure of the project. It is also important for researchers to find define the strategy for the research as it fulfills the overall purpose of the research (Nasir, et al., 2018). Saunders et al. (2016) defines about the five categorical strategy of the research any one can be used according to the situation persist. For this research, survey with structured questionnaire has been approached. It is used to capture a wide variety of information regarding attitude and decisions. The choice of this method is due to the adequate number for farmers living in Dhulikhel who may or may not be aware of using ICT tools.

## 3.4 Data Collection

### 3.4.1 Sampling Methods and Sample Design

The two main data collection methods which are used widely are questionnaires and interviews. A questionnaire is a list of structured questions and the aim is to collect the data via the answers to the research questions. Data distributed can be collect with many different ways (Tajvidi & Karami, 2015). There are different ways the questionnaires can be distributed and each have its strength and weakness. The method used in this research is random sampling. The questionnaires were distributed to all the farmers irrespective of user using the ICT tools living in Dhulikhel. Structured questionnaires were distributed and conducted. The researcher presented 20 questionnaires via hard copy. As most of the farmers were illiterate, the questionnaires were had to be explained. Online surveys couldn't be conducted keep in mind that most of the farmers are unable to access to internet and also most of them are illiterate. Here is a brief summary of the research strategy:

- **Population Identification**  
The population will be all farmers residing in Dhulikhel Municipality, a sub-urban town in Central Nepal.
- **Sampling Methods**  
Simple random sampling method will be used for the study. A list of households will be taken from Dhulikhel Ward Office. The sample will be selected randomly so it will be representative of all population in Dhulikhel
- **Data Gathering Approach**  
Primary data will be collected using interview method. Structured questionnaire will be used as a tool to data collection.
- **Data Analysis Approach**  
Data will be cleaned using Microsoft excel. Then it will be exported to SPSS for further analysis. Data are presented in graphs and tables as needed.

Table 7: Data Distribution Information

Mode of Distribution of Questionnaire	Distributed	Received
Hardcopy	220	201

### 3.4.2 Data Collection Methods

The research was carried out after analyzing the different literature reviews related to the topic the research has chosen. The objective of the research was drawn after analyzing the different variable associated with the topic. Below is the presentation of how the data collection process was conducted:

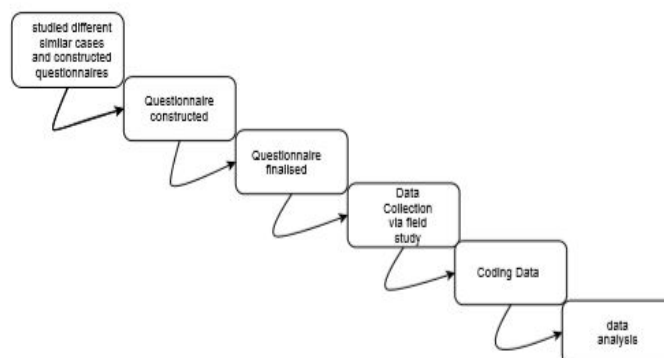


Figure 6: Flowchart of data collection process

An interviewer will visit the house of selected participants to collect data. An interviewer will also take a help from Dhulikhel ward office to gather selected participants in a particular place for data collection. A verbal informed consent will be taken from each participant before the interview. An interviewer will state the purpose of the study and address any questions that the participants have before the start of the interview. An interviewer will make sure that the interview is taken in a quiet and separate place without any interruption. Participants will be thanked at the end of the interview for their valuable time and information.

### 3.4.3 Constructing the questionnaire

Similarly, even for the questionnaire, different base papers were studied and a valid questionnaire were drawn to ensure the validity of the questions. The questionnaire was designed into five sections where first one outlines the farmer's demographic backgrounds. Whereas the knowledge of ICT use among farmers was judged by the second question. Similarly, the third section was to judge the attitude of using ICT tools. Finally, the fourth section was to know the use of ICT tools and the final section was to find out the barrier and facilitators of using ICT in agriculture.

### 3.4.4 Data Capturing and Data Editing

The collected data will be entered into Microsoft excel on the same day of data collection. This is to ensure that the data is accurate, complete and valid. After the completion of the study, the data will be imported into SPSS software for analysis.

### 3.4.5 Level of Measurement

There are various ways of measuring data. Statistically the primary data can be measured in four levels: nominal, Ordinal, interval and ratio levels. The nominal scale requires the determination of equality for placement in the classes implied; the ordinal scale additionally requires a determination of "greater than" or "less than" for objects. The interval scale in addition requires determination of equality of differences between scale intervals; and the ratio scale further requires determination of a true zero point. The ratio scale, of course, has all the qualities of the three previously named scales (Borgatta & Bohrnstedt, 1980).

### 3.5 Data Collection Limitations

- The participants were restricted to structured questionnaire.
- The answer given by the respondents may not be 100% accurate as some of the answers were given on assumption

### 3.6 Data Collection Assumption

- The respondents are chosen randomly to represent the entire farmer population of Dhulikhel.

### 3.7 Limitations

One of the limitations of the study will be that it is conducted in sub-urban town of Nepal, so will not be generalizable among farmers from urban and rural area. Another limitation will be the time constraint of farmers and difficulty to meet them. Farmers are typically busy in their work in day time and will be out of home. So, it will be difficult to meet them at the time of data collection. However, it will be ensured that we meet as many possible as we can.

## 4 DATA ANALYSIS AND FINDINGS OF RESEARCH

### 4.1 Mode of Analysis

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. It is said that various procedures provides a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data (Responsible Conduct in Data Management, 2019). For this research, data were gathered via the survey questionnaires. Questionnaires were distributed to farmers living within Dhulikhel municipality, and questionnaires were asked and filled of each farmer. Once the data were collected, tools such as SPSS and Microsoft Excel were used to carry out the analytical process.

### 4.2 Overview Analysis of Questionnaire Results

#### 4.2.1 Questionnaire Duration

Each questionnaire duration was of ten (10) minutes.

#### 4.2.2 Profile of Participants

The participants for the field survey were all farmers living in Dhulikhel

#### 4.2.3 Number of Participants

The number of participants were 201. The results are given below.

#### 4.2.4 Knowledge of ICT tools

This is the section where analysis of the study was done to find out the knowledge of ICT among the respondents. The first questionnaire predicts the number of respondents that have heard the ICT tools or not. The below frequency table depicts that the majority of the respondents did not hear about the ICT tools. Only 38.8% of the respondents have heard of ICT tools while majority (61.2%) had not heard of ICT tools

Table 11: ICT tool heard by respondents



Have you heard of ICT tools					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	78	38.8	38.8	38.8
	No	123	61.2	61.9	100.0
	Total	201	100.0	100.0	

Below it displays the graphical representation of ICT tools heard by the respondent:

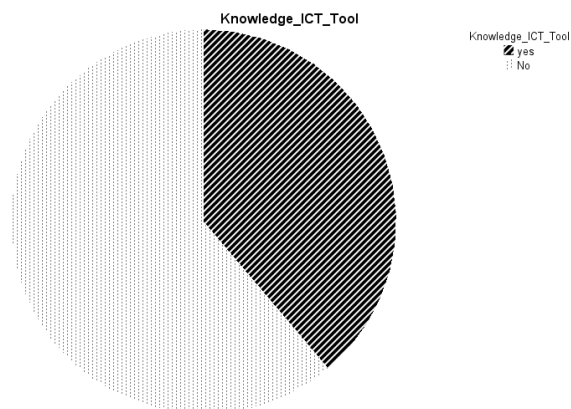


Figure 10: Graphical representation of ICT tool heard by respondent

#### 4.3.4.1 Knowledge of ICT

##### ICT tool information heard from by the respondents

Table 12 below shows the number of respondents accessing the ICT information tools. It was a multiple-choice questionnaire where the respondents were allowed to choose the multiple options from the list. The frequency distribution shows that majority respondents 89.1% heard ICT tools from radio and television. Those followed by those respondents who heard about ICT tools from organization with 32.8% and then from meetings with 31.3%.

Table 12: ICT tools used to access agricultural information

ICT tool Information heard from					
Information heard from		Frequency	Percent	Valid Percent	Cumulative Percent
Radio and TV	Yes	179	89.1	89.1	100.0
Organization	Yes	66	32.8	32.8	100.0
Meetings	Yes	63	31.3	31.3	100.0

## 5 DISCUSSION, CONCLUSION AND RECOMMENDATION

### 5.1 Results

The study was conducted to explore the effects of ICT usage in agriculture sector of Dhulikhel using the primary data collected by the researcher taking a total population of 201 of the farmers. To measure the effects of ICT usage in Agriculture sector of Nepal a set of questionnaires was asked to the farmers. A five-section questionnaire was present where first section covered the demographic of the farmer. The second section was to find out the knowledge of ICT among the farmers. Similarly, the third section was to find out the attitude of farmers towards ICT tools. The fourth section was to find out the use of ICT tools whereas the final section was to find out the barriers and facilitators of using ICT in agriculture. All the data were collected and SPSS was used for analysis. To meet the objectives of the study various statistical tools like mean, median, mode, Chi-square test, T-test and Anova were used.

#### 5.1.1 Demographic

The result of the study shows that various age group of respondents were involved in farming. Out of 201 respondents, about 33% of the respondents are of age group between 46-55 years whereas it's about 20.4% in 26-35 years of age group. Similarly, about 19% of the respondents are of age group 35-45 years and about 17% are below 25 years of age. On the other hand, about 9.5% are above 56 years of age. Moreover, gender distribution was also calculated where about 54% of the respondents were females and just about 46% were male. Furthermore, about 37% of the respondents has studied up to secondary level whereas 26% of the respondents had studied up to primary level and 10% and 4% of the respondents had studied up to senior secondary and Bachelors level. However, 22.9% of the respondents were illiterate.

#### 5.1.2 Knowledge of ICT

Similarly, out of total respondent about 61% of them had not heard about the ICT whereas 39% were aware of it. Also, among all the respondents, the tool that they are using to access the information were from radio and television and that mark up about 89%. Similarly, about 33% had also chose the organization and about 31% have also chosen meetings. A Chi-square test was running through the distribution of age and the ICT heard and it showed the significant association between the age and ICT heard. Similarly, Chi-square was running through the distribution of gender and the ICT heard and it showed the similar result of significant association, however the Chi-square ran through the education and the respondent had a different result which showed an irrelevant association between them.

Moreover, a frequency of ICT owned was calculated where about 71% of the respondents had ICT tools, whereas about 29% did not had the tools. When a chi-square was ran through the age and the ICT owned respondents which showed the significant association among them. Also, when ran through gender with ICT owned respondents and education with ICT owned, it had the same result of significant association.

Similarly, while analyzing the type of ICT tools that the respondents own, a multi choice question was asked with the respondents where about 88% of the respondents chose mobile phones while about 85% also chose TV and similarly 83% chose radio while only 6.5% chose computer. It also showed that out of all respondents about 71% had used ICT whereas 29% of the population had not used ICT tools. Both the result showed the significant association between the variables.

### 5.1.3 Attitude of ICT

Similarly, T test analysis was done to find of the signification association with the attitude of farmers and the demographic variables. Here it showed the significant association between the gender and the attitude of ICT. Also, Anova test was carried out the find the signification between gender with attitude of ICT and education with attitude of ICT.

### 5.1.4 Use of ICT tools

Also, a multiple-choice question was asked to know the type of tools they are using to access in daily life. About 58% chose radio, similarly about 50 chose television and about 31% chose mobile phones. However, only about 14% chose telephone and newspaper, similarly, about 11% and about 10% chose internet and computer respectively. Moreover, frequency analysis was executed to see the population to find out how the ICT has served farmers in agribusiness activities. About 61% think that it served them to know the pricing information whereas about 47% thought it helped them to grow their market value and at the same time 44% also think that it helped them to know the weather and disease information whereas about 29% also thought of serving them with their product competencies. However, none of the population used it for E-Billing purpose. At the same time, frequency analysis was carried out to know the conditions of farmers before and after using ICT tools. It showed about 71% chose it to be time saving and about 45% chose it to have developed their farming skills. Similarly, about 40 chose it to have developed their product competencies and market grown and about 30% though of using new production technologies.

### 5.1.5 Barrier and facilitator of using ICT tools

While accessing the barrier that the respondents are finding on using ICT tools, about 83% thought lack of knowledge on ICT has been the biggest barrier, similarly, about 77% also chose unable to access to ICT tools and about 55% chose the infrastructure hindrance. Only about 5% and 3% of the respondents think that un-affordable prices and airtime prices can be of any hindrance. On the other hand, about 64% have thought ICT as an easy access to ICT tools whereas 58% had chosen adequate information from different sources and about 56% as a low cost of service.

### 5.1.6 Results for the ICT users

Similarly, another analysis was done to find out the number of respondents that had chosen the option that already had heard about the ICT. In the age group distribution, about 31% of the farmers lay between 26-35 years. Similarly, about 26% were between 36-45 years and about 19% of them were between the age group of 46-55 years. Also, about 17% were below 25 years of age and about 8% were above the age of 56 years. Similarly, about 68% of the respondent were female whereas about 32% were male. Also, in education, 35% of the respondent had studied up to secondary education and about 27% had studied up to primary level. However, about 17% of the users are illiterate. The mean was taken out to see from where did the respondent heard about ICT. Here, almost about 92% heard it from radio and television whereas about 85% heard it from organizations and 81% heard it from meetings.

Also, about 92% have own the ICT tool whereas almost 8% of the respondents do not own their own ICT tools. Similarly, the material they own are mobile phones which is of almost 93% and television and radio of almost 86% and 86% respectively. Only about 8% owns the computer. Similarly, almost 89% have used the ICT tools whereas about 12% have not used ICT tools. With the perception, almost 71% had the excellent perception whereas 18% had very good perception and about 10% had good perception. However, none of the respondent had bad or very bad perception. About 97% of the respondents thought of ICT providing wider information whereas just around 3% did not. Also, 85% thought it is suitable for literate people and around 15% did not. Meanwhile, around 60% can

use ICT without assistance whereas around 40% could not use without assistance. Around 73% of the users are using mobile phones in daily life whereas around 72% using radio and 54% using television. Similarly, around 15% using newspaper, 10% using telephone and internet and 8% using computer.

Around 91% of the respondent thought ICT tool as providing agribusiness price information, whereas 77% thought of market information. Similarly, around 55% thought of weather and disease information and 49% thought of product competencies. Around 97% have thought of saving more time after the use of ICT tools. Whereas about 70% thought to improve farming skills and 62% thought of market grown and 45% thought of product competencies and about 22% thought of new production technologies.

Similarly, around 86% of the population thought of lack of knowledge toward ICT as a barrier to access the ICT information, whereas around 64% thought unable to access on ICT and around 47% thought as infrastructure hindrance. About 27% thought of telecommunication network shortage and about 12 and 6 percentage thought of unaffordable price and high cost service. Similarly, about 15 percentage could not tell the barrier. Meanwhile, about 81% thought of ICT as easy medium to access information, whereas about 66% thought of providing adequate information from different sources. About 62% thought of ICT as low-cost service and about 19% did not know what to answer.

## 5.2 Findings and Discussion

The research was done on the Effects of ICT usage in Agriculture sector in Dhulikhel with certain objectives was an interesting study. It was a study where primary data were collected and base on that analysis were done to explore the use of ICT in that sector. The surveys data were analyzed via excel and SPSS tool.

The main findings and discussion of the study are listed below:

- i. Most of the users had not heard about the ICT tools. But the people who had heard about the ICT tools had the positive response towards the tool.
- ii. Even people were using the ICT tool, most people did not had idea that it could be used for agricultural purposes. As we can see that the percentage of people heard of ICT is about 61% whereas the percentage of people own ICT tool is about 91%.
- iii. Most of the farmers are accessing the ICT information from mobile phones, radio and television.
- iv. The farmer's attitude towards the ICT is overwhelming. The people who are already getting the benefit of ICT are finding it as a good source to help them to grow their agricultural needs.
- v. Most of the farmers had saved time after using the ICT tool. This is because, before they had to travel all the way to urban area to know the pricing information's. But now they find it in mobile phones and radio broadcast.
- vi. After the use of ICT, farmers also think that their product competencies have increased as well as market has grown as, they are now able to compete with the other farmers.
- vii. The barriers of using ICT tools is found out to be the lack of knowledge on ICT. Most of the farmers were helped out via the organizations and meetings and the people who are unreached are unaware of the ICT tools. The other barriers were unable to access the tools and the infrastructure hindrance.
- viii. The people who had used the ICT found out to be the good source of information. They also find it as an easy access to use.

### **Is there a statistically significant relationship between demographic variables and farmer's knowledge on ICT?**

There were three analysis done to find out the results if there is any significant relationship between the farmer's knowledge on ICT. It is seen that the farmers of the age group 45 or below had more

knowledge on ICT than of the farmers above the age of 45. This is pretty true for the case as most are of younger generations are keen on the latest technologies. Similarly, when compared the knowledge with the gender females had more knowledge. This must be also because of the more involvement of females on farming. Most of the male were mostly out of house in search of better opportunities. Similarly, when done with the education, it was found that there was no significant association. This is because, farmers were getting information through the organisations and in meetings. This is a good step taken by the private organisation on initiating meeting among the farmers so that they can provide information on spot.

#### **Is there a statistically significant relationship between demographic variables and farmer's access to ICT tools?**

It was seen that majority of the farmers (90.5%) has access to ICT tools. It was also seen that the age had a significant relationship with the farmers owing the ICT tools. Similar, same scenario was seen among the farmer's gender. However, different result was found with the education as it did not show the significant association between the farmer's education and the owing of the ICT tools.

#### **Is there a statistically significant relationship between farmer's demographic variables and farmer's attitude on ICT?**

T test and Anova was carried out to see the significance of farmer's demographic variables and the attitude on ICT. A T test carried out on the gender and farmer's attitude on farmer showed the significant association. Similarly, Anova test on age and attitude showed that there was a significant association between the age and attitude on ICT. However, different finding was found between the education and farming attitude on ICT as signification was not seen between these two.

### **5.3 Conclusion**

The less than half of the respondents were aware of the ICT and was benefiting from it. Similarly, the main reason being not using ICT was the lack of knowledge of ICT among the farmers. The study also found out that there has not be a proper use of ICT tools and government and private sector have to give more effort on benefiting the farmers by easy access to ICT schemes. This study found that out of total respondent about only 39% had heard of ICT tools and they are mainly from radio and television. There was a significant relationship between respondent's variables (age, gender) and knowledge of ICT tools. However, the study did not show association between respondent's educations and knowledge of ICT tools. Similarly, 71% of the respondents had ICT tools. The mostly owned ICT tool was mobile phones, followed by radio and TV. The study showed a significant association between demographic variables (age, gender and education) and possessing ICT tools. Similarly, the study showed an association between the gender and the attitude of ICT. More than half of respondents (58%) use radio as a main ICT tool in their daily life. About 61% think that it served them to know the pricing information whereas about 47% thought it helped them to grow their market value. The biggest barrier to the use of ICT tool was lack of knowledge on ICT tools and the main facilitating factor reported was easy access to use ICT tools.

## 5.4 Recommendation

- i. It is to increase awareness among people regarding ICT tools and its benefit in agribusiness. Since majority of people own mobile phone, it can be heavily used for create awareness.
- ii. It is recommended that government should initiate difference programmes to provide more knowledge in ICT.
- iii. It is also recommended that government should provide easy access to ICT materials so that they are easily accessible and also feasible.
- iv. It is recommended that government should encourage the use of ICT by developing the infrastructures, providing trainings on how to use ICT tools.
- v. Since majority of the respondents are using ICT tools for pricing information, government should make policies on pricing so that farmers will not get cheated by other vendors.

## REFERENCES

- Adewale Joel, S. & Ojo Adigun, G., 2013. Use of Information and COmmunicaiton Technologies (ICTs) by Yam Farmers in Boluwaduro Local Government Area of Osun State, Nigeria. *Library Philosophy and Practice (e-journal)*, pp. 1-18.
- Akthar, I., 2016. Research Design. *Research in Social Science: Interdisciplinary Perspectives*, Volume 1, pp. 68-84.
- Bisallah, H., 2014. Effect Of Ict On Agricultural Sector In Nigeria. *Academia Arena*, 6(5), pp. 16-24.
- Bohara, A., 2014. Strategic Implementation of ICT in Agriculture Information Dissemination: A case of Gulmi District. *Proceedings of IOE Graduate Conference*.
- Borgatta, E. F. & Bohrnstedt, G. W., 1980. Level of Measurement: Once Over Again. *Sociological Methods & Research*, 9(2), pp. 147-160.
- Food and Agriculture organisation of the United Nations, 2016. *E-AGRICULTURE STRATEGY GUIDE*, Bangkok: the Food and Agriculture Organization of the United Nations and International Telecommunication Union.
- Gautam, M., 2018. ICT and Agriculture Development A Farm Level Case of Nepal. *Asian Journal of Humanities and Social Studies*, 6(4), pp. 129-137.
- Kharel, S., 2018. Information and Communication Technology for the rural development in Nepal. *Tribhuvan University Journal*, 32(2), pp. 177-190.
- Kautish, S., 2008. Online Banking: A Paradigm Shift. *E-Business*, ICFAI Publication, Hyderabad, 9(10), pp.54-59.
- Kautish, S., & Thapliyal, M. P. (2013). Design of new architecture for model management systems using knowledge sharing concept. *International Journal of Computer Applications*, 62(11), 27–30.
- Kautish, S. and Thapliyal, M.P., 2012. Concept of Decision Support Systems in relation with Knowledge Management–Fundamentals, theories, frameworks and practices. *International Journal of Application or Innovation in Engineering & Management*, 1, pp.1-9.
- Kaur, R., & Kautish, S. (2019). Multimodal Sentiment Analysis: A Survey and Comparison. *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)*, 10(2), 38-58.
- Kumar, A., Rajpurohit, V.S. and Kautish, S., 2020. A Study on Technology-LED Solutions for Fruit Grading to Address Post-Harvest Handling Issues of Horticultural Crops. In *Modern Techniques for Agricultural Disease Management and Crop Yield Prediction* (pp. 203-221). IGI Global.

- Leung, W. K., 2012. A qualitative study in the ethnic identification processes of HAKKA people in Hong Kong: The role of family socialization among generations of HAKKA. *SS Student E-Journal*, Volume 1, pp. 140-153.
- Nasir, M., Arafah, E. & Sofyan, H., 2018. The Efficiency of Manufacturing Sector: Empirical Evidence From Aceh Province Indonesia. *Indonesian Journal of Business and Entrepreneurship*, 4(1).
- OLADELE, O., 2015. Effect of Information Communication Technology (ICT) on agricultural information access among extension officers in North West Province South Africa.. *SCIELO*, Volume 43, pp. 30-41.
- Pandey, N., 2017. Role of Information and Communication technology in agriculture development: A study of nabarangpur district. *Scholedge International Journal of Business* , 4(4), pp. 24-35.
- Parkey, M., 2012. Assessing the national innovation system in a developing country. *All Dissertations*.
- Rani, S. and Kautish, S., 2018, June. Association Clustering and Time Series Based Data Mining in Continuous Data for Diabetes Prediction. In 2018 Second International Conference on Intelligent Computing and Control Systems (ICICCS) (pp. 1209-1214). IEEE.
- Responsible Conduct in Data Management, 2019. *Data Analysis*. [Online]  
Available at: [https://ori.hhs.gov/education/products/n\\_illinois\\_u/datamanagement/datopic.html](https://ori.hhs.gov/education/products/n_illinois_u/datamanagement/datopic.html)  
[Accessed 5 November 2019].
- Singh, C. and Kautish, S.K., Page Ranking Algorithms for Web Mining: A Review. *International Journal of Computer Applications*, 975, p.8887.
- Saunders, M., Lewis, P. & Thornhill, A., 2016. *Research Methods for Business Students*. 7th ed. Harlow: Pearson Education Limited.
- Sobalaje, A. J. & Adigun, G. O., 2013. Use of Information and Communication Technologies (ICTs) by Yam Farmers in Boluwaduro Local Government Area of Osun State, Nigeria.. *Library Philosophy and Practice (e-journal)*.
- Tajvidi, M. & Karami, A., 2015. Research Strategy. Product Development Strategy . *Product Development Strategy*, p. 45–78.
- Thapa, K., 2019. *ICT in agriculture: Need of the hour*, Kathmandu: The Himalayan.