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Information Seeking Behavior Regarding The Adoption Of Information Technology To Improve Farming Practice In Punjab: A Case Study Of District Vehari

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Abstract

The study's major purpose was to assess information-seeking behavior regarding the adoption of information technology to improve farming practices in Punjab: a case study of District Vehari. The study's objective was to explore the application of Information Technology to improve farming practices in Punjab. The study was limited to farmers in the Vehari District. The research was holistic in character and subjective in approach, with an interactive design. The methodology used in the study was qualitative in nature. The research was carried out using a case study as the research design. The population of the study was the farmers of district Vehari including 105 Union Councils. Data was collected qualitatively. After doing a literature study, semi structured interview was developed for the purpose of data collection. To select the sample, multi-stage sampling technique was used. There were selected 06 union councils from rural and urban locality conveniently. 18 farmers were interviewed .Thematic analysis technique was used to analyze the qualitative data. For each question, the exact words of the responses were written. The general themes that emerged from the responses of the respondents were formulated. Findings were made based on qualitative data analysis, and then conclusions were drawn. It was concluded that the farmers in Punjab were found to have a lack of financial resources, educational facilities, social issues, institutional issues, passive support by Agriculture Department, behavioral/psychological problems, a lack of Information agricultural technologies, and institutional set up as well as private sector services in the agriculture area. It was suggested that the Government should provide sufficient funds to the farmers to use Information technology. Agricultural farmers should be required to get technical education.

Keywords: Information seeking behavior, Information technology, Farming practice, Adoption.

1. Introduction

We all know that Pakistan's economy is based primarily on agriculture. It contributes 25% of the GDP of our nation. Additionally, it offers a means of earning money through exports and job opportunities in rural areas. It is impossible to exaggerate the significance of the agriculture industry to Pakistan's economic growth. It has long been recognised as a vital sector of Pakistan's economy, accounting for 42.3% of employment and 19.5% of the country's GDP (Javed, I., Rehman, A., Nabi, I., Razzaq, A.,

Saqib, R., Bakhsh, A., & Luqman, M.) (2020). The best food production in the agricultural sector is dependent on the use of modern technology tools and farming practice, which are closely tied to farmers' economic circumstances, according to several official publications from recent years (Trilles et al., 2019).

In Pakistan, livestock accounts for 60.54 percent of the total agriculture industry and provides 11.22 percent to economic growth. Despite a 3.8 percent target, this industry grows at a significant rate of 4.0 percent. Pakistan's fishing sector provides 0.39 percent to economic growth and accounts for 2.1 percent of the country's total agriculture sector. Due to a government of KPK initiative to improve timer production, woods contributed 26.7 percent of aggregate during 2018-2019, an increase of 6.47 percent. In Pakistan, there are two cropping seasons: "Kharif" and "Rabi." The "Kharif" season lasts from April to December, but the "Rabi" season lasts from October to April. During the "Kharif" season, rice, moong, cotton, bajra, maize, mash, and sugarcane are farmed. In the "Rabi" season, potatoes, wheat, barley, tobacco, gramme, masoor, and mustard are grown. Water has a vital influence in the agriculture sector's productivity in this way, whereas subsurface water levels in Pakistan are declining (Ali Chandio, Magsi, Rehman, & Ghulam Murtaza Sahito, 2017).

From 1988 to 1989 and 1993 to 1994, the overall export of these items was 33 and 38 percent (Pakistan, 1996). In the 1990s, the entire value of exports accounted for 45 to 55 percent of foreign exchange earnings (Mughal, 2019).

Pakistan's agriculture sector is the backbone of the country's economy. In Pakistan, this industry is the largest producer of raw resources, food, and jobs. Unfortunately, this sector's contribution to GDP is diminishing year after year. Agriculture's contribution to GDP was 60% in 1947, but it is now barely 18.5 percent in 2019. The agriculture sector's poor performance reflects the large contribution disparity. As a result, it is vital to concentrate on this sector, which is still regarded the primary industry despite the significant decline.

This industry employs roughly 38.5 percent of the country's direct and indirect labour force (Pakistan Economic Survey, 2018). Experts believe that economic progress and poverty reduction in Pakistan will be difficult without the development of the agriculture sector (Peerzado, Magsi, & Sheikh, 2018; Zulifqar & Thapa, 2017; Saqib, Kuwornu, Ahmad, & Panezai, 2018; Chandio, Jiang, Gessesse, & Dunya, 2019). As a result, there is still a significant gap in understanding the factors that impede agricultural productivity.

Pakistan's economic growth is heavily reliant on agricultural productivity (Kahlown & Majeed, 2004). Several inputs, such as biological, chemical, mechanical, and hydrological inputs, have been found to have an impact on the productivity of agricultural goods. Farm mechanization is one example of mechanical inputs (Legesse, Ayele, & Bewket, 2012).

Farmers intend to make an ineffective selection of agricultural machines when they are unable to purchase expensive machinery. They are unable to generate high-quality, standardized items as a result of these factors (Muhammad Iqbal, Ahmad, & Abbas, 2003). Finally, in comparison to other countries, Pakistani farmers rely on outdated agricultural productivity strategies (M. A. Iqbal, Iqbal, Afzal, & Akbar, 2015).

Furthermore, it is agreed that sophisticated adequate mechanization saves 15% to 20% of seeds, 15% to 20% of fertilizers, 20% to 30% of working time, and 20% to 30% of labour on

farms.

Additionally, it has the potential to increase crop intensity by 5% to 20% and crop production by 10% to 15%. (Tiwari et al, 2019).

Furthermore, the fast growing population makes it increasingly difficult to supply food demands due to reduced agricultural productivity. As a result, it is critical to enhance agricultural productivity as quickly as possible by taking preventative measures to spare people from starvation. This major problem could be solved by utilizing cutting-edge farming technologies to boost agricultural productivity.

Agriculture accounts for almost half of the Gross Domestic Product (GDP) of a typical African or Asian country, with services accounting for 35% and industry accounting for only 15%. As a result, the agricultural sector's supremacy, rather than the manufacturing sector's, becomes the primary determinant of economic growth. Agriculture is extremely important in India's economy. It generates employment for approximately 70% of the country's working population, provides food for the rising population, supplies raw materials to various businesses, earns the majority of export earnings, and contributes one-third of the country's national income. Food grains and non-food grains are the two main components of agricultural production. Approximately two-thirds of overall agricultural production is produced by the former. Rice and wheat are the most common dietary grains and wheat occupies the second position.

Agriculture technologies have evolved over time, from prehistoric times to the mediaeval ages to the Renaissance and the industrial revolution, leading to the industry we know today.

In today's world, advanced agricultural technology is critical to increasing crop output (Foster & Rosenzweig 2004).

Agricultural technology lowers crop costs through lowering fuel usage in tractors, harvesters, and other agricultural equipment, as well as lowering labour costs. Information agricultural technology aids in increasing soil fertility, crop turnover, crop quality, and, most critically, reducing crop climatic risks. It is vital to develop agricultural techniques and tools through innovation and extension with the support of research in order to improve agriculture productivity, sustainability, and profitability (Ebrahimi Sarcheshmeh, Bijani, & Sadighi, 2018). Pakistan is the world's biggest producer of agricultural products, although in this technological age, Pakistani farmers are still practicing Stone Age farming techniques. These ancient approaches are impeding Pakistan's agricultural output and increasing CO2 emissions. Based on these factors, I've decided to include technology as a variable in our research.

Again, information dissemination and raising awareness of the availability, advantages, and risks associated with the adoption decision are the main elements influencing farmers' intents to use technology. This means that the farmer's good view of the information technology, which comes with awareness, is a key factor in his or her decision to embrace any information technology. Therefore, it is predicted that the decision to accept technology is influenced by socioeconomic and institutional variables, such as age and farming experience, as well as by the subjective judgments and attitudes of the farmers. Farmers' socioeconomic traits have a direct and indirect impact on their awareness and perceptions, which in turn affects whether they have positive or bad goals.

Nearly every area of human progress requires the utilization of information. The process of assessing information needs is prompted by the need for people to be knowledgeable and informed. Without understanding how people communicate, seek, assess, choose, and then apply the necessary information, often known as information-seeking behavior, this process

cannot function on its own. Since it aids in the planning, implementation, and operation of information systems and services in the specific work environments, it is crucial to comprehend the information needs and information-seeking behavior of diverse professional groups. To strengthen their ability to provide farmers with information or training, extension staff members require information that will satisfy their practical needs. Personal motivations are involved in information-seeking behavior (Kehindhe,L.A. 1994).

The internet has made it easier to acquire agricultural information as information technology advances, and there are now numerous solutions available for handling the pertinent data. Traditional information sources used by producers may include spoken word and written content (such as reports in newspapers, newsletters, books, letters, special journals, laws, circulars, and other institutional documents); however, over the past few decades, electronic resources like databases and the internet have become increasingly significant (Kostagiolas, et al 2014).

Multimedia is one of the most adaptable audiovisual mediums out of all the mass communication methods that of communication (Brun & Mangstl, 2001). Learning with multimedia is more effective since the student can really see, hear, and apply the learning (Roden, 1991). Technology can be effectively transferred using interactive multimedia compact discs (Senthikumar et al., 2003). Due to the greater level of subject matter mastery provided by multimedia, students learn by doing, retain information better, receive more individualised feedback, and achieve higher levels of knowledge (Andara, 1999).

The representation, storing, retrieval, and dissemination of machine-processable information conveyed in multimedia including text, speech, image, audio, and video are all examples of multimedia communication. The best way to describe complicated and dynamic processes that are difficult to explain using conventional media and approaches is by using multimedia technologies. An efficient strategy for transferring technology is to present agricultural technology to subjects using Interactive Multimedia Compact Discs (IMCDs), which could help spread farm information (Vanetha, 2013).

The development of agricultural technologies has been ongoing. To the advantage of farmers, innovations in seed genetics, climate-smart technology, fertilizers, and integrated pest management strategies are all promoted (Kumar et al., 2020). But acceptance of these agricultural practice has remained minimal, especially in developing nations (Ullah et al., 2020). The majority of the research on technology acceptance has focused on measuring adoption rates in agricultural output.

For instance, the association between farmer socioeconomic characteristics and policy variables (Sileshi, et al, 2019). These studies are unquestionably helpful for comprehending the barriers to technology adoption (Simtowe et al., 2016). As a result, one of the most important indicators of farmers' adoption of technology is their understanding of innovations like better varieties and fertilizers (Mango et al. 2017).

High agricultural productivity boosts annual income and has a positive effect on the availability of food for households, which contributes to agricultural resilience through

enhancing agricultural practice (Kopittte.P.M.Menzies at al, 2019). Pakistan is mostly an agricultural nation, but it has greatly diversified its economy throughout time (Zulifqar,F. & Thaps.G.B, 2017).

One of the most significant economic sectors in the nation is agriculture, which accounts for around 19.8% of GDP and 42.5 percent of the rural population (Muhula.R, 2019).

The most frequent areas of crop technology research and promotion, according to Loevinsohn et al. (2013), include new varieties and management regimes, soil and soil fertility management, weed and pest management, and irrigation and water management. New technology tends to boost output while lowering average production costs due to improved input/output links, resulting in considerable increases in farm income (Dalango.D. & Tedesse.T, 2019).

A Improved technology users increase their output, which leads to ongoing socioeconomic progress. Adoption of new information technology has been associated with increased incomes, reduced poverty, better nutritional status, lower prices for basic foods, more employment opportunities, and greater wages for migrant workers (Kasirye, 2010). The green revolution in Asian nations is regarded to have been successful in large part due to the use of modern technologies (Ravallion and Chen, 2004; Kasirye, 2010).

Contrarily, non-adopters are fighting to make ends meet as a result of deprivation brought on by socioeconomic stagnation (Jain et al., 2009).

So, for long-term food security and economic development, a new information technology that enhances the sustainable production of food and fibre is essential. The dynamics of technological progress in agriculture have been a prominent area of study since the early 20th century (Loevinsohn et al., 2013).

These technologies are a key priority for development projects since smallholder farmers in undeveloped countries confront numerous obstacles. For instance, some farmers operate their farms in locations with poor soils and infrequent, low-rainfall climates. Moreover, underdeveloped institutions and infrastructure include marketplaces for inputs and products, irrigation, financing, and extension services (Muzari et al., 2012).

Over the years, numerous studies on innovation and the adoption of new technologies in developing countries have been conducted. Moreover, research has been done on the adoption of new information technology and its effects on smallholder farmers. Nonetheless, while being seen as a crucial path out of poverty in the majority of developing nations, new agricultural technology is typically adopted slowly and several adoption-related factors are still poorly understood (Bandiera & Rasul, 2006; Simtowe, 2006)

However, it is worth noting that, thus far, the introduction of new information technology has met with only partial success as assessed by the observed rate of adoption. Agriculture in India retains its traditional nature. Traditional agriculture can be transformed into contemporary agriculture by information technological innovation and adoption (Ahmed, 2012).

Poor agricultural technology has numerous detrimental effects on productivity. The phrase technology refers to the "accurate application of information and tools for apprehending social aims and economic purposes." Farmers in poor nations usually adopt conventional farming methods, which results in low output. As a result, if we do not adopt and implement new production techniques and continue to rely on old and conventional methods of cultivation, our production process will stay slow. Technology is also inextricably linked to land because land is scarce and cannot be produced. This is one of the reasons behind the low

agricultural output (Masood et. al., 2012).

Technology adoption calls for more than merely disseminating knowledge; the target audiences must receive it properly and apply it. In particular, incorporating cutting-edge knowledge into current curricula is exceedingly challenging (Kutt 2001). The target groups and organizational structures of the current educational environment were examined to aid it. Based on the findings, instructional materials and training exercises were created to cater to the appropriate target audiences, provide a more concentrated approach, and ultimately, facilitate an even more effective knowledge transfer.

Transfer of electronics plays a lively duty in the process of land growth. Shift necessitates that ranchers endure believe to recognize and work for the change. They need expected arranged rationally and emotionally to acknowledge the new land science with the constant work of the administration and different extension instrumentalities. Most of the peasants are experienced about the new development in farming and they are ready to select the new gardening technology but are not in a position to select the upgraded science at complete due to sure restraints met by them in ordinary history (Ahmed, 2013).

The fast adoption of ICT in developing nations presents a rare opportunity for knowledge transfer through both commercial and public information systems. More than 60% of people in sub-Saharan Africa, Asia, and Latin America have access to mobile phone coverage in 2009. Mobile phone coverage has rapidly expanded throughout these regions during the previous ten years. Over 4 billion people had mobile phone subscriptions as of 2008, with 374 million of those in Africa, 1.79 million in Asia, and 460 million in Latin America. Mobile phones were once primarily used by wealthier, metropolitan, and better educated citizens, but in recent years, both rural and urban populations in some of the world's poorest nations have accepted them (Aker and Mbiti, 2010).

In recent years, small farmers in Vehari (Cold Punjab) have advocated farming innovations such as new irrigation channels, virus and disease control methods, harvesting and post-harvest arrangements (Asante and others., 2014). It is critical to evaluate and comprehend the **socioeconomic**, financial, and uniform variables that drive peasants in society to choose (or not) these information technologies. It is important to reveal the variable movement that influences and explains the action behind the acceptance once again.

Against this history, skilled is a need to identify t he farm electronics selected by
laborers because non
approval of currently grown Information farm sci ences (source,
manure, pesticide, whole of practice, watering sc hedule) maybe the main reason of poor
accomplishment of farming in Cold Punjab,
Vehari. My work deals with the
level of maintenance of up to date information technology, approach and condition of new information technology.

1.1 Statement of the Problem

The purpose of this study was to determine information seeking behavior regarding the adoption of information technology to improve farming practice in Punjab: A case study of district Vehari.

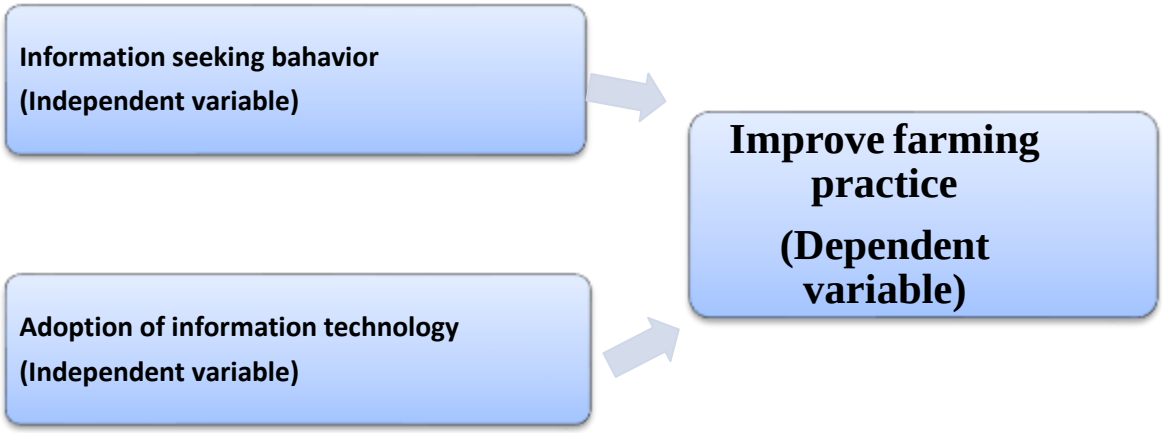
1.2 Objectives of the Study

Objectives of the case study were:

1. To explore the application of Information Technology to improve farming practice in Punjab.
2. To explore the adoption patterns of Information technology to improve farming practice in Punjab.
3. To explore the differences among farmers adopted information technology in Agriculture and non-adopters.

1.3 Conceptual framework

A conceptual framework describes about the expectation which are being find out through research. It defines the relevant variables for the study and maps out its relation with each other.



2. Research Design

The research design is an action which is the basis of the whole study. Research design is a frame of the research relating to questionnaire. Research design is an approach based on techniques of sampling. Research design defines objectives with research tools and techniques. The design of this study is iterative, meaning that data collection and research questions are modified in response to what is discovered. It is holistic in nature and subjective in approach. Qualitative research was used to carry out the study.

The population studied for the purpose of determining the final outcome is the target population. The available population is realistically chosen by the researcher (Cottrell, 2001).The population of this study was the farmers in the District Vehari Punjab Pakistan. As the current research was carried out in District Vehari. So it was taken as universe. Sample is calculated on the basis of the population, and it is a subset of the population chosen for a study, and the method of selecting a representative portion of the entire population, sample is often dependent on the population of the study.

For this study, sampling was done at various stages. For this study, multi-stage sampling was used at various stages. There were selected 6 union councils (UCs) of District Vehari by convenient sampling technique. Among these, 03 Union Councils were selected conveniently from urban area. The remaining 03 UCs were selected conveniently from rural area. From each of the selected union council, three villages were selected. Out of each selected village, respondents were selected conveniently. Interview guide was used as the tool for the data collection. For the collection of data interview guide was used. We personally visited the selected 09 UCs and conducted 18 semi-structured interviews from the farmers of selected UCs conveniently. Consent of each participants was taken prior to the interview of this research.

The researcher becomes familiar with the data by reading it repeatedly and learning the semantic

meanings. Codes were created to capture key analytic ideas within the data that may be relevant to the research question. Themes were created by combining codes that are related to a single concept. The themes were examined in relation to the coded data as well as the data as a whole. The themes were identified and assigned names. The researcher writes an analytic narrative in this section to explain what is happening in the data, how it relates to the research question, and why the reader should care. A thematic analysis method was adopted for the analysis exact words of the participants were transcribed and major themes were identified. On the basis of identified major themes, analysis was made and conclusions were drawn. The Results were pinched on the basis of the finding of the research work and recommendations were offered accordingly.

3.DATA ANALYSIS

This chapter is comprised of the thematic analysis of collected data. Data was collected through semi-structured interview in this qualitative research. The participants were homogeneous because all the participants were living in district Vehari. Thematic analysis having six-step process approach was used in this thematic analysis, covering familiarization (initial notes and responses), coding (extracting from interview data), generating themes(turning codes into themes), reviewing themes (confirming the themes accuracy), defining & naming themes (formulating exactly and succinct & easily understandable) and writing up the main themes to draw the results. Final findings were made after the thematic analysis.

3.1 Information technology

Codes: Mobile phone and apps, Computer & internet, Solar system, sensors, GIS software, Satellite, drone, Robotic system and any tool which increase the productivity.

The participants were asked about the information technology, a few of the participants said that: “Today is the age of science and technology and each field of life is adopting information technology as per its need i.e. use of mobile in multi purposes (Games, mapping, measurement, video, communication, agri assessment, GPS, sensor, remote control, apps usage etc”. One other participant said that:” The advance technology of computer is mobile phone and its programmes are app”. Some participants said that “Due to the information technology, solar system has been introduced and being used in domestic as well as in agriculture field”. An educated participant added more that: “Every tool which enhance the productivity in any field of life, is called information technology either it starts from needle to big item”. The development, installation, and usage of everything related to computing and telecommunications are all included in the broad definition of information technology. With the aid of hardware and software networks, workstations, and storage devices at lower costs. Information & Communication Technology (ICT) plays a significant part in the farmers' decision-support system. Farmers can stay informed about the latest developments in agriculture, weather, new crop types, and production-boosting techniques using Information & Communication Technology (ICT). As one of the participants said: "Information technology has changed the world”, other participant said: “The world has been advanced and every field of life is progressing day by day”.

3.2 Agricultural information technology

Codes: Herbicides, pesticides and insecticides, Harvesting machinery, Computerized leveller, Boom sprayer and drone, Hybrid seeds (HYV), Farming software and online data.

When participants were questioned about the types of Information technologies being used in agriculture field in Punjab, one participant said that: “With the help of information technology, we knew about the usage and effects of herbicides, pesticides and insecticides”. Other participants added more that: “Man started cutting/harvesting cops by hand, but with the passage of time farmers knew about information technology and now using different machinery in the agriculture field”. One participant shared hi experience that” He has used the computerized level and save water consumption fifty percent”. Other said that “Boom sprayer and drones have helped farmer to cover major portion of land through these two filed”. One participants was in views that: “Hybrid seed (HYV) , robotic system & sensors, satellite, etc”.One of the participants said: "Man has reached on the Moon due to the information technology”. Another participant said: “aj kal to hr bchay k pass mobile ha, ap kon c technology ki baat krty ho”.

3.3 Sources of Knowledge

Codes: Electronic & print media, Agriculture department, Fellow farmers, Private company representatives.

When participants were questioned about the source of knowledge and Information technology in agriculture field in Punjab, one participant responded that “they have obtained information and knowledge about Information technology in agriculture field from electronic media like television, mobile phone, computer, internet, different apps, commercials and other sources where electronic items are engaged”. Further one more participants added that “they get knowledge from print media including newspaper, handout, pamphlets, broachers, bill board, standees, leaflets, booklets and any circulation”. Other participants responded that “they get knowledge from their colleagues, friends and fellow farmers who are available”. While one participant said that “Private companies also visit them and provide the important information to uplift their knowledge level which is considered a source of knowledge”. Responded that they get knowledge about information technology from other sources. A participant said that: “The Mobile phone has taken place in every filed of life”.

3.4 Adoption standards of Information Technology

Codes: Cost of machinery, tools, devices, Agri land, Availability & repairing facilities, Time saving machinery, Farmers literacy and experience

When the participants (farmers) were questioned about the standards observed during adoption of information technology for improving the farming practice, one participant responded that “Farmer keeps many standards during adoption of information technology in agriculture field like cost of machinery”. Actually the cost of machinery/tool or device is seen prior to the purchase or even for the usage”. One participant said that “minimum 10 acre land owner can purchase the modern machinery or knew the importance of the information technology; further he added that fertile land increases the production so the farmer becomes strengthen”. Other participants said that “The availability of information technology gadgets and tools is rare in the rural areas but in the city areas its availability & repairing facilities are available. So it is difficult for farmers to approach the city areas for purchase and repairing”. An old person said that: “Information technology is useful for the

revolution and time saving machinery is available and its price issue is 2nd element". Other participants said that "Farmer looks back on his experience and farmers literacy rate". A participant said that: "China chaa gea ay but farmer literacy level & experience also has plus point. Farmer should feel the difference of information technology". Further he added that "China is providing each item cheaply even at our door step".

4. Findings and Suggestions

The thematic analysis revealed four major themes named information technology, Agricultural information technology, Sources of knowledge & Adoption standards of information technology. The study's findings are discussed in greater detail below..

4.1 Information technology

The farmers within the study suggested that the information technology is taking place step by step in agriculture field but the farmers less knowledge and low literacy rate is hindrance to accepting fully. The findings went beyond previous research on information technology by providing personal accounts of why farmers thought it was useful. Farmers in Punjab have identified various types of information technology and their application in agriculture to improve farming practices. The farmers described their understanding of information technology and the various types that exist in the area.

4.2 Agricultural Information technology

Information technology is used in the agriculture field. The findings also endorsed that for the food security and to enhance production, information technology usage in agriculture is mandatory as various requirements came during research study like sowing to harvesting, information technology was seen an important factor for agriculture field.

4.3 Sources of knowledge

Farmer values sources of knowledge through media (electronic and print), institutional departments, and other privately managed companies, according to the study's findings. The farmers appreciated the companies' efforts to reach out to them in order to raise awareness and gain their acceptance.

4.4 Adoption standards of Information technology

The findings extended upon previous literature are some extent proves that adoption ratio is different in micro and macro level and it depends upon the farmer capacity and approach. The farmers spoke about the factors for the adoption of information technology in agriculture field to improve farming practice. They also described that if the facilities are given at door step than they will adopt information technology fully in agriculture field to save time and to increase yield.

5. Conclusions and Recommendations

On the basis of analysis of the data, conclusions of the study are presented. When participants were asked about the concept of Information technology in the agriculture field in Punjab, they told that the main purposes of the

Information technology in the agriculture field in Punjab depend upon its usage in agriculture field. As regarding the application of Information technology in agriculture field, it was concluded that Information technologies are those equipments & machineries which are information & communication technology (ICT), information technologies are those tools which increase the productivity and accessibility, adoption of information technologies & their follow up for better results, innovations which save time and labor and cultivation of crops with new methods in agriculture field in Punjab. When participants were questioned about the types of Information technologies being used in agriculture field in Punjab, they responded that major components of Information technology are Herbicides, pesticides and insecticides, harvesting machinery/equipments, computerized land leveler, chemical Fertilizer/foliar, Boom sprayer and drown sprayer, Mobile phones & mobile apps, GIS software and GPS agriculture, Hybrid seed (HYV), Robotic system & sensors, Satellite, Drone and other aerial imagery, and Farming software and online data. It was concluded that these major components play a vital role in agriculture field in Punjab.

When the participants (farmers) were questioned about the standards observed during adoption of Information technology for improving the farming practice, they responded that major standards are the cost of the machinery & equipments, farmers having agri land, availability & repairing facilities, time saving machinery & Farmers Literacy and experience. It was concluded that the given standards are important to agriculture field in Punjab. When the participants (farmers) were questioned about the sources of knowledge regarding Information technology that is used in agriculture field, they responded that they got knowledge of Information technology from television & radio, fellow farmers, internet & computer, mobile phone and other sources. It was concluded that these knowledge sources are very important and useful for informative disseminating to the farmers regarding agriculture field.

There must be proper awareness about Information technologies by the agriculture department in order to save time, labor, updating the farmers and cultivation of crops with new methods in agriculture field in Punjab. The farmers must be trained in order to use the major components of Information technology like mobile/apps, harvesting machinery/equipment, computerized land leveler, chemical Fertilizer/folier, Boom sprayer and drown sprayer, GIS software and GPS agriculture, Hybrid seed (HYV), Robotic system, Satellite, Drone and other aerial imagery, and Farming software. The farmers must be given awareness about standards that are important to improve farming practices in Punjab. There must be programs on electronic media to deliver knowledge and useful for information to farmers regarding improving farming practices in Punjab.

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