

**STUDY ON EFFECT OF INFORMATION AND COMMUNICATION
TECHNOLOGY ON FARMERS KNOWLEDGE AND ADOPTION OF
POTATO PRODUCTION TECHNOLOGY IN AYODHYA DISTRICT
(UTTAR PRADESH)**



THESIS

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IN

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BY

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**INDIA
2020**





DEDICATED
To
My Adorable Parents
Smt. Mamta Pandey
Shri. Awadhesh Kumar Pandey

Aman.... 

Dr. Prakash Singh,
Professor
Deptt. of Extension Eduaction



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CERTIFICATE-I

This is to certify that the thesis entitled “Study on effect of Information and Communication Technology (ICTs) on farmers knowledge and adoption of potato production technologies in Ayodhya district of Uttar Pradesh.” submitted for the degree of **Master of Science (Agriculture)** in the subject of **Extension Education** of the Acharya Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.) is a bonafide research work carried out by **Mr. Aman Kumar Panday, I.D. No. A- 10562/18** under my supervision and that no part of this thesis has been submitted for any other degree.

The assistance and help received during the course of investigation have been fully acknowledged.

Kumarganj, Ayodhya
October, 2020

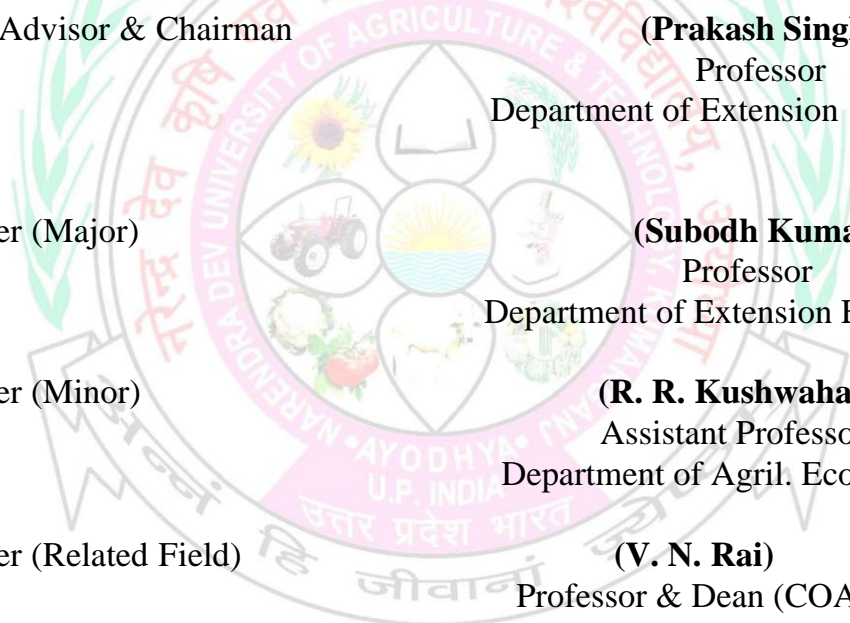
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CERTIFICATE-II

This is to certify that the thesis entitled Study on "effect of Information and Communication Technology (ICTs) on farmers knowledge and adoption of potato production technologies in Ayodhya district of Uttar Pradesh submitted by **Mr. Aman Kumar Panday**, I.D. No. A-10562/18 to the Acharya Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.), in the partial fulfillment of the requirements for the degree of "**Master of Science**" (**Agriculture**) in subject of **Extension Education** has been evaluated satisfactory by the External Examiner and approved by the Student's Advisory Committee after an oral examination.

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***Kumarganj, Ayodhya.
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(Aman)

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ABBREVIATIONS

A.D.Os	:	Assistant Development Officers
B.D.Os	:	Block Development Officers
V.D.Os.	:	Village Development Officers
K.S.	:	Kishan Sahayak
<i>et al.</i>	:	Exalli (Coauthors)
etc.	:	Ex Cetra
Fig.	:	Figure
H.Q.	:	Head Quater
ha.	:	Hectare
i.e.	:	That is
Kg.	:	Kilogram
Mm	:	Miligramm
Mx	:	Maximum
Mn	:	Minimum
No.	:	Number
Rs.	:	Rupees
S. No.	:	Serial Number
S.D.	:	Standard Deviation
vi	:	Videlicet, Namely
⁰ c	:	Degree Celsius
%	:	Percentage

INTRODUCTION

The trend growth rate for potato production during initial 18 years of 21st century was the highest in India followed by China and Russian Federation. On productivity front, although India has grown significantly, yet the growth rate is much lower than that of the area during this period of time. Higher contribution of area expansion than productivity enhancement in the potato production growth scenario in India indicates that changing Indian socio-economic scenario is generating higher demand for potato (Singh *et al.* 2014, Rana 2015).

Potato production in India is highly concentrated in Gangetic plains as three largest potato producing states, viz. Uttar Pradesh (30.33% of national production), West Bengal (24.92% of national production) and Bihar (15.09% of national production), collectively contribute about 74% to the national production. Share of Bihar state in national potato production and area has increased from the year 2013 to 2018; however, this share has decreased in case of Uttar Pradesh and West Bengal states, over this period. Trend growth rates over the period of 2017 to 2018 depict that potato production has significantly grown in all these seven states while the productivity grew only in case of Uttar Pradesh state.

The education has vital role in building the society. It is one of the most important needs for the well-being of individual and the society. Quality education helps to empowering the nation in all aspects. There are many ways to increase the learner's knowledge and Information. ICT is one of them and the term ICT was coined by **Dennis Stevenson** in 1997. It is an acronym that stands for Information and Communication Technology that includes all technologies for the manipulation and communication of information (Swati Desai, 2010). Broad definition of ICT includes radio, television, satellite, mobile phones, computers and the internet. It can be divided into two groups; traditional ICT namely radio, television and the new ICTs like internet and telecommunications. Learning through new ICTs is also called e-learning. Information and communication technology (ICT) is an indispensable part of the contemporary world. It is a force that has many aspects of the way we live and also an electronic means of capturing, processing, storing and communicating information. The potential of

information and communication technologies today from the time we awaken in the morning to the time before we sleep. We are surrounded by media, such as newspapers, radio, television and computers. Sometimes we are not even aware that we are surrounded by these media. All these media come under the overall umbrella of ICTs. Impact of ICT in education includes two things - ICT and education. It includes any communication device, application or service used to educational purposes to support and improve the learning of the students. ICT can be considered as a sub field of educational technology.

According to UNESCO: ICT is a scientific, technological and engineering discipline and management technique used in handling information in application and association with social, economic and cultural aspects. Appropriate use of ICT can transform the whole teaching-learning processes leading to paradigm shift in both content and teaching methodology (Anu Sharma *et al.*, 2011).

Information and Communication Technology (ICT) has been considered as a tool that can be used to achieve development goals in developing countries. These technologies may help to fight against illiteracy, disease, unemployment, poverty, agriculture and other development problems. Agriculture plays a vital role in the society and the economy of the country. Nowadays, more and more new advanced technologies are used for agricultural development such as satellites, the Internet, mobile phone and social media. The use of the technologies divides in both developed and developing nations. It can be used to improve agricultural information and farming methods with transformational development (Lu, 2001). In India around 70% of population earns its livelihood from agriculture. According to census 2011, 68.9 percent (83.30 crore) population is still rural (Kurukhetra, 2015).

Today we are far from exploiting all the possibilities that progress in ICT can offer to people, businesses and governments. A world of opportunities is ahead of us and Europe cannot afford to miss them. The next waves of ICT development will make devices, networks and services smaller, smarter, cheaper and more reliable. ICT will provide a wider range of applications, enabling people to interact with their surroundings and with each other in totally new ways. Progress in ICT will help us monitor our health and well-being at anytime and anywhere. It will enable every child and adult to get access to personalized learning whenever needed. It will bring infinite computing and data handling capacities to the desk of every engineer and scientist and will enable every business, large or small, to be connected to worldwide trading communities. This is why, in most major

economies, ICT research gets the largest share of research investment, accounting for over 30% of the total research effort. This applies to both the public and the private research fields. However, this is not the case in Europe where ICT research represents only 18% of the total research effort (M. Claessens ed. 2007).

Information and communication Technology (ICTs) encompasses development and use of electronic and allied gadgetry for effective generation, documentation, processing, storage, retrieval and use of information for maximum and speedy output (Chaturvedi and Khare, 2004).

ICTs are most natural allies to facilitate the outreach of Agricultural Extension system in the country. Despite a large, well-educated, well-trained and well-organized Agricultural extension manpower. Around 60 per cent of farmers in the country still remain un-reached (NSSO, 2005), not served by any extension agency or functionary of the 40 percent, who have some access to Agricultural Information, the major sources of this information are Radio and Television. The telephone has just started to make its presence felt on this scenario. During last four years of its operations, the Kisan Call Centers (KCC) helpline-1551 has registered over 2.4 million calls. Hence ICTs are highly relevant for Agricultural Extension scientists, researchers, functionaries and organizations.

Information and communication Technology (ICTs) includes technologies such as desktop and laptop, Computer, Software, peripheral connection to be intended to fulfill information processing and communication functions. ICTs are emerging as an important tool for the development of societies and have driving forces in the economic worldwide. ICT are no more confined to assist high research and development, the new technologies have made significant improvement in the lifestyle and the efficiency levels in all sectors of economy. The positive impact of ICTs is most visible in service sector, where the efficiency levels have gone very high.

The information technology has made learner WWW afflicted. This is because technological developments that brought developments in two ways. First, by enhancing human capabilities by helping people to participate actively in social, economic and political life in society at large. Second, by giving advantage to technological innovation as a means for human development due to economic progress and increased productivity (Bisht, 2013).

ICT tools like apps, programs and web2.0 applications are part of our modern society. Schools all over Europe are adopting this essential trend, but in many countries this adoption is happening at a rather slow pace. This has many reasons, from missing infrastructure to security concerns to teachers not being familiar enough with using ICT in regular classes. To encourage teachers to think about an increased use of ICT tools in teaching, and to inspire them on where and how to use these tools is the main idea of this ICT Guide. We need well-educated students with profound ICT skills – in terms of operation as well as media literacy – to become active members of our knowledge society which is built on the foundation of ICT in most areas these days. The aim of this guide is to practically support teachers in using ICT tools in class (Kampschulte and KarstenEilert *et al.*, 2016).

The knowledge is prerequisite for adoption of any technology or innovation. A higher knowledge level of member on IDFBs facilitated better adoption rate in the form of members than that of the no-members. This facilitated the member share their experience and problems faced in performing day to day activities in the farms. The process of sharing information helped them in gaining knowledge and encouraged them to adopt feasible and viable practices in their field. The group members maintained links with various potatoes growers that also supported them in empowering with latest knowledge and skills. The internal dynamics of the groups, interaction with other groups of farmer capacity building of farmer and change agents positively contributed in knowledge gain and adoption level of IDFBs in the farms of the SHG members. Even though large efforts have been made to disseminate potato technologies through the support of government and non-government organizations in different parts of the country, the adoption of potato technologies by farmers varies widely across different agro-ecologies and within the same agro-ecology based on various technical and non-technical factors.

The knowledge has been recognized as one of the most important components of human behavior which gives impetus to adopt a technology a proper understanding if an improved practice of potato production is prerequisite for its adoption by the farmers. The knowledge in the present context has been conceptualized as the amount of information about currently recommended practices to the farmers and the adoption would be operationalized as the amount of recommended technology is being utilized by the farmer on their fields.

In spite of all concerned efforts potato is lambing over its poor profitability. This could be attributed to the fact that required level of supply to the people one hand prone its worth when compared with prevailing crops in the area on other hand. Thus the technology should be developed and constraints should be reduced on the basis of various categories of farmers.

Hence the present study entitled “Study on effect of Information and Communication Technology (ICT) on farmers knowledge and adoption of potato production technologies in Ayodhya district of Uttar Pradesh.” was undertaken for improvement of farmers knowledge and adoption. Thus the study has been carried out on the basis of the following objectives:

1. The social, economical, communication and psychological profile of the potato farmers
2. The knowledge and utilization pattern of Information and Communication Technology (ICT) tools
3. The knowledge and adoption level of potato production practices
4. The impact of ICT on knowledge and adoption of potato technologies of farmers
5. The constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

IMPORTANCE/JUSTIFICATION OF THE STUDY:-

1. The present study in attempt to identify the effect of ICTs on farmer’s knowledge and adoption of potato production technology in respect to use of ICTs tools, potato production and their knowledge about potato production etc.
2. This study would be helpful for the development of socio economic status of particular farmers.
3. This study will be helpful to the farmers and extension workers too in formulation of conceptualization for increasing the involvement of farmers for better knowledge and adoption of potato production
4. This study will helpful to know the effect of ICTs on farmers knowledge and adoption about potato production practices and use of farm resources by the farmers

LIMITATIONS OF THE STUDY:-

1. The study was confined to the Milkpur district of eastern Uttar Pradesh only. This shows the small proportion of the state with respect to geographical area and hence, may be considered a micro study.
2. Due to lack of time period and not proper resources it was not possible to cover large area in the study. Therefore, only few selected villages in the district were considered.
3. The findings are based on the expressed opinion of the respondents which has been limited to a total of 120 respondents only.
4. The present study is limited to knowledge and adoption extent of potato production technology by the farmers only.
5. Agriculture being a biological process takes more time for development. On the other hand, the study was conducted on the basis of one year data which is very short time for real generalization.

Review of Literature

A systematic review of relevant literature forms an integral aspect of any research project. It helps a great deal in defining the problem, formulating the scientific objectives, deciding the methodology and discussing the finding of the project in hand. Keeping in view, the nature of the present study, a brief review of available research finding is presented under the following subheads:

1. The social, economical, communication and psychological profile of the potato farmers
2. The knowledge and utilization pattern of Information and Communication Technology (ICTs) tools
3. The knowledge and adoption level of potato production practices
4. The effect of ICTs on knowledge and adoption of potato technologies of farmers
5. The constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

2.1. The social, economical, communication and psychological profile of the potato farmers

Sonane 2008 reported that maximum respondents of potato growers belonged to middle age group.

Singh et al. 2009 reported that majority 86.67% of respondents were solely dependent on agriculture.

Zekriet al. 2010 revealed that farmers of age 25-80 years were engaged in farming with an average family size of 13 members. None of the farmers is merely and solely dependent upon farm income only. Rather, most of them are farming partially.

Yadav 2010 revealed that nearly one-half (48.40%) of the potato producers were from young age group, followed by middle age (40.00%) and old age group (11.60%).

Barrera et al. 2010 stated that this system has the highest productivity potential in the area and it is feasible to adopt because it increases production and income. It represents the best choice since the producers already have the necessary productive assets and family labor which allow sustainability. From an environmental point of view, if the system is operated properly with the implementation of alternative environmental friendly

technologies, it could stop the advance of the agricultural frontier into wasteland areas. This system is an option that local governments should promote to preserve the ecosystem of the highland.

Ekweet *al.* 2010 reported that youths be encourage to participate effectively in potato farming, seeing the majority of the farmers are aged and will retire from active farming. This is to ensure food security and even an effective structure should be put in place for the input and credit facilities provided by the government. This will ensure that these facilities get to those who need it and in turn help the farmers expand their production.

Panditet *al.* 2010 revealed that the adoption of technologies was an important contributor of enhancing potato yield. It was evident from the regression analysis that one percent increase in adoption of potato production technologies would increase potato yield by 0.96 and 0.88 % in irrigated and rain-fed areas respectively. The major constraints faced by potato farmers of both irrigated and rain-fed regions were lack of sufficient quantity of healthy seed, lack of late blight forecast mechanism, low efficiency of mancozeb against late blight etc.

Aske 2011 revealed that higher percentage 63.33% of respondents had low social participation.

Reichert *et al.* 2012 stated that the habit of growing, family work and cooperatives organization are a common initiative in both locations, although they use different system of growing. We also found that both groups face technological, economic and environmental difficulties but supported by processes of social articulation they are alternatives to overcome them and providing conditions for potato growing.

Arulraj 2012 concluded that majority of the potato farmers (56.67%) had medium participation in extension activities.

Mukulet *al.* 2013 stated that the problem faced by the potato farmers were lower price of potato during harvesting period, price fluctuation, shortage of capital, high charge of cold storage, lack of good quality seed, perish ability of potato, poor storage, higher price inputs and lack of marketing facility etc. Proper steps should be postulated by government to puzzelout this problem. The determinations of the study will generate basic economic data on the production practices of potato. At long last it will helpful to the planners and policy makers in contriving micro or macro level policy for the enlargement of potato production in the country.

Raghavet al. 2014 found that marginal and small farmer are reluctant to use new technology because it increases the cost of production whereas relatively large farmer believe that technologies are good to them in terms of high yield, less pest and more benefits.

Peer et al. 2014 revealed that 31.5% of respondents had adopted recommended irrigation practices 5-6 numbers and 49.3% adopted right time of irrigation as per recommendation. Similarly, most had applied furrow method of irrigation. In case of intercultural practices like hoeing and earthing-up of potato 41.33 and 58.4% of respondents adopted these practices, respectively.

Singh et al. 2018 reported that majority of farmers engaged with agricultural occupation were in the age group between 31 and 45 years. They owned one or two hectares of land and belonged to schedule tribes and educated just can read only group and lived in nuclear type of family system.

Acheampong 2019 showed that access to capital mechanization and poor road network were among the main constraints that militated yam production. A majority (68%) farmer are also still using shifting cultivation in search of fertile land of yam production. The study found that farmer had poor knowledge of the pigeon pea-yam cropping system and benefits and uses of pigeon pea. Given the potential of the pigeon pea-yam intercropping system in addressing soil fertility and providing a readily available source of stakes. It would be a viable option for small holder farmer to increase and sustain production.

2.2 The knowledge and utilization pattern of Information and Communication Technology (ICT) tools

Meera et al. 2010 reported that majority (55.00%) of public extension functionaries in Tamil Nadu were regularly updating their knowledge on agricultural technologies using modern ICT tools.

Salaam and Adebore 2010 discovered that search engine were an essential electronic resource for students of private universities in Ogun state with 51(45.95%) of the total population of 111 using them very frequently.

Naiket et al. 2011 found that half of the Agricultural Assistants (50.00%) had high level of knowledge regarding audio visuals aids, whereas 26.60 and 23.40 % of the Agricultural Assistants had medium and low level of knowledge respectively.

Tunjiet al. 2011 showed that use of electronic resources recorded huge success among academic staff and they demonstrated the positive impact of the e-resources on teaching and teaching and research work. Information searching skills were interrelated with the use of electronic resources but the level of the basic personal computer skills did not play a major role in using of the these resources.

Yakubuet al. 2013 observed that all the extension agents (100%) had knowledge of radio television and telephone as ICT tools. Majority had knowledge of DVDs (99.10%), camera (98.60%), video (98.20%), computer (96.40%), printer (95.90%) and the web (93.20%).

Raghava and Punna Rao 2014 reported that majority 63.00% of the farm scientist possessed medium level of knowledge about ICTs, whereas 22.00 % of them had high level of knowledge and 15.00 % of respondents possessed low level of knowledge about ICTs.

Singh et al. 2014 found that television and mobile phones were the principal ICT tools in the study area. The frequency of use of television and mobile phone by DCS members was significantly higher in the plains than in the hills. Radio was the third option and was more frequently used by members in the hills than in plains.

Bansode and Narfide 2014 revealed that majority 76.92% of the extension personnel had more knowledge on electronic information resources, whereas 23.08 % of respondents had more knowledge and there were no respondents with no knowledge.

Madhuet al. 2015 reported that majority of the scientist 71.42% had knowledge on Krishikosh institutional repository and were using it to access the electronic information.

Ndem and Akanem 2015 revealed that male and female student in the faculty of Agriculture don't differ in their level of utilization of ICTs facilities.

Adelekeet al. 2015 found that most of the participant were advanced in the use of email (51.8%) and the Internet (47.1%) mostly acquired through self-effort (46.5%). The vast majority have used computer (95.0%) and the internet (93.6%) for more than 3 years and many (86.2%) expressed a desire for further ICT training.

Lokeswari 2016 suggested that farmers with large land can use ICT more effectively than the farmers with small land. However, it is necessary to comprehend how the farmers make use of ICTs.

Abdulrahman 2016 found that ICT was not effectively utilized in the tertiary institutions studies because of many problem.

Mavellaset al. 2016 revealed that the available ICTs are being utilized to a very low extent and it was generally agreed that the given factors are indeed the ones affecting or hindering utilization of the available resources in schools.

Lakshmi and Babu 2018 indicated that majority of extension functionaries utilizing social media platform like Gmail (97%) followed by Whatsapp (59%), facebook (55%) and youtube (47%) for sharing of information. Nearly 58 per cent of extension functionaries were using the social media platforms for sharing the information. It is also observed from the study that innovativeness (0.5103), information seeking behavior (0.6136) found to be positively significant at 0.01 level of probability.

Mtega 2018 showed that that accessibility of radio and television sets, gender based division of labour, language, number of agricultural programmes broadcasted and awareness of the broadcasting time of agricultural programmes were among the factors influencing their uses as source of agricultural knowledge.

Roy et al. 2018 revealed that majority of farmer often used mobile phone (98%) followed by TV(97%), telephone (60%), radio (57%) and internet (49%) as ICTs tools. The ranking of ICT tools used by the respondents was also done on the basis of MWS.

2.3 The knowledge and adoption level of potato production practices

Singh et al.2009 reported that higher knowledge level was in selection of soil by marginal and medium farmers, harvesting of crop by small farmers and manures &fertilizers in case of large farmers. The average knowledge level of large farmers was found highest and lowest in case of marginal farmers.

Rathod 2009 concluded that a majority (68.33 per cent)of the chilli growers had medium level of adoption regarding recommended plant protection measures, followed by high and low level of adoption with 20.00 per cent and 11.67 per cent respectively.

Jatet al. 2011 reported that majority of the potato growers had medium knowledge about the recommended cultivation practices of potato. Among the various aspects of different recommended cultivation practices, majority of the farmers had knowledge about “method of harvesting”, “grading and standardization”, “time of harvesting” , “depth of sowing”, “sowing time”, “irrigation interval”, “seed treatment”, “method of taking water samples”, “climate is suitable”, “time of application of nitrogenous fertilizer” and “time of application of phosphorus fertilizer”. Only a few farmers had knowledge regarding

“storage practices”, “dose of weedicides”, “application method of bio-fertilizer and time for application of bio-fertilizer”.

Srivastava et al. 2012 stated that regarding overall practices of potato cultivation a majority (71.3%) of potato farmers had high level of knowledge followed by 16.6 per cent and 12 per cent of potato farmers who had medium and low level of knowledge respectively.

Patel et al. 2012 reported that vast majority (95.84%) of the potato growers in study area possessed medium to high level of knowledge regarding potato production technology. As far as practice wise knowledge is concern, potato growers had inadequate knowledge about chemical means of weed control and disease control.

Patel and choudhary 2013 reported that majority of vegetables growers (85.83%) possessed low to medium level of knowledge about eco-friendly management practices.

Sharma et al. 2014 found that the level of knowledge of potato growers about recommended potato production technology, the majority of respondents who possessed the complete knowledge was found in the case of practices of field preparation, improved varieties, time of sowing, seed rate, seed treatment with fungicides, method of sowing recommended row to row spacing, depth of sowing, irrigation management, recommended dose of fertilizers, method of weed control, insect control, whereas partial knowledge was found in the case of seed treatment with culture, use of bio fertilizers, use of micro nutrients, use of weedicides, IPM, IDM and disease control.

Dwivedi 2013 reported that majority of potato growers (65.83%) had medium level of knowledge about potato production technology.

Patel and Vyas2014 stated that majority of all potato growers (65%) belonged to medium level of knowledge and technological gap category.

Peer et al. 2014 found that 31.5% of respondents had adopted recommended irrigation practices 5-6 numbers and 49.3% adopted right time of irrigation as per recommendation. Similarly, cent percent had applied furrow method of irrigation. In case of inter-cultural practices like hoeing and earthing-up of potato 41.33 and 58.4 % of respondents adopted these practices, respectively. The study further indicates that majority of potato growers (67%) had adopted manual weed control measures and only 16% adopted dehauling practice in potato.

Jotirmay and Banerjee 2014 observed that education of the farmers encourage their ability to adoption of scientific package and practice of potato cultivation. Those

potato growers who earned more were better adopter of modern production technology. Psychological attributes and communication skills had the significantly positive effect on the adoption of modern scientific technology of potato production.

Chavalet *al.* 2015 conducted that complete adoption of recommended potato practices by the cent percent potato growers were planting time, giving required irrigation to their crops and weeding before earthing-up. While, the 95.45 per cent of them adopted improved varieties of potato viz. kufrichandramukhi, kufrijyoti and kufripukhraj, 93.63 per cent were storing produce in Airan which is local method, 92.72 per cent and the 86.36 per cent of them adopted the recommended seed rate and planting distance, respectively. The 86.63 per cent followed by weeding 50-55 days after planting and the 73.63 per cent adopted application of recommended N:P:K doses. The 71.81 per cent adopted the control measures for Aphid, jassids and whitefly pest. Use of weedicides (50%) and control measure for blight disease by using fungicides (33.63%).

2.4 The impact of ICT on knowledge and adoption of potato technologies of farmers

Mittal and Tripathi 2009 reported that ICTs act as catalyst to improving farm productivity and rural incomes, the quality of information, timeliness of information and trustworthiness of information are the three important aspects that have to be delivered to the farmers to meet their needs and expectations. The study has reported many examples of the benefits created by the characteristics of mobility, customized content delivery and convenience of mobile phones. The most common benefits of ICTs has been found as a basic device of communication because for many of the farmers. It was the only convenient access to agricultural information. Increased extension services and capacity building efforts can complement information dissemination via mobile phone and associated services to accelerate the adoption of new techniques.

Ahmed and Laurent *et al.* 2009 concluded from an investigation on 150 farmers, importers and fishermen that the farmers have secured, on an average about 15% higher profit for their farms after having paid net costs. In addition, the fishermen were able to reduce the amount of spoiled fish. Moreover, an added benefit in reducing information asymmetry in the local context led the farmers to realize that there were often higher returns in producing for the local markets compared to the exports markets.

Mittal et al. 2010 conducted an investigation on 187 farmers of UP, Maharashtra, Rajasthan, New Delhi and union territory of Pondicherry in 2008 to study impacts of ICTs on agriculture and concluded that the farmer of UP and Rajasthan benefited from improved access to information included seed variety selection, best cultivation practices, protection from weather related damage handling plant disease and price realization and the Maharashtra farmers reported benefits occurring from ICTs uses including yield improvements, price realization and increased revenues through better adjustments of supply to market demand. Among small farmers almost all reported some increase in convenience, cost savings and significant gain in productivity from using mobile phones as basic communication devices to seek information. \

Aker and Mbiti 2010 concluded from a study that in West African countries mobile phone provided good facilities and access to farmers for getting the information about agriculture from near markets. However many farmers live in remote areas and they have no proper access of communication technologies in their areas. The study showed that mobile phones have given a positive impact on farmer's income.

Muto and Yamano 2011 conducted a study in Ghana to identify the impact of mobile phone and concluded that the mobile phones were used by farmers to communicate with traders and their representatives for selling their bananas in advance and negotiate with costumers and get high price. The mobile phones technologies directly good price from brokers and costumers. Farmers had another advantage of mobile phones they did not go to market but directly communicated and asked the price of their production. In this context they saved their money, time and energy.

Kefela 2011 concluded from a study in Bangladesh that farmers use mobile phones for getting the information from different markets and weather information while other communicate with agriculture experts to obtain information about the use of pesticides in their farms. The farmers directly contact with buyers and get the information about rice price and vegetables while some of them inquire about the price of coffee from international brokers countries. The use of mobile phones among farmers has played positive impact in their income. Two decades before it was very difficult for farmers to take information about their production from markets within minutes from their villages.

Siraj 2011 concluded from a study in Pakistan that ICTs were used in different sectors of the society such as health, education, rural development and in agriculture for the economic growth. The impact of ICTs was empowerment of farmer communities in rural areas which provided access to marketing information. The study also showed that the farmers communicated with buyers in different markets of cities and sold their product where they found better price of their goods and services.

Adhiguru and Devi 2012 conducted a study on 120 farmers (40 farmers from each initiative i.e. “e-chaupal” in Dhar district of Madhya Pradesh, “Helpline” in Kanpur district of Uttar Pradesh and “I-Kisan” in Knachipuram district of Tamil Nadu). The study showed the impact of ICTs on reduction in transaction cost in the case of potato and helpline services reduced transaction cost for seeking information by about 90 per cent.

Duncombe 2012 concluded that mobile phones are an important technological innovation that is increasingly impacting the lives of the poor in developing countries. These interactions have been conceptualized in relation to how the use of the phone leads to interrelated forms of substitutions, enhancements, exchange, combination and disembodiment of assets.

Vermaet al. 2013 concluded after the study of impact of IFFCO Kisan Sanchar Limited (IKSL) on 120 farmers that the extent of knowledge of mobile phones users was from 64.04% to 88.23% while in case of non-users, it was found from 44.76% to 65.05% in all major improved crop production techniques. The extent of knowledge of cell phone users and non-users was 64.03 & 88.23 to 65.05 MPS about all major improved crop production techniques. Therefore, it is included that mobile phone users respondents possessed more knowledge than the non-users of mobile phone services of IKSL.

2.5 The constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

Singh et al. 2009 found that the major constraints were high wages of labour, unavailability of newly released varieties high cost of irrigation, high price of manures and fertilizer and lack of knowledge about plant protection chemicals.

Arnejaet al. 2009 reported that majority of the farmers were small, medium farmer therefore many constraints were faced by potato growers in area of procurement

of credit 5.33 per cent of potato grower reported the problem of non-availability of credit and 16 per cent said there was less amount of credit available in the area of selection of varieties, 35.33 per cent potato growers reported the problem of non-availability of varieties resistant to diseases, availability of seed at proper time of planting is very important, 11.33 and 33.33 per cent respondents reported the difficulty of less availability and non-recommended seed availability. In the area of seed treatment, 23.33 per cent of potato growers had lack of knowledge of proper chemical and dose of chemical. They also reported that 17.33 per cent respondents faced the problem of heavy soil texture, whereas 44.66 and 34.66 per cent respondents were dissatisfied due to non-availability of fertilizer and lack in knowledge of dose, time and method of weedicide application. They furthermore reported that maximum number of problems i.e. 84.66 per cent were in area of insect-pests and disease as reported by the potato growers. Majority of the respondents (68%) showed the problem of no minimum support price fixed by government for their produce whereas 45.33 per cent respondents faced difficulty in sale of potatoes and 11.33 per cent the problem of transport facility respectively. Indicated that only 2.66 per cent respondents had the problem of non-suitability of the area and 31.33, 24.66 and 56.66 per cent of the respondents showed the unfavorable government policies, lack of technical knowledge about potato growing and awareness about marketing trends respectively.

Pandit 2010 reported that the major constraints faced by potato farmers of both irrigated and rain-fed regions were lack of sufficient quantity of healthy seed, lack of late blight forecast mechanism, low efficiency of mancozeb against late blight etc. Farmers should be made aware about the usefulness of potato technologies like new varieties such as K. Himalini etc. which possess higher degree of late blight resistance. The scheme of contract farming needs to be supervised by the state government or panchayat. Moreover, government may declare Mandi as 'seed potato zone' and Kangra as 'processing quality potato zone' and develop proper market infrastructure to upgrade the socio-economic condition of the potato farmers.

Surwanshi 2014 major constraints as reported by the potato growers in adoption of improved potato production technology were electricity problem, irregular visits of RAEOs and lack of availability of technical information from gram panchayat, less rate of potato in the market, lack of training of improved potato production technology, lack of knowledge about insect and diseases, lack of training procedures on potato

production technology, high cost of seed, fertilizer, insecticides and implements, lack of demonstration on farmers field, technical information are not available in local language, lack of information about improved varieties of potato, market is far away from the 100 village, lack of loan facilities lack of soil testing facilities, high labour charges, lack of money to purchase input agriculture material and lack of transport facilities.

Munyuliet al. 2017 found that **the** importance of constraints varied between sites (territories). Lack of access to market information, seasonal low market prices, lack of access to processing and post-harvest technologies for value addition and price fluctuation were ranked among most important constraints. However, the level of constraints varied from one study site to another. 97.1 per cent of farmers from Mabunguindicated that pests were serious problems whereas only 59.4 percent of farmer from Mulungu-Miti study site indicated pests as a big issue. Across the different study sites, farmers ranked diseases and pests as top constraints to potato production and marketing.

Raghuvanhi 2018 reported thateight major constraints were found responsible for the mismanagement of post-harvest operations. Capital unavailability was found to be the major constraints followed by inadequate storage facilities and shortage of labor experienced by 93, 92 and 88 respondents respectively.

RESEARCH METHODOLOGY

The study was conducted during the year 2019-2020 in Ayodhya district of Uttar Pradesh. The major purpose of this chapter is to deal with the various methods and procedures used with respect to the selection of area, locale of the study, sampling designs and procedure of the data collection, selection of the respondent, selection of variable under study and their empirical measurement and statistical methods employed for the analysis of the data have been discussed here as follows.

3.1 Locale of the study

3.2 Sampling designs and selection of the respondents

3.3 Selection of variables and their empirical measurements

3.4 Procedure of data collection

3.5 Statistical methods used

3.1 Locale of the study:

The present study was conducted in Milkipur block of Ayodhya district of eastern part of Uttar Pradesh.

3.1.1 Selection of the district:

Ayodhya district was selected purposely for the study to understand the ground reality with respect to the issues in village around the university and familiarity to researcher. Ayodhya district is located in eastern plain zone of Uttar Pradesh. The major problem of poverty, unemployment is seen in this area. Another consideration for selecting this district was the close familiarity of investigator with its area, people, officials, non-officials and local dialect which enabled investigator to carry out the work more efficiently.

Ayodhya district is situated at 26.50⁰ N latitude and 81⁰ E longitudes. Its total geographical area is 4,511 square kilometers. It has five Tehsils, namely, Ayodhya, Milkipur, Bikapur, Sohawal, and Rudauli, and 11 Community Development Blocks, viz, Sohawal, Masodha, Bikapur, Milkipur, Purabazar, Amaniganj, Harintaganj, Tarun, Rudauli, Maya bazar, Mavai.



Fig. 1 Map of Ayodhya district of Uttar Pradesh

3.1.2 Selection of the block:

Out of the 11 community development blocks of Ayodhya district, the Milkipur block was selected purposely for this study, because it was nearest to A.N.D.U.A.T. Kumarganj, Ayodhya and researcher is familiar with the local language, socio-economic and cultural condition, which helped in rapport building and authentic data collection. The location of the block and its villages is presented in fig 2.

Community development block Milkipur was established in the year 1962. This is a post stage block according to block settlement record. The block has been divided in to six villages Development officers (VDOs) circle for effective implementation of development programmers. The block has 10 Nyay Panchayat namely Inayat Nagar, Dobhiyara, Gokula, Alipur Khajuri, Kuchera, Tendha, Sariyanwan, Kurawan, Sidsid, and Milkipur with 69 Gram Panchayat and 113

villages with cover a total geographical area of 4511 square kilometers. The total population of the block according to (2011) census was 192651 (96,979 male and 95,672 female) among them 65,071 males and 46,427 females were literate. From literacy of point view male literacy 64% and female literacy 34% respectively. (Census 2011)

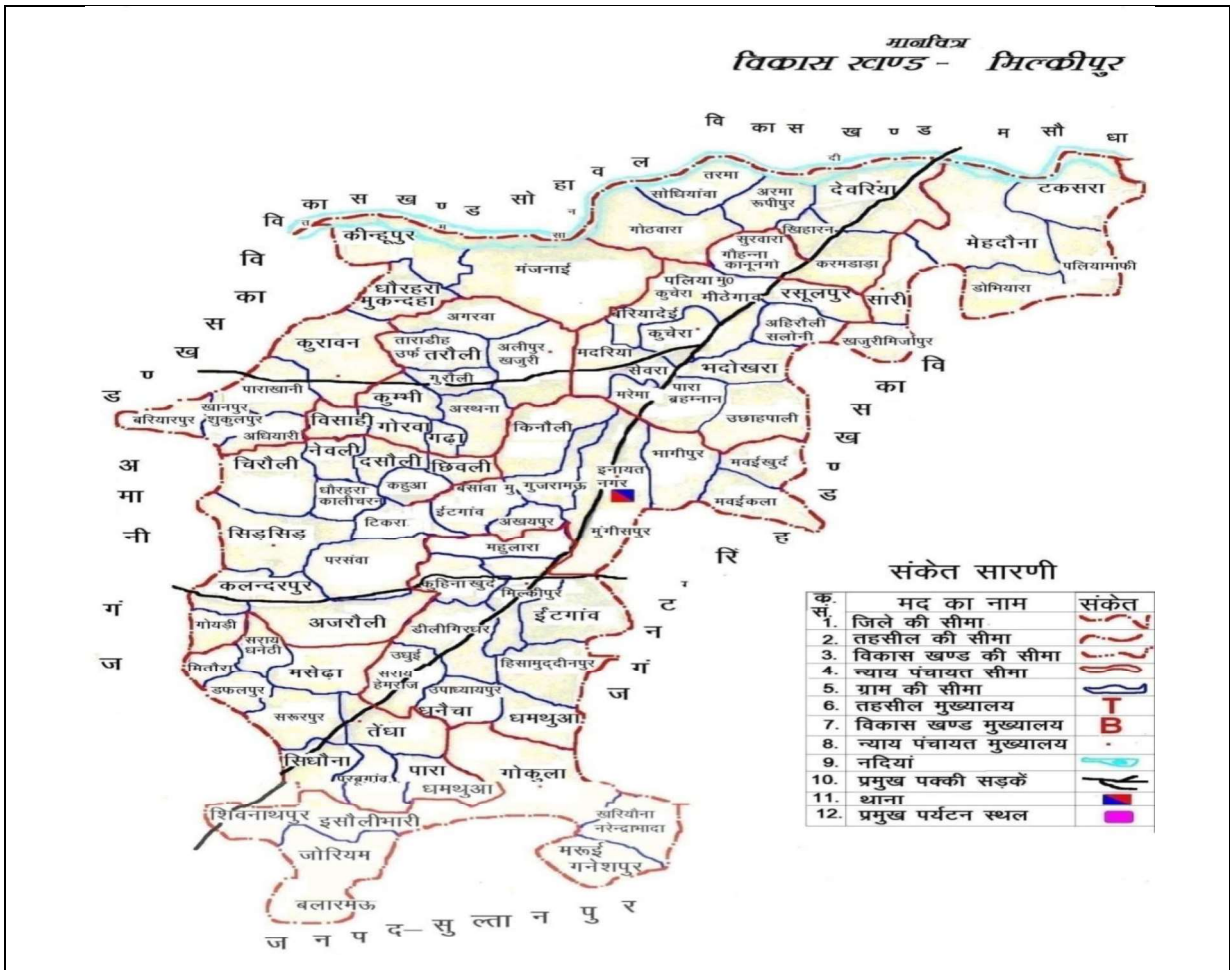


Fig. 2 Map Milkpur block of Ayodhya district

3.1.2.1 Location:

The Milkpur block is located in the southern part of the Ayodhya district which is situated at 26.49° N latitude and 82.12° E longitudes and at altitude of 113 m² above the mean sea level. The block head quarter is situated at the distance of 27 KM away from district head quarter and 13 KM from the main campus of Acharya Narendra Deva University of Agriculture and Technology Kumarganj Ayodhya.

3.1.2.2 Topography:

The area of block is well leveled except some low lying packets lacking with drainage facilities. This makes kharif cropping pattern rather precarious.

3.1.2.3 Soil:

The soil of this area is mostly sandy loamy in nature. The soils found throughout the block are mainly of four types.

1. Sandy loam soil.
2. Loam soil.
3. Clay loam soil.
4. Clay soil.

3.1.2.4 Climatic conditions:

This region falls in the sub-tropical part of U.P. where summer is moderate to every hot & dry and the winter is sufficiently cold. The following table reveals the temperature ($^{\circ}\text{C}$) and rainfall (mm) of different months as recorded for current agricultural year *viz.*, 2019-2020.

(a) Temperature:

The following table depicts the maximum and minimum temperatures at different months as recorded for the agricultural year.

(b) Rainfall:

The following table shows the rainfall as it rained during different months for the agriculture year,

Table-3.1: The minimum and maximum temperature ($^{\circ}\text{C}$) and rainfall of Milkipur block from Jan. 2019 to Dec. 2019 year

So. No.	Month	Temperature ($^{\circ}\text{C}$)		Rainfall (mm)
		Minimum	Maximum	
1.	January	3.00	25.50	----
2.	February	5.00	25.50	---
3.	March	6.00	37.50	20.15

4.	April	14.00	43.00	35.12
5.	May	21.00	44.00	69.10
6.	June	23.50	44.50	215.15
7.	July	23.00	37.00	10.00
8.	August	24.50	35.00	20.00
9.	September	22.00	34.00	--
10.	October	16.50	34.00	---
11.	November	13.50	31.00	---
12.	December	10.50	28.50	---

Source: Agricultural Meteorology Department of Acharya Narendra Deva University of Agriculture and Technology Kumarganj Ayodhya (Jan. 2019 to Dec. 2019 year)

Table 3.2: The particulars of land utilization pattern are as follows:

So. No.	Land utilization pattern	Area (ha.)
1.	Total geographical area (ha.)	21601
2.	Cultivated area (ha.)	13880
(a)	Irrigated area (ha.)	9539
(b)	Unirrigated area (ha.)	4341
3.	Uncultivated area (ha.)	7721
(a)	Area under forest (ha.)	240
(b)	Area under permanent posture (ha.)	179
(c)	Area under user land (ha.)	201
(d)	Area under pond, canal, and water logged (ha.)	210
(e)	Area under parti land (ha.)	2922
(f)	Area under trees and industries in hectare.	1259

Source: Community Development Block Milkipur, Ayodhya – 2015

Table 3.3: Distribution of farmers on the basis of size of land holding in Milkipur block:

So. No.	Area (ha.)	Number of farmers	Area under possession (ha.)
1.	Marginal (Below 1 ha.)	19051	19144
2.	Small (1.0 to 2.0 ha.)	3367	5782
3.	Medium (2.0 to 4.0 ha.)	751	6234
4.	Large 4.0 ha. And above)	441	7018

3.1.2.5 Irrigation Source:

Source of irrigation as available in the block are canals, well, tube well, ponds, diesel pumping set government electric tube well etc. from all these sources, an area of more than 9539.00 hectares is irrigated, which has been shown in table.

Table-3.4 Irrigation source of Milkipur block, Ayodhya.

So. No.	Source of irrigation	Number	Area covered
1.	Wells	NA	NA
2.	Tube well (electric) private	1470	11841.00
3.	Diesel pumping set	6570	
4.	Ponds	NA	NA
5.	Canal	1	3031.00
6.	Others govt. electric tube well	67	3015

Source: C.D. Block Milkipur, Ayodhya – 2015

Table-3.5 Major crops rotation which are commonly followed by the farmers in Milkipur block

S. No.	Crops rotations	Duration
1.	Paddy-Wheat	One year
2.	Jawar-Wheat	One year
3.	Paddy pea	One year
4.	Maize-lahi-wheat	One year

5.	Fallow-Potato-MP Chari	One year
6.	Maize-Potato-Sugarcane	Two years
7.	Jawar-Potato-Wheat	One year
8.	Paddy-Pea-Sugarcane	Two years
9.	Paddy-Sugarcane-Ratoon	Three years
10.	Jawar + Arhar-Paddy	One year

Table-3.6 Existing agencies which are running at block level

So. No.	Agencies	Number
1.	Bank (Nationalized)	07
2.	Cooperative bank	01
3.	Cooperative society	06
4.	Regional Rural Bank	01
5.	Seed store	06
6.	Agriculture Department	01
7.	Fertilizer store (Private)	05
8.	Fertilizer store (Government)	01
9.	Veterinary Hospital	02
10.	Agricultural Plant Protection Unit	01
11.	Artificial Insemination Centers	02
12.	Primary Health Care Centers	01
13.	Family and maternal welfare centers	01
14.	Family and maternal welfare sub-centers	21

Source: Census survey 2011 and C.D. Block Milkipur, Ayodhya - 2015

3.3.1: Selection of the villages:

For selecting the villages, a list of all the villages in Milkipur block was prepared and five villages were selected randomly. The villages selected for the study were Taksara, Madriya, Rajaupur, Mavai kala and Sariyawan.

Table 3.7 General information of the villages under study:

So. No.	Villages selected for the study	General information				
		Name of the Gram Panchayat	Name of the Post office	Name of the Block	Thana	Tehsil
1.	Taksara	Taksara	Sahganj	Milkipur	Inayatnagar	Milkipur
2.	Madriya	Kuchera	Kuchera	Milkipur	Inayatnagar	Milkipur
3.	Rajaupur	Barun	Barun	Milkipur	Kumarganj	Milkipur
4.	Mavai kala	Mavaikala	Mavaikala	Milkipur	Kumarganj	Milkipur
5.	Sariyawan.	Sahulara	Milkipur	Milkipur	Inayatnagar	Milkipur

3.3.2: Selection of the respondents:

The list of all the villages in the selected block was prepared and a list of farmers according to their farm size was prepared and categories according to farmer's category viz. small marginal, medium, and large. Then total of 120 respondents were selected through proportionate random sampling technique.

Table-3.8 SAMPLING DESIGN FOR RESPONDENTS SELECTION

S. No.	Unit	Particulars	Sampling design						
1.	District	Ayodhya ↓	Purposive						
2. A.	Block (11)	Masaudha*, Bikapur*, Amaniganj*, Tarun*, Milkipur*, Maya Bazar*, Hastinganj*, Sohawal* Pura Bazar*, Rudauli*, Mavai*							
	Sample block (01)	Milkipur							
	Villages	113 Villages							
	Sample Villages		Taksara	Madriya	Rajaupur	Mavai kala	Sariyawan.	Total	
	Marginal + Small (Up to 2 ha.)		P	P	P	P	P	P	S
	Medium (2.1 to 4.0 ha.)		312	247	215	238	262	1274	64
	Large (4.1 ha. to above)		109	88	92	102	115	506	41
	Total		450	352	321	352	393	1868	120

3.3 Selection of variables and their measurements:

The variables were selected according to the objective of the study. The selected variables were categorized into the independent and dependent variables. The variables along-with the statistical instruments used for measuring them are given below in tabular form.

Table-3.9 Variables and their empirical measurements

A	Independent variables	Measurements
1.	Age	Chronological age class development
2.	Education	Developed by Trivedi and Pareek (1964) with suitable modification.
3.	Caste	As per government notification
4.	Sex	Government notification.
5.	Family types	Scale developed by Trivedi and Pareek (1964) with suitable modification.
6.	Family Size	Socio-economic scale (Rural) 1964 developed by Trivedi and Pareek with some modifications
7.	Housing Pattern	Socio-economic scale (Rural) 1964 developed by Trivedi and Pareek with some modifications
8.	Land Holding	As per government norms
9.	Occupation	Socio-economic scale (Rural) 1964 developed by Trivedi and Pareek with some modifications
10.	Annual income	Socio-economic scale (Rural) 1964 developed by Trivedi and Pareek with some modifications

11.	Socio participation	Socio-economic scale (Rural) 1964 developed by Trivedi and Pareek with some modifications
12.	Contact with information sources	07 point scale to be used
13.	Material possession	Structured scheduled
14.	Scientific Orientation	Scale used as developed by Supe (1969)
15.	Economic motivation	Scale developed by Supe (1969) with suitable modification.
16.	Risk Orientation	Scale developed by Supe (1969) with suitable modification
B.	Dependent variables	Measurements
1.	Knowledge about ICT tools	Index to be developed
2.	Utilization pattern of ICT tools	Index to be developed
3.	Knowledge level of farmer about potato cultivation	Procedure followed by Anastasi (1961)
4.	Adoption level of farmers about potato cultivation	Procedure followed by Sengupta (1967) to be used.
5.	Effect of ICTs tools on knowledge and adoption of potato production	Index to be developed
C.	Constraints	Open ended response
D.	Perceived suggestionsdo.....

A. Independent variables

The personal, social, economical, communication and psychological profile of respondents were age, education, caste, family type, family size, housing pattern, land holding, occupation, annual income, social participation, extension contact with source of

information, material possession, scientific orientation and Economic motivation were selected for investigation. Measurement procedures adopted to measure these variables are given below.

3.3.1 Age:

It is operationally defined as number of years completed from the date of birth by the respondents at the time investigation. Age of an individual is thought to influence knowledge and attitude of the respondents regarding agricultural government scheme. In the present study, age is referred to the chronological age of respondents. The respondents were grouped into three categories by mean \pm standard deviation as follows.

Education:

Education is the process of bringing desirable change in the behavior of individual. Education is operationalized as the formal education completed by an individual beneficiary. Formal education of the agricultural scheme beneficiaries was considered for knowing his educational standards. The respondent education can have a bearing on the knowledge and understanding about agricultural government schemes. It was measured in terms of standard completed in formal school passed by the respondent formers and considered the score such.

On Basis of educational qualification, they were grouped into six classified as below.

S. No.	Category	Score
1.	Illiterate	0
2.	Primary School	1
3.	Middle School	2
4.	High School	3
5.	Higher Secondary School	4
6.	Under graduate & Post graduate	5

3.3.3 Caste:

It refers to the caste of farmers as defined by the constitution of India as hereditary indigenous group having traditional association with an occupation and a particular position in the hierarchy of the caste. The respondents have been divided into four categories as below.

S. No.	Category	Score
1.	Schedule Tribe	1
2.	Scheduled caste	2
3.	Other Backward Class	3
4.	General caste	4

3.3.4 Type of family:

It refers to the type of family system of individual respondents at the time of investigation, whether the family is nuclear or joint. The respondents were categories into two groups and score 2 for joint and 1 for nuclear was assigned.

3.3.5 Family size:

It refers to the number of persons living with the respondents, the farmers were classified with the help of household scale developed by Trivedi and Pareek (1964) the respondents were categorized into three group based on the basis of mean \pm standard deviation. The score for big size of family member (9 to above), two score for medium size of family member (5 to 8) and one score for small (up to 4) size of family member as below.

S. No	Category	Score
1.	Small (Up to 4)	1
2.	Medium (5 to 8)	2
3.	Large (9 to above)	3

Mean= 5.97,

S. D. = 2.53

3.3.6 Housing pattern:

It refers to the types of house owned by the respondents in terms of its construction i.e. Hut, Kachcha, Semi-Pucca / mixed & Pucca. Hut refers to the construction of wood or metal. Kachcha refers to mud house, mixed refers to a house that is made of mud and partly of bricks and cement. A pucca house refers to one that is can constructed with bricks and cement. The scores assigned to hut, kachcha, mixed and pucca houses were 1, 2, 3, and 4, respectively.

3.3.7 Land holding:

Land holding operationally defined as the number of hectares of total land possessed by the respondent farmers. It includes irrigated, rained and fallow land possessed by respondents. The respondent farmers were formed into four categories according to standard classification of land holding possessed by farmers as below.

S. No.	Land Holding	Area (ha)
1.	Marginal farmer	(Up to 1ha.)
2.	Small farmer	(1.1 to 2 ha.)
3.	Medium farmer	(2.1 to 4.0 ha.)
4.	Large farmer	(Above 4.1 ha.)

3.3.8 Family Occupation:

The occupation of the respondents’ families was worked out on the basis of enterprises which contribute more than 50 per cent share in the total income as main and below 50 per cent that as subsidiary occupation. Occupation of the respondents’ families was categories into following categories and scores assigned as given in brackets; Agriculture labour (1), Caste-based occupation (2), Service (3), Agriculture & Animal husbandry (4), Business (5), and Agro-based enterprises (6), subsidiary occupation the same pattern was used.

3.3.9 Annual income:

Annual income operationally defined as the gross income of family of the respondent farmers in terms of rupees from all sources by the entire family member in a year was considered as score. The respondent farmers were grouped into four classes on the basis of equal interval method as below.

So. No.	Category	Income in rupees
1.	Low	up to 1 lac
2.	Medium	1 - 2 lac
3.	Medium- High	2 - 3 lac
3.	High	Above 3 lac.

3.3.10 Social participation:

It refers to association of respondents with any formal and informal organization and their involvement in its activities, either as a member or its office bearer was considered as social participation. Social participation of the respondents was measured through scale developed by Trivedi and Pareek (1963). The various categories and scores assigned are given in brackets: According to total score obtained by the respondents were grouped into following four categories ad below.

S. No.	Categories	Score Range
1.	No member in any organization	0
2.	Member of one organization	1
3.	Member of two organizations	2
4.	Member in more than two organizations / office bearer in any organizations	3

3.3.11 Extension contact with information sources:

To study the information sources utilization pattern (ISUP), the availability and contact pattern were included. So far as the contact of the respondents with each

information source is concerned, each source and 0, 1, 2, 3, 4, 5, 6, scores were assigned to them, respectively. A rank order was placed was measured on 6 points continuums (never, yearly, half yearly, quarterly, monthly, fortnightly, weekly and daily to them for interpretation.

3.3.12 Materials possession:

A. Farm power:

The farm power materials included under study with their scores in parenthesis were bullock (1), Electric motor, Power tiller, Tube well and pumping set (diesel engine) (2), Tractor (3), respectively.

B. Agriculture Implements:

The scores assigned to various farm materials with the respondents were, Deshi plough, Kudal, kurpi sickle, chaff cutter and pata (1), sprayer, duster, ditcher (2), disc plough, cultivator, rotavator, thresher, seed drill, (3), respectively.

C. Transportation materials:

The scores were assigned to various transportation sources like bullock cart and cycle (1), bike/scooter, E-rickshaw (2), Jeep/car, pick-up, tractor trolley (3) and truck, bus (4) given, respectively.

D. Household materials possession:

The scores assigned to various household materials with their scores in parenthesis were viz., double bed, sofa set, dining table, dressing table, chair, cots (1), pressure cooker, crockery, smokeless chulha, gas cylinder (2), fan, cooler, solar light, heater, sewing machine, electric press, Induction chulha (3), respectively.

E. Communication media possession:

The scores were assigned to various sources of communication with their scores in parenthesis were viz, agriculture journal, news-paper, magazines, agriculture books (1), T.V, radio, mobile, computer, laptop, D.T.H, internet (2), respectively.

3.3.13 Scientifics orientation:

It is the degree to which a farmer is oriented to use of in scientific technique or method in knowledge, attitude and involvement in govt. schemes for agriculture production. The scale developed by Supe (1969) was used for measuring the scientific orientation consisting of six statements with modifications which were all positives. The scale was administrated on five points scale viz., strongly agree, agree, undecided, disagree and strongly disagree. The scores were assigned as 5, 4, 3, 2, 1, respectively for all the statements. The maximum possible scores were 30 and minimum possible scores were 6. The respondents were categorized into three categories; low, medium and high on the basis of total scores obtained by the respondents, such as following procedure are given below.

S. No.	Category	Range
1.	Low scientific orientation	Less than Mean-S.D.
2.	Medium scientific orientation	Between Mean \pm S.D.
3.	High scientific orientation	More than Mean + S.D.

3.3.14 Economic motivation:

Economics motivation of the respondent about agricultural development scheme was measured with the help of responses given by the respondents obtained against agreement or disagreement. The scale developed by Supe (1969) was used for measuring the economic motivation consisting of six statements with modifications which were all positives. The scale was administrated on five points scale viz., strongly agree, agree, undecided, disagree and strongly disagree. The scores were assigned as 5, 4, 3, 2, 1, respectively for all the statements. The maximum possible scores were 30 and minimum possible scores were 6. The respondents were categorized into three categories low,

medium and high on the basis of total scores obtained by the respondents, such as following procedure are given below.

S. No.	Category	Range
1.	Low economic motivation	Less than Mean-S.D.
2.	Medium economic motivation	Between Mean \pm S.D.
3.	High economic motivation	More than Mean + S.D.

3.3.15 Risk orientation:

The scale developed by Supe (1969) was used for measuring the risk orientation consisting of six statements with modifications in which five were positive and one was negative. The scales administrated on five points scale viz., strongly agree, undecided, disagree and strongly disagree. The scores were assigned as 5, 4, 3, 2 and 1, respectively for all positive statements and 1, 2, 3, 4 and 5, respectively for negative statement. The respondents were categorized into three categories such as low, medium and high following the procedures of mean-SD, mean \pm SD and mean+SD, respectively.

B. Dependent variables:

The dependent variables in the present study were knowledge, attitude and involvement pattern. The operationalization of dependent variables and categorization have been presented as below.

3.3.16 Knowledge extent about potato production technologies

For the purpose of the study, knowledge was defined as the awareness, behavior of scientific technology was measured by knowledge test used in the study knowledge about the government scheme for agriculture, developed by the investigator and used. The modification in the existing knowledge test was in relation to items regarding scientific technology in crop rotation.

All the questions in the knowledge test were dichotomized having correct/incorrect. If the answer was ‘correct’ the respondent was assigned a score of one and if the answer was ‘incorrect’ the respondent was assigned as score of zero.

$$\text{Knowledge extent} = \frac{\text{Number of scores obtained}}{\text{Number of possible scores}} \times 100$$

The study was carried on knowledge and adoption of crop rotation among. The range of score obtained by the respondent might vary in low, medium and high range in the knowledge test which indicate the knowledge level of the respondent. It was categorized into three categories according to means \pm SD respectively.

S. No.	Category	Range
1.	Low level knowledge	Less than Mean-S.D.
2.	Medium level knowledge	Between Mean \pm S.D.
3.	High level knowledge	More than Mean + S.D.

3.3.17. Adoption extent about potato crop

Adoption of recommended potato crop will be measured by means of ‘Adoption intensity index.’ This procedure was followed for ten selected particulars under study.

It was viewed for the study of extent of adoption new agricultural technology. The adoption of farm practices by individual farmers, however, is a topic which has large number of studies. The procedure followed by Narayan Swamy (1995) with slight modification was used to assess the adoption of potato crop production.

The extent of adoption potato crop production was worked out for individual respondent for all the particulars. This procedure was applied for all the 120 respondents to get individual extent of adoption on the basis of ‘adoption intensity index’. All the statement in the adoption extent were dichotomized having for ‘most/somewhat/least/nil’ and scores were assigned as 3, 2, 1 and 0 respectively. It was categorized into three categories viz..., (i) mean–SD, (ii) means \pm SD (iii) mean + SD, respectively.

3.3.18 Utilization extent of ICTs tools:- The utilization extent of ICTs tools was measured by on 8 point continuum (No, Yearly, Half yearly, quarterly, forth nightly, weekly and daily) and 0,1,2,3,4,5,6 and 7 were assigned, respectively.

3.3.19. Constraints:

Constraints refer to the items of difficulties faced by farmers in particulars schemes or project. The respondents were asked to mention their views about constraints faced under agricultural development scheme. The responses about constraints were obtained, they were summed up. Lastly, responses were converted into frequency and percentages.

3.3.20. Suggestions:

Suggestions were secured from the respondents to overcome constrains experiment by them in knowledge, attitude and participation in government schemes for agriculture development the suggestion of were grouped and percentage of suggestions were worked out. The suggestive measures were recorded as perceived by the respondents at the time of investigation and frequency distribution was done accordingly.

3.4 Data collection procedure:

A structured schedule for data collection was designed and exercises by interviewing with few respondents for pretesting. Then the suitable modification was made according to need of this study. Thereafter, the data were collected from the respondent farmers, through personal interview method.

3.5 Statistical methods used:

The percentage, average, S.D. and correlation coefficients 'r' were used for making simple interpretation.

3.5.1 Percentage (%):

The frequency of a particular cell was divided by the total number of respondents or (MPS) in that particular category and multiplied by 100 for calculating the percentage.

3.5.2 Average (\bar{X}):

The average (\bar{X}) was calculated by adding the total scores obtained by the respondents and divided it by the total number of respondents using the following formula:

$$(\bar{X}) = \frac{\sum X}{N}$$

Where,

\bar{X} = Average or mean

$\sum X$ = Total number of scores obtained by respondents

N = Total number of respondents

3.5.3 Standard deviation (σ):

S.D. is the square root of mean of the squares of all deviations, the directions being measured from the arithmetic mean of the distribution.

It is commonly developed by symbol (σ).

$$\text{S.D. } (\sigma) = \frac{\sqrt{\sum d^2}}{n}$$

Where,

σ = Standard deviation

d = Deviation of variables mean

n = Total number of items

3.5.4 Correlation coefficient (r):

The coefficient of simple correlation r is a measure of the mutual relationship between two variables that is i.e. x and y , where relationship is measured and commonly termed as product moment correlation coefficient and is computed by the following formula:

$$r = \frac{\sum (x_i - \bar{X})(y_i - \bar{Y})}{\sqrt{\sum (x_i - \bar{X})^2 \sum (y_i - \bar{Y})^2}}$$

Where,

r = correlation coefficient

x_i = i^{th} value of x variables

(\bar{X}) = mean of x

Y_i = i^{th} value of y variables

\bar{Y} = mean of y

CONCEPTUAL FRAME WORK

This chapter deals with the conceptual frame work of variables related to the study under taken is as follows:

Age:

It refers to the chronological age of the respondents in number of years completed by the respondents of the time of interview.

Agriculture:

It is the branch of science which deals with the cultivation of crops, animal rearing and farm management.

Annual income:

It refers to the total income in rupees earned by the respondent from all sources in a particular year.

Below Poverty Line:

Below poverty line (BPL) has been pegged at about Rs.27000 per annum. In India if an annual income of a person is less than Rs. 27000 then the person belongs to below poverty line (BPL).

Bibliography:

List of books or other written materials placed for reference after a piece of academic writing or appearing as a separate publication.

Block (Kshetra Samiti):

A block is the unit of planning and development. This is an administrative means for taking the problems of rural people in their entirety in a concerted and coordinated manner and undertaking the developmental activities for the betterment of rural masses.

Caste:

Caste is a permanent type of social stratification of the society into higher and lower categories. There stata viz., general caste, schedule caste and backward caste were taken in the study.

Category:

A class, group of type based on some traits.

Communication:

Communication is a process by which two or more persons exchange their ideas, facts, feelings and impressions in a way that each gains a common understanding of meaning, content and use of the messages.

Communication media possession:

These are the means by which information or knowledge is passed from one group or individual to another.

Constraints:

Problems or hurdles faced by the individuals in carrying out assignments successfully.

Data:

Data are defined as facts, figures either known or available informations.

Economic motivation:

It means that the individual is oriented towards achievement of the maximum economic yield such as maximization of farm profit.

Education:

It refers to the level of formal education obtained by the respondents.

Family:

All members of youth who live together under one root and one man's guidance. They eat together and share responsibilities in the interest of their family members.

Family size:

It refers to the total number of persons living in a family.

Family type:

It is of two types *viz.*, single family and joint family. In a single-family system, the father, mother and their unmarried children and considered while in a joint family system, the members of two and three generations along with relatives and servants live together unclear one roof with common fooding system.

Illiteracy:

It refers to the inability of a person to read and write.

Illiterate:

The term illiterate is used to designate a person who can not read and write the figures and has attained no formal schooling or its equivalent degree/diploma and certificates etc.

Information:

Information is difference in matter energy that effect uncertainty in a situation where a choice exists among a set of alternatives. So, information is something which reduces uncertainty.

Interview:

Interviews are conducted with selected individual respondents. Interviewing a number of different people on some topic shale quickly reveal a wide range of opinions, attitude a strategy.

Knowledge:

Knowledge is a familiarity, awareness, or understanding of something, such as facts, information, descriptions or skills, which is acquired through experience or education.

Land utilization pattern:

Land utilization means the management and moderation of wild lands and the land which were not used before, in such a way to make it appropriate for living or for industrial usage.

Locale:

The place, environment or setting where a particular event or the action happens.

Materials possession:

Operationally defined as the general material, possession by the respondents including recreational, farm implements, machines domestic materials, communication and transportation materials.

Mean (\bar{X}):

A measure of central tendency, the some of all sources divided by their number, more popularly known as arithmetic mean. It is indicated by the sign (\bar{X}).

Message:

A message is the information, a communicator wishes his audience to receive, understand, accept and act upon.

Objectives:

Objectives are expressions of the ends towards which our efforts are directed.

Household: A group of person normally living together taking food from common kitchen.

Occupation:

The main occupation is that which generates income more than 50% while, the subsidiary below of that.

Participation:

Subsidiary action unit involves physical appearances.

Percentage:

Percentage is usually used to arrive at a measure of the ratio of one quality to another.

Performance:

Way of action, the individual does with regard to his task/ assignment.

Preference:

Act of preferring any object to undertake in action.

Probability:

As estimated of the like hood that a particular thing or event will occur.

Purposive sample:

A type of non probability sample in which the elements to be included in the samples are selected by the researcher on the basis of special characteristics or topicalities of the respondents.

Random sampling:

The process in which all combinations of units of population have an equal change of being selected for investigation.

Range:

A measure of dispersion, a difference score obtained by subtracting the smallest score from the largest score in distribution.

Rank order:

Listing of pupils in order or merit.

Reference:

Note in a publication referring the reader to another passage source person who supplies a recommendation for some who supplies a recommendation for some seeking employment or an introduction.

Respondents:

People who have answered the questions asked by an interviewer is a social survey. They are the people from who by social researchers usually obtained data requested for their research work.

Risk orientation:

It refers to degree of which the respondents are oriented towards the risk uncertainty and has courage to face the problems.

Adoption:

Adoption is a decision to make full use of an innovation as the best course of action available. Adoption is essentially a decision-making process.

Rural:

Areas of low population density small absolute size, and relative isolation, where the major economic base was agricultural production and where the way of life of the people way reasonably homogeneous and differentiated from that of other sectors of society, most notably the “city”.

Sample:

A part of population consisting of one or more sampling units selected and examined as representative of the whole population.

Schedule:

Schedule is the name usually applied to a set of questions which are asked and filled in by the investigator in a face-to-face situation with another person.

Scientific orientation:

Scientific orientation means broadening the outlook of the people so that they may think logically and rationally and utilizes the scientific knowledge properly in agriculture replacing the outdated and inelegant practices by advance techniques.

Size of land holding:

It refers to the possession of land in hectares/acres by respondents.

Material possession:

Operationally defined as the general material possessed by the respondents including recreational, farm implement, machine, domestic materials, communication and transport.

Social participation:

Degree of involvement of individual in a social organization as a member or as office bearer.

Source of information:

It refers to the objects through which sample respondents get informations about package of practices activities about potato farming and undertaken by them

Standard deviation:

A measure of dispersion which is square root of the sum of squared deviations of each score from the mean divided by the total number of scores.

Status:

The status is the position of an individual in the group or society which he occupies by virtue of this belonging to a sex, age, birth, being married, physical abilities possessed, achievements and designated duties.

Technology:

It refers to the application of knowledge for human. It is the tangible and intangible out come from science which is used with a view to facilitate and benefit of the users.

Variables:

A variable is the description of the characteristics of a group of individuals which when measured can present more than one numerical value. Variables are of two types as follows.

1. Dependent variable:

The variable whose value is influenced or is to be predicted is called dependent variable.

2. Independent variable:

The variables which influence the value are used for prediction is called independent variables.

RESULTS AND DISCUSSION

The findings and inferences drawn in respect to the specific objectives of the study on the basis of analysis by using relevant statistical techniques have been presented in this chapter.

The findings of the study have been divided and discussed into following sub-heads:

- 5.1 Social, economical, communication and psychological profile of the potato farmers
- 5.2 Knowledge and adoption extent of potato production practices
- 5.3 Knowledge and utilization pattern of Information and Communication Technology (ICT) tools
- 5.4 Effect of ICT on knowledge and adoption of potato technologies of farmers
- 5.5 Constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

5.1 Social, economical, communication and psychological profile of the potato farmers

Age composition:

Table-5.1.1: Distribution of respondents on the basis of age:

N=120

S.No.	Age Categories (Years)	Respondents	
		Number	Percentage
1.	Young (Up to 40)	17	14.16
2.	Middle (41-65)	59	49.16
3.	Old (65 and above)	44	36.67
Total		120	100.00

Mean = 54.11, SD = 12.79, Min. = 28, Max. = 82

The Table 5.1.1 indicates that the majority of the respondents (49.16%) were observed in the category of 40-60 years of age followed by (36.67%) and (14.16%) for above 61 and up to 39 years of age, respectively. It means that the majority of the farmers fall in the category of 40-60 years of age.

Education:**Table.5.1.2: Distribution of respondents on the basis of education**

N=120

S.No.	Categories	Respondents	
		Number	Percentage
A)	Illiterate	15	12.5
B)	Literate	105	87.5
1.	Primary School	10	8.33
2.	Middle School	21	17.5
3.	High school	26	21.67
4.	Intermediate	34	28.33
5.	Graduate and above	14	11.67
Total		120	100.00

It is imparted from the Table-5.1.2 that the literacy percentage of respondents was observed 87.5% and illiteracy percent 12.5 per cent. Further, the education standard of literate respondents in ascending order was found as 8.33% primary school, 11.67% Graduate and above, 17.5% Middle School, 21.67% High School and 28.33% Intermediate. Hence, it can be reasoned out that the majority of respondents (87.5%) were literate. The literacy rate of the respondents was higher compared to Ayodhya district (Total-68.7%, Male-78.10%, Census-2011) and Milkipur block (Total-68.16%, Male-79.51%, Census-2011).

Caste:**Table.5.1.3: Distribution of respondents on the basis of caste**

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	General caste	41	34.16
2.	Backward caste	62	51.67
3.	Scheduled caste	17	14.16
Total		120	100.00

The table-5.1.3 indicates that little higher than half of respondents (51.67%) were belonged to backward caste while the general caste and scheduled caste were 34.16 per cent and 14.16 per cent, respectively. Thus, it may be said that the backward caste was dominant in the study area.

Type of family:

Table.5.1.4: Distribution of respondents on the basis of types of family

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Nuclear/Single family	39	32.5
2.	Joint family	81	67.5
Total		120	100

The Table-5.1.4 indicates that 67.5 per cent respondents were observed residing in joint family system as against nuclear family i.e. 32.5 per cent. Hence, it pointed that joint family system is dominantly prevailing in the study area.

Family size:

Table.5.1.5: Distribution of respondents on the basis of size of family

N=120

S.No.	Categories (members)	Respondents	
		Number	Percentage
1.	Small (up to 6 members)	26	21.66
2.	Medium (7-14 members)	79	65.83
3.	Large (15 and above)	15	12.50
Total		120	100

Mean = 10.53

SD = 4.28,

Min. = 3,

Maximum = 20

It is evident from Table-5.1.5 that 65.83 per cent respondent families were observed such who had 7 to 15 members followed by 21.66 per cent families up to 6 members and 12.5 per cent respondent's families were found having 16 and above members in the families. The average member of family was observed to 10.53. The range between minimum and maximum number of family member was recorded from

3 to 20. More number of family members might be due to dominance of joint family system in the area.

Housing pattern

Table.5.1.6: Distribution of respondents on the basis of housing pattern

N=120

S.No.	Housing pattern	Respondents	
		Number	Percentage
1.	Kachcha	22	18.33
2.	Mixed	37	30.83
3.	Pucca	61	50.83
Total		120	100

It is the apparent the data given in Table-5.1.6 the more than half of the respondents (50.83%) were found having their houses of pucca type followed by mixed type (30.83%) and kachcha type (18.33%), respectively. It focuses that the village residence are becoming economically sound day by day which has enabled them to convert their houses in pucca house.

Size of land holding

Table.5.1.7: Distribution of respondents on the basis of land holding

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Marginal (Below 1 ha.)	34	28.33
2.	Small (1 to 2 ha.)	30	25.0
3.	Medium (2 to 4 ha.)	41	34.16
4.	Large (4 ha. and above)	15	12.50
Total		120	100.00

Mean = 2.25, SD = 1.70, Min. = 0.25, Max. = 8

The Table 5.1.7 indicates that the more respondents (34.16%) were found in the land holding category *i.e.* medium farmers (2 to 4 ha.) and 28.33 per cent respondents found in marginal farmers (below 1 ha.). The small (1 to 2 ha.) farmers were found having 25.0 per cent and large (4.0 ha. & above) farmers found having 12.5 per cent. In this study. The average land holding of the respondents was found to be 2.25 ha. The minimum and

maximum landing holding was 0.25 ha. & 8 ha. Hence, it may be concluded that the mostly land holding has become medium farmers in the study area.

Occupation:

Table.5.1.8: Distribution of respondents on the basis of occupation

N=120

S.No.	Categories	Respondents			
		Main		Subsidiary	
		Number	Percentage	Number	Percentage
1.	Agriculture labour	00	00.00	18	15.00
2.	Caste based occupation	12	10.00	09	7.50
3.	Agriculture	83	69.16	12	10.00
4.	Business + Agriculture	8	6.67	05	4.16
5.	Service (Govt. + Private)	17	14.17	25	20.83

It is clear from the Table-5.1.8 that in case of main occupation, the Agriculture was emerged as main occupation (69.16%) followed by service (14.16%), caste-based occupation (10.0%), and while in case of subsidiary occupation, 20.83 per cent respondents adopted business followed by agriculture labour (15.0%) and agriculture (10.0%), respectively.

Annual Income:

Table.5.1.9 Distribution of respondents on the basis of annual Income

N=120

S.No.	Categories	Respondents	
		No. of Respondents	Percentage
1.	Up to 1.0 lakh	08	6.66
2.	1 lakh to 2 lakh	31	25.83
3.	2-3 lakh	48	40.00
4.	Above 3 lakh	33	27.50
Total		120	100.00

Average = 3.50 lakh,

Min. = 1.45 lakh,

Max. = 6 lakh

The Table-5.1.9 reveals that more of the respondents 40.0 per cent belong to the annual income Rs. 2-3 lakh whereas 27.50 per cent respondents belong to above 3 lakh,

25.83 per cent respondents belong to 1 to 2 lakh and 6.66 per cent respondents belong to up to 1 lakh annual income range. It can be said that the respondents will be having the annual income Rs. 1-3 lakhs. Below poverty line (BPL) has been pegged at about 27000per annum. So, there was no any respondent below poverty line.

Social Participation

Table.5.1.10: Distribution of respondents on the basis of social participation

N=120

S.No.	Categories	Respondents	
		No. of Respondents	Percentage
1.	No Participation	48	40.00
2.	Participation in one organization	55	45.83
3.	Participation in two organization	12	10.00
4.	Participation in more than two organization	05	0.041
Total		120	100.00

A cursory glance over the data depicted in the Table-5.1.10 indicates that out of 120 respondents, 45.83 per cent respondent participate in one organization followed by 40.0 per cent respondent's no participation in any organization, 10.0 per cent respondents participates in two organization and 0.041 per cent respondents participates in more than two organization.

Material Possession

A) Farm Power

Table.5.1.11: Distribution of respondents on the basis of farm power

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Tractor	27	22.5
2.	Diesel Engine/Pumping set	68	56.67
3.	Electric Motor	37	30.83
4.	Bullock	05	4.16
5.	Power tiller	02	01.67

Note: More than one item has been shown by the respondents. Hence, the total percentage of all the item would be more than 100.

The Table-5.1.11 indicates that 56.67 per cent respondents were found having diesel engine, followed by 30.83 per cent, 22.67 per cent, 04.16 per cent and 01.67 per cent having Electric motor, Tractor, Bullock and power tiller, respectively.

B) Farm Implements

Table.5.1.12: Distribution of respondents on the basis of farm implements

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Cultivator	26	21.67
2.	Seed drill	06	5.00
3.	Thresher	28	23.33
4.	Rotavator	12	10.00
5.	Winnower	05	0.041
6.	Chaff cutter	85	70.83
7.	Deshi plough	18	15.00
8.	Pata	30	25.00
9.	Sprayer	47	39.16
10.	Spade	78	65.00
11.	Sickle	90	75.00
12.	Khurpi	72	60.00

Note: More than one item has been shown by the respondents. Hence, the total percentage of all the item would be more than 100.

It is clear from the data included there in Table-5.1.12 that majority of the respondents were reported having sickle (75.0%), chaff cutter (70.83%), spade (65.00%), khurpi (60.0%), sprayers (39.16%), pata (25.0%), thresher (23.33%), cultivator (21.67%), deshi plough (15.0%), rotavator (10.0%), seed drill (5.0%) and winnower (0.041%), respectively.

Thus, it can be said that the respondents were having a good number of implements with them.

C) Transportation material possession**Table.5.1.13: Distribution of respondents on the basis of transportation material possession**

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Truck	01	0.83
2.	Car/ Jeep	05	4.16
3.	Pickup	03	2.50
4.	Tractor trolley	27	22.50
5.	Bike/Scooter	84	70.00
6.	Cycle	115	95.84
7.	Auto/E-Rickshaw	02	1.67

Note: More than one item has been shown by the respondents. Hence, the total percentage of all the item would be more than 100.

The Table-5.1.13 indicates that an over whelming majority of respondents (95.84%) was found having cycle as a means of transportation followed by Bike/Scooter (70.00%), tractor trolley (22.50%), Car/Jeep (4.16%), Pickup (2.50%), Auto/E-rickshaw (1.67%) and truck (0.83%), respectively. Thus, the inference can be drawn from the above data that cycle was important means of transportation with the respondents.

D) Household material possession**Table.5.1.14: Distribution of respondents on the basis of household material possession**

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Double bed	45	37.50
2.	Sofa set	23	19.17
3.	Gas cylinder	86	71.67
4.	Electric press	52	43.33
5.	Pressure cooker	74	61.67

6.	Crockery	20	16.67
7.	Fan	65	54.16
8.	Cooler	32	26.67
9.	Solar light	35	29.16
10.	Cots	120	100.00
11.	Dining table	15	12.50
12.	Washing machine	15	12.50
13.	Sewing machine	65	54.16
14.	Chairs	84	70.00
15.	Wall watch	75	62.50

Note: More than one item has been shown by the respondents. Hence, the total percentage of all the item would be more than 100.

The Table-5.1.14 indicates that 100 percent respondents were reported that cots followed by Gas cylinder (71.67%), Pressure cooker (61.67%), Sewing machine (54.16%), Electric press (43.33%), Double bed (37.50%), Solar light (29.16%), cooler (26.67%), Sofa set (19.17%), Crockery (16.67%) and (12.50%) Dining table and washing machine, respectively. The condition of household materials seems to be good.

E) Communication media possession

Table.5.1.15: Distribution of respondents on the basis of communication media possession

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Radio	45	37.50
2.	T.V.	92	76.67
3.	D.T.H.	85	70.83
4.	Mobile phone/Cell phone	120	100.00
5.	Computer	04	03.34
6.	News paper	45	37.5
7.	Agriculture book	08	6.67

Note: More than one item has been shown by the respondents. Hence, the total percentage of all the item would be more than 100.

Table-5.1.15 indicates that the majority of respondents was observed possessing mobile phone (100.0%), T.V. (76.67%), DTH (70.83%), and radio (37.50%) with them. The rest respondents who had other communication media were in descending order News Paper (37.5%), Agriculture book (6.67%) and Computer (3.34%), respectively. Thus, it can be inferred that mobile phone and radio were main sources for getting information and recreation purpose.

Extention contact:-

Table 5.1.16: Extent of contact of respondents with different information sources

N=120

S. No.	Particulars	Total score value	Meanscore values	Rank order
A.	Formal sources			
1.	B.D.O.	195	1.62	IX
2.	A.D.O.	188	1.56	X
3.	V.D.O.	415	3.45	V
4.	Kishan sahayak	475	3.95	IV
5.	Gram Pradhan	675	5.62	I
6.	Cooperative society	484	4.03	II
7.	Agriculture college/University	297	2.47	VII
8.	Mandi samiti	349	2.90	VI
9.	Fertilizer store/Seed Store	483	4.02	III
10.	Agricultural scientist	103	0.85	XI
11.	others	261	2.17	VIII

	Average		2.96	
	B. Informal sources			
1.	Family members	840	07	I
2.	Neighbours	840	07	II
3.	Friends	773	6.4	III
4.	Relatives	428	3.56	IV
5.	Local leader	379	3.2	V
6.	Progressive farmers	266	2	VI
	Average		4.86	
	C. Mass media exposure			
1.	Radio	804	5.9	I
2.	T.V.	699	5.6	III
3.	Newspaper	777	5.2	IV
4.	News bulletins	290	1.7	IX
5.	Journal	261	2.4	VII
6.	Farm Magazines	263	1.2	XIV
7.	Circular letters	185	1.6	XI
8.	Agricultural books	203	1.7	X
9.	Posters	534	4.5	V
10.	Farmers fairs	135	5.9	II
11.	Demonstrations	308	1.1	XV
12.	Folders	311	2.5	VI
13.	Film show	386	1.58	XIII
14.	Exhibition	259	2.1	VIII

15.	Others	257	1.6	XII
Average			2.97	
Overall average			3.32	

The data furnished in Table-5.1.16 pertains to extent of contact of respondents with different information sources as used by them receiving general information as well as about various practices of other enterprises. The information sources were categorized into three categories namely formal sources, informal sources and mass media exposure to find out the extent of contact of respondents. So far as contact with formal sources was concerned, Gram Pradhan, Cooperative society, Fertilizer store/Seed store, Kisan sahayk, V.D.O., Mandi samiti, Agriculture college/University, Others, B.D.O., A.D.O. and Agril. Scientist had got the rank □, □, □, □, □, □, □, □, □, □, □, respectively. The means of scores for all the formal sources was found as **2.96**.

As far as contact with informal sources was concerned, family members, neighbors, friends, relatives, local leader and Progressive farmers had got rank orders as □, □, □, □, □ and □, respectively. The mean of scores for all the formal sources was found as **4.86**.

Among the mass media sources Radio, Farmer fair, T.V., Newspaper, Posters, Folders, Journals, Exhibitions, News bulletins, Agricultural book, Circular letter, Others, Film show, Farm magazines and Demonstrations had got rank orders as □, □, □, □, □, □, □, □, □, □, □, XII, XIII, XIV and XV, respectively. The mean of scores for mass media exposure was found as **2.97**.

Hence, it can be concluded that informal sources of information seemed to be most important as generally utilized by most of the respondents. The formal and mass media exposure were also utilized by the respondents with considerable extent. The overall mean of scores for formal, informal and mass media exposure was found as **3.32** which may be considered as fair contact with information sources.

Scientific orientation**Table.5.1.17: Distribution of respondents on the basis of scientific orientation****N=120**

S. No.	Categories	Respondents	
		Number	Percentage
1.	Low (up to 20)	24	20.0
2.	Medium (21 to 24)	51	42.5
3.	High (25 and above)	45	37.5
Total		120	100

Mean = 23.78, SD = 2.86, Min. = 17, Max. = 32, All possible score = 35

It is apparent from the Table-5.1.17 that the maximum number of respondents (42.5%) was found having medium level of scientific orientation, 37.5 per cent and 20.0 per cent respondents were such who had high level and low level of scientific orientation, respectively. The average mean of scores for scientific orientation was observed to be 23.78 with a range of minimum 17 and maximum 35. Hence, it can be concluded that most of the respondents were found having medium level of scientific orientation.

Risk orientation**Table.5.1.18: Distribution of respondents on the basis of risk orientation****N=120**

S.No.	Categories	Respondents	
		Number	Percentage
1.	Low (up to 18)	35	29.17
2.	Medium (19 to 20)	74	61.67
3.	High (21 and above)	11	09.16
Total		120	100

Mean = 19.72, SD = 1.68, Min. = 16, Max. = 24, All possible score = 30

It is apparent from Table-5.1.18 that 61.67 per cent of the respondents were found having medium level followed by low (29.17%) and high (09.16%) level of risk orientation. The mean scores of risk orientation was observed to be 19.72 with a range of minimum 16, maximum 24 and all possible score 30. Hence, it can be concluded that the respondents have average internet to bear relating to crop rotation.

Economic motivation**Table.5.1.19: Distribution of respondents on the basis of economic motivation**

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Low (up to 16)	47	39.17
2.	Medium (17 to 19)	58	48.33
3.	High (19 and above)	15	12.5
Total		120	100

Mean = 17.5, SD = 1.64, Min. = 15, Max. = 22, All possible score = 25

It is apparent from the Table-5.1.19 that a maximum number of respondents (48.33%) was found having medium level of economic motivation, 39.17 per cent respondents have low level and 12.5 per cent respondents had high level of economic motivation. The average mean of scores for economic motivation was observed to be 17.5 with a range of minimum 15 and maximum 22. It had all possible score 25. Hence, it can be concluded that most of the respondents were found having medium level of economic motivation.

5.2 Knowledge and utilization pattern of Information and Communication Technology (ICT) tools

5.2.1 Knowledge about Information and Communication Technology (ICT) tools

Table5.2.1: Distribution of the respondents on the basis of Knowledge about Information and Communication Technology (ICTs) tools

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Low (up to 15)	33	27.5
2.	Medium (16 to 18)	58	48.34
3.	High (19 and above)	29	24.17
Total		120	100

Mean = 16.81, S.D. = 1.98, Minimum = 15, Maximum = 23

Table-5.2.1 shows that the maximum number of respondents (48.34%) had medium level of knowledge about information and communication technology tools followed by low (27.5%) and high (24.17%), respectively. The mean scores of knowledge about ICTs tools is 16.81, minimum value of knowledge extent is 15 and maximum is 23. Standard deviation of knowledge extent about ICTs tools is 1.98.

5.2.2 Utilization extent of Information and Communication Technology (ICT) tools

Table 5.2.2: Distribution of the respondents according to level of utilization extent of Information and Communication Technology (ICT) tools

N=120

S.No.	Categories	Respondents	
		Number	Percentage
1.	Low (up to 32)	37	30.84
2.	Medium (33 to 51)	62	51.66
3.	High (52 and above)	21	17.50
	Total	120	100

Mean = 42.39, SD = 10.51, Min. = 26, Maximum = 62

The Table-5.2.2 shows that maximum numbers of respondents (51.66%) were using ICTs tools at medium extent followed by low extent (30.84%) and high extent (17.50%), respectively. Thus, concluded that majority of the respondents were using ICTs tool at medium extent level. The mean score value of utilization extent of ICTs tools is 42.39, minimum value is 26 and maximum value is 62. Standard deviation of utilization extent of ICTs tools is 10.51.

5.3 Knowledge and adoption extent of potato production practices potato production practices

Table 5.3.1: Distribution of the respondents on the basis of knowledge extent of potato production practices

N=120

S. No.	Particulars	Knowledge					
		Good		Fair		Poor	
		Freq	%	Freq	%	Freq	%

1.	Varieties	32	26.66	48	40.0	40	33.34
2.	Preparation of field	26	21.67	52	43.33	42	35.0
3.	Seed rate	28	23.34	61	50.83	31	25.83
4.	Seed treatment	25	20.83	65	54.16	30	25.0
5.	Time of sowing	23	19.16	52	43.34	45	37.5
6.	Spacing	21	17.5	49	40.83	50	41.67
7.	Amount of man. & fertilizer	22	18.34	57	47.5	41	34.17
8.	Irrigation	18	15.0	67	55.83	35	29.17
9.	Intercultural operation	14	11.67	66	55.0	40	33.33
10.	Plant protection measures	09	7.5	81	67.5	30	25.0
11.	Harvesting and storage	16	13.33	55	45.83	49	40.83

Data presented in the Table-5.3.1(i) indicates the extent of knowledge about potato production practices. The table revealed that under the varieties of crop respondents have 40.0% fair knowledge followed by preparation of field (43.3%), seed rate (50.83), time of sowing (43.33%), spacing (40.83%), amount of man.& fertilizer (47.5%), irrigation (55.83%), intercultural operation (55.0%), plant protection measures (67.5%) and harvesting and storage (45.83%) have fair knowledge, respectively.

5.3.2: Adoption extent of potato production practices

Table 5.3.2: Adoption extent of potato production practices

N=120

S. No.	Particulars	Adoption					
		High		Medium		Low	
		Freq	%	Freq	%	Freq	%
1.	Varieties	33	27.5	50	41.67	37	30.83
2.	Preparation of field	42	35.0	60	50.0	18	15.0
3.	Seed rate	45	37.5	38	31.67	37	30.83
4.	Seed treatment	41	34.17	59	49.17	20	16.67
5.	Time of sowing	52	43.33	40	33.33	28	23.33

6.	Spacing	41	34.17	46	38.33	33	27.5
7.	Amount of man. & fertilizer	38	31.67	55	45.33	27	22.5
8.	Irrigation	44	36.67	62	51.66	14	11.67
9.	Intercultural operation	51	42.5	46	38.33	23	19.17
10.	Plant protection measures	37	30.83	55	45.83	28	23.34
11.	Harvesting and storage	41	34.17	54	45.0	25	20.83

Data presented in Table-5.3.2 indicates the extent of adoption of potato production practices in three categories viz. High, Medium and Low. In these three categories the frequency and per cent have been shows in each category separately.

5.4 Effect of ICT on knowledge and adoption of potato production technologies of farmers

Table 5.4.1 Correlation coefficient between Independent variables and knowledge about ICTs tools

S. No.	Independent variables	Correlation coefficient
1.	Age	0.057029
2.	Education	0.021406
3.	Caste	-0.00394
4.	Types of family	-0.03899
5.	Size of family	0.093194
6.	Size of land holding	0.2603**
7.	Occupation	0.075177
8.	Material possession	0.096859
9.	Housing pattern	0.05152
10.	Social participation	0.148002
11.	Annual income	0.06856
12.	Extension contact	0.04165
13.	Scientific orientation	0.30874**
14.	Economic motivation	0.118948
15.	Risk orientation	0.25282**

*Significant at 0.05 % probability level 0.197

**Significant at 0.01% probability level 0.257

Table 5.4.1 focuses that out of 15 variables studied that i.e. size of land holding, scientific orientation and Risk orientation were found highly significant and positive correlate with knowledge about ICTs tools on potato production. The variables like age, Education, types of family, housing pattern, annual income were found non-significant and positively correlated with knowledge of ICTs tools for potato production practices. Caste and type of family found non-significant negatively correlated with knowledge about ICT tools for potato production practices.

It means if the value of these variables increase, the knowledge extent of ICTs tools for potato production will increase.

Table 5.4.2 Correlation coefficient between Independent variables and utilization extent of ICTs tools

S. No.	Independent variables	Correlation coefficient
1.	Age	0.225826
2.	Education	0.204164**
3.	Caste	-0.12635
4.	Types of family	0.047861
5.	Size of family	-0.05973
6.	Size of land holding	0.053138
7.	Occupation	0.153686
8.	Material possession	0.13539
9.	Housing pattern	0.025736
10.	Social participation	0.05109
11.	Annual income	-0.02288
12.	Extension contact	0.015242
13.	Scientific orientation	0.283547**
14.	Economic motivation	0.26085**
15.	Risk orientation	0.25045**

*Significant at 0.05 % probability level 0.197

**Significant at 0.01% probability level 0.257

Table 5.4.2 focuses that out of 15 variables studied i.e. Scientific orientation, economic motivation and risk orientation were found highly significant and positive

correlated with Utilization of ICTs tools for potato production practices. The age, education, types of family, size of land holding material possession, hosing pattern, social participation and extension contact were found non-significant and positively correlated. The variables like caste, size of family and annual income were found non-significant and negatively correlated.

It meant if the value of these variables increases, the utilization extent ICTs tools for potato production practices.

5.5 Constraints in gaining the knowledge and adoption of potato technologies and their remedial measure

Table 5.5 Constraints in gaining the knowledge and adoption of potato technologies and their remedial measure

S. No.	Constraints	Total	Mean score value	Rank
A.	Socio-economic Constraints			
1.	High labour wages	100	83.33	□
2.	Small size of holding	90	75.00	□
3.	Lack of education	65	54.16	□
B.	Technical Constraints			
1.	Unavailability of newly release variety	95	79.16	□
2.	High cost of irrigation	83	69.16	□
3.	Ultimately availability of fertilizer	77	64.16	□
4.	Cost of insecticides/pesticides are very high	55	45.83	□
5.	Lack of knowledge about plant protection	98	81.66	□
C.	Marketing Constraints			
1.	Store charges are very high	85	70.83	□
2.	Support price of crop not adequate to the farmers	45	37.5	□□
3.	Poor road and transportation facility	35	29.16	□□
4.	Lack of marketing information	49	40.83	□□
5.	Flactuation in market price	110	91.67	□
6.	Market places are far away	105	87.50	□

SUMMARY AND CONCLUSION

The present study entitled “**Study on effect of Information and Communication Technology (ICTs) on farmers knowledge and adoption of potato production technologies in Ayodhya district of Uttar Pradesh.**” Out of 11 community development block, Milkipur block has been selected purposively for the study because of familiarity with the local language, socio economic profile and cultural condition. An exhaustive list of the villages of Milkipur block was procured from block headquarter and out of 113 villages in the block Milkipur, 5 village were selected randomly for this study A complete list, a total number of 120 respondents was selected through proportionate random sampling technique on the criteria of land holding possessions. The investigator himself had collected the data from the help of pretested interview schedule.

Analysis was done with the use of percentage, mean and standard deviation for drawing the references. The study also highlighted the constraints as faced by the respondents in knowledge and adoption with respect to potato production practices. The study was undertaken with the following objectives:-

1. The social, economical, communication and psychological profile of the potato farmers
2. The knowledge and utilization pattern of Information and Communication Technology (ICT) tools
3. The knowledge and adoption level of potato production practices
4. Effect of ICT on knowledge and adoption of potato technologies of farmers
5. The constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

6.1. Social, economical, communication and psychological profile of the potato farmers

1. A maximum number of respondents (49.16%) was found in the age group *i.e.* middle (40-60 years)

2. The maximum *i.e.* (87.50%) of respondents were found to be literate, while (12.50%) were found illiterates.
3. The maximum number of respondents (51.67%) were belonging to the Other Back Ward caste followed by general caste (34.16%).
4. Joint families were more in number than single families in terms of percentage *i.e.* (67.50%) respondents belong to joint families while (32.50%) respondents found in nuclear family.
5. The maximum respondents (65.83%) were observe having medium (7-15 members) family followed by (21.66%) having small (up to 7 members) and only (12.50%) respondents having large (above 15 members) family.
6. The maximum number of respondents (50.83%) reported their pucca type houses followed by mixed (30.83%) and kachcha (18.33%) houses, respectively.
7. The maximum number of respondents (34.16%) were found belonging from the medium (2 to 4 ha.) categories followed by (28.33%) marginal category (below 1 ha.) and (25.0%) small land holding category (1 to 2 ha.) in this study, respectively.
8. An over whelming majority *i.e.* (69.16%) respondents families have reported Agriculture as their main occupation.
9. Majority (40.00%) respondents were from those families annual income were between 2 to 3 lakh followed by (27.83%) respondents above 3 lakh and rest of the respondents (25.83%) respondents having family annual income between 1 to 2 lakh, respectively.
10. Majority of respondents (45.83%) were such who participates in only one organization followed by (40.00%) respondents have no participation in any organization, (10.00%) respondents having participation in two organization and (0.041%) respondents having participation in more organization or office bearer, respectively.
11. The (56.67%) respondents were found having diesel engine followed by (30.83%) electric motor, (22.50%) tractor and (4.16%) respondents have bullock, respectively.
12. Majority of respondents was found having (75.00%) sickle followed by (70.83%) chaff cutter and (65.00%) respondents having spade, respectively.
13. An over-whelming majority of the respondents out of (95.84%) was found cycle as a means of transportation followed by bike (70.00%), tractor trolley, respectively.

14. The cent percent respondents reported that they have cots each followed by gas cylinder (71.67%), pressure cooker (61.67%), fan (54.16%), sewing machine (54.16%), double bed (37.50%) and crockery (16.67%), respectively.
15. The majority of respondents 100 per cent respondents were found having mobile phone/cell phone followed by T.V. (76.67%), D.T.H. (70.83%) and radio & newspaper (37.50%), respectively.
16. The contact of the respondents with Gram Pradhan was maximum in category of formal sources followed by cooperative society and fertilizer store.
17. The contact of the respondents with family members and neighbors was maximum in informal sources followed by friends and relatives, respectively.
18. The contact of the respondents with radio was maximum in category of mass media exposure source followed by farmers fair, T.V. and news-paper, respectively.
19. The highest number of respondents (42.50%) were in medium level of scientific orientation followed by high (37.50%) and low (20.00%), respectively.
20. Majority of respondent (61.67%) were in medium level of risk orientation followed by low (29.17%) and high (9.16%), respectively.
21. Majority of respondent (48.33%) were in medium level of economic motivation followed by low (39.17%) and high (12.50%), respectively.

6.2. Knowledge and utilization pattern of Information and Communication Technology (ICTs) tools

6.2.1. Knowledge about Information and Communication Technology (ICT) tools

The maximum number of respondents (48.34%) had medium level knowledge about Information and Communication Technology (ICTs) tools followed by low (27.50%) and high (24.17%), respectively.

6.2.2 Utilization pattern of Information and Communication Technology (ICTs) tools

The maximum number of respondents (51.66%) were using ICTs tools at medium extent followed by low extent (30.84%) and high extent (17.50%), respectively. Thus, concluded that majority of the respondents were using ICTs tolls at medium level.

6.3. Knowledge and adoption level of potato production practices

6.3.1. Knowledge level of potato production practices:-

Majority of potato growers had medium level of knowledge followed by high and low levels. These potato growers might not have been exposed to the improved practices

and as a result, only less per cent of them possess high knowledge with regard to improved practices.

More than 90 per cent of the potato farmers had correct knowledge about the practices like recommended variety, preparation of field, seed, time of sowing, seed rate, seed treatment, amount of manure and fertilizer, irrigation, insect/pest and post harvesting & storage.

Further, majority of potato farmers had correct knowledge about recommended dose of FYM, nitrogen, phosphorus, potash and chemicals used for controlling pest and disease and yield per acre. Added to this fact, it could also be mentioned that the farmers of the study area are involved in cultivating the crop since long time and this experience must have also added to their present level of awareness.

Majority of the potato farmers did not have proper knowledge with regards to practice like chemical used for seed treatment, application FYM, nitrogen dose, phosphorus dose, potash dose and chemicals used for controlling pest and disease and yield. This might be due to the fact that these technologies are complex in nature and comparatively difficult to understand. Further, the extension participation, mass media participation and extension contact of these farmers are not up to the required level.

6.3.2. Adoption level of potato production practices:-

Majority of respondent had medium level of adoption followed by high and low adoption level, respectively. The improved practices of potato such as use of improved variety had adopted cent per cent of the respondents and majority of potato respondents had adopted seed rate per acre and plant protection measures against insect and diseases. Majority of the respondents were have partially adopted to the practices such as spacing between plant to plant and row to row, application of chemical fertilizers and organic manures. The considerable proportions of the potato growers have not adopted the practices such as seed treatment and none of them have adopted the bio-pesticides/bio-extract.

It could be visualized that the simple technologies are relatively adopted to greater extent as compared to complex technologies. Lack of knowledge about recommended quality of chemicals for controls of pest and diseases. Use of recommended dose of chemical fertilizer may be the reason for partial adoption of these technologies. Complexity of an innovation, high cost of inputs and environmental factors might have

influenced the farmers for limited adoption of practices like fertilizer dose and use of recommended plant protection chemicals.

One of the possible reasons for partial adoption of disease and pest control measures might be due to the high cost as perceived by farmers in the study. Non-availability of adequate quantity of farm yard manure and also its high cost might be the reasons for partial adoption of by the potato respondents.

6.4 Effect of ICTs on knowledge and adoption of potato production technologies of farmers:-

Table 5.4 focuses that out of 15 variables studied that i.e. size of land holding, scientific orientation and Risk orientation were found highly significant and positive correlate with knowledge about ICTs tools on potato production. The variables like age, Education, types of family, housing pattern, annual income were found non-significant and positively correlated with knowledge of ICTs tools for potato production practices. Caste and type of family found non-significant negatively correlated with knowledge about ICT tools for potato production practices.

It means if the value of these variables increase, the knowledge extent of ICTs tools for potato production will increase.

Table 5.4.2 focuses that out of 15 variables studied i.e. Scientific orientation, economic motivation and risk orientation were found highly significant and positive correlated with Utilization of ICTs tools for potato production practices. The age, education, types of family, size of land holding material possession, hosing pattern, social participation and extension contact were found non-significant and positively correlated. The variables like caste, size of family and annual income were found non-significant and negatively correlated.

It meant if the value of these variables increases, the utilization extent ICTs tools gor potato production practices.

6.5 Constraints in gaining the knowledge and adoption of potato technologies and their remedial measures

The constraints perceived by the potato growers in adopting advanced potato production technologies which scientist recommend were carefully identified and analyzed. Small size of land holding, unavailable of good and early maturing varieties,

high price of manure and fertilizers, availability of adulterated fertilizers, plant protection chemicals, lack of knowledge about plant protection, high incidence of fermentation due to high temperature and no support price announced by the government were the very serious constraints perceived by potato growers.

Based on the insight gained while conducting the present investigation following area is suggested for future research on the subjects.

- The present study was conducted in Ayodhya district only because of limitations of technical man power, time and finance at the disposal of researcher. Further it may be extended to whole area of Uttar Pradesh
- To study the unit effect of the socio economic and technological variables in the decision making process of the farmers
- To examine the effectiveness of purchase made by government units and private units of improved potato cultivation
- To compare the effectiveness of market pattern of potato on adoption pattern of recommended practices of potato in Uttar Pradesh
- To examine the effectiveness of feedback mechanism operating from the field to the development and research system
- To critically examine the influence of government policies in the respect of their effectiveness in augmenting the potato production

6.6 Suggestions:-

- Government should install government tube wells in every villages and irrigation water should be provided at reasonable rates to the farmers
- Loans should be provided at cheaper rates to the farmers to install their own tube wells and to purchase agricultural inputs and equipment
- Electric supply should be regulated
- Crop insurance against all calamities, incidence of insect-pest and disease etc. should be introduced at nominal premium
- Adequate subsidy on inputs should be given
- Scientist should be develop early maturing varieties of different potato crops
- Plant protection chemicals and fertilizer should be made available within easy reach, convenient pack and at cheaper rate
- Government should take necessary step to stop the adulteration in agricultural inputs

- Local storage facilities should be created by the government so that farmer can store their product at nominal charges
- Increase the education facilities in the villages to improve the educational status
- Extension agencies/change agents should organize demonstration on different practices
- Authentic marketing information should be provided timely to the farmers and free farm literature in regional language be distributed by the extension agents
- Local purchasing units should be established to avoid the burden of transportation charges on farmers
- Support price should be increased as per cost of production and announced earlier at potato setting

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DEPARTMENT OF EXTENSION EDUCATION

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Advisor:
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INTERVIEW SCHEDULE

ON

Title of Thesis – “Study on effect of Information and Communication Technology (ICT) on farmers knowledge and adoption of potato technologies in Ayodhya District (U.P.)”

Investigator.....

Date.....

A. Independent Variables

(A)General Information- About the respondents

1. Name of the respondent-..... S/o.....

Village-.....Post-.....Block-.....

District-.....State-..... Pin code-

Mobile No-

2. (a)**Age (Years):**..... (b) **Sex:** Male / Female.....

3. **Education-**Illiterate / Literate / Passed Class: - (1) Primary (2) Middle

(3) High School (4) Intermediate (5) UG (6) PG

4. **Marital status-** Married/Unmarried/Other specific

5. **Caste-** SC / ST / OBC /General

6. **Type of Family-** Joint /Nuclear

7. **Religions-** Hindu/Muslim/Sikh/Isai/Bauddh/Others

8. **Housing Pattern-**

(a) Hut

(b) Kaccha

(c)Pucca

(d) Mixed

9. Total Landholding (ha.):

- a. Cultivated
 - i. Irrigated
 - ii. Unirrigated
- b. Uncultivated
 - i. Parti
 - ii. Banjar
 - iii. Garden
 - iv. Forest

10. Occupation:

S.No.	Particulars	Main	Subsidiary
1.	Agricultural labour		
2.	Service		
3.	Agriculture		
4.	Business		
5.	Agro-based enterprises		
6.	Caste based occupation		

11. Annual income of the family (Rs.):

Main	Subsidiary	Total

12. Social participation:

S. No.	Statement	Members	Office bearer
1.	No. membership in any organization		
2.	Participation in one organizations		
3.	Participation in two organization		
4.	Participation in more than two organizations		

13. Material possession:**A. Farm power:**

S.No.	Farm Materials	Number of Implement
1.	Bullock	
2.	Tractor	
3.	Power tiller	

4.	Diesel engine/Pumping set	
5.	Electric motor	

B. Agriculture Implements:

S.No.	Particulars	Number	S.No.	Particulars	Number
1.	Cultivator		8.	Deshi Plough	
2.	Seed drill		9.	M.B. Plough	
3.	Thresher		10.	Pata	
4.	Rotavater		11.	Sprayer	
5.	Winnower		12.	Spade	
6.	Chaff cutter		13.	Sickle	
7.	Disc Plough		14.	Khurpi	

C. Transportation material possession:

S.No.	Particulars	Number	S.No.	Particulars	Number
1.	Car		6.	Cycle	
2.	Jeep		7.	Auto	
3.	Pick up		8.	Tempo	
4.	Tractor Trolley		9.	Bullock cart	
5.	Bike/Scooter		10.	Tanga	

D. Household materials:

S.No.	Particulars	Number	S. No.	Particulars	Number
1.	Double bed		10.	Cooler	
2.	Sofa set		11.	Solar light	
3.	Dining Table		12.	Heater	
4.	Dressing Table		13.	Cots	
5.	Gas cylinder		14.	Induction cooker	
6.	Electric press		15.	Washing machine	
7.	Pressure cooker		16.	Sewing machine	
8.	Crockery		17.	Chair	
9.	Fan		18.	Wall watch	

E. Communication media possession:-

14.	Exhibitions								
15.	Others								

15. Scientific orientation:- The following statements are related the scientific orientation. Please give your of agreement or disagreement with each of them on the point scale as follows.

S.No.	Statements	S.A.	A.	U.D.	D.A.	S.D.A.
1.	New ICT tools give better information to a farmer than old ICT tools					
2.	Even a farmer with lot of experience should use new ICT tools					
3.	Though it takes time for a farmer to access to new ICT tools, but it is worth of efforts					
4.	In order to have our hands productive, to have the farming economically more profitable and ecofriendly, the present system of farming needs to change					
5.	The way our forefather where practicing farming is still the best way to follow today					
7.	A good farmer should experiment with idea in farming					

16. Economic motivation:- The following statement are related to economic motivation. Please give your degree of agreement or disagreement with each of them on the point scale as follows.

S.No.	Statements	S.A.	A.	U.D.	D.A.	S.D. A.
1.	A farmer should always look towards good information sources to get useful information					
2.	Successful farmer is one who makes the most profit by exposing to modern ICT tools					
3.	A farmer should try to access different ICT sources to earn more money.					
4.	A farmer should grow more crops to increase monetary profits					
5.	It is difficult for farmers children to make a good start unless he provides them with economic assistance					

17. Risk orientation:- The following statement are related to risk orientation. Please, give your degree your extent of agreement or disagreement with each of them on the point scale as follows.

S.No.	Statements	S.A.	A.	U.D.	D.A.	S.D.A.
1.	A farmer should rather take more chance in making a big profit than to be contented with a smaller but less risky profit					
2.	It is good for farmers to take risks when he knows that his chance of success is fairly high					
3.	A farmer who is willing to take greater risks than the average farmers usually do better financially					
4.	A farmers should grow large number of crops to avoid greater risks involved in growing two or more crops					
5.	It is better for a farmers not to try new farming methods unless most other farmers have used them with success					
6.	Trying an entirely new method in farming by a farmer involves risks but it is worth doing it					

S.A = Strongly agree, A. = Agree, U.D = Undecided, D.A = Disagree, S.D.A = Strongly disagree

B. Dependent Variables:

(A) Knowledge extent of farmers about potato cultivation

1.Varieties:-

Please tell the 2 improved potato varieties of early, medium, late recommended for this area

Early variety		Medium variety		late variety	
KUFRI BAHAR	C/IC	KUFRI JYOTI	C/IC	KUFRI BADSHAH	C/IC
UPTODATE	C/IC	PRESIDENT	C/IC	KUFRI CHNDRA MUKHI	C/IC

2. Preparation of field:-

a. When the first ploughing should be done for potato cultivation

(June/July)C/IC

b. Before sowing of potato, how many ploughing are required

(2-3)

C/IC

3. Seed Rate:-

a. How much seed of potato is required for one hectare sowing?

(20-25q/ha)

C/IC

4. Seed treatment:-

Hormone:

a. Which hormone is used for potato seed treatment?

Thiourea

C/IC

b. How much quantity to hormone is used to treat one kg of seed?

100 lt. water + 1 lt. Thiourea

C/IC

c. For how many hours, the seed should be treated with Hormone before it's sowing?

1 hour

C/IC

5. Time of sowing:-

a. What is the best time for sowing of potato crop?

Mid-September to mid-October

6. Spacing:-

i. How much distance did you maintain for row to row and plant to plant?

a. Row to row 60 cm.

b. Plant to plant 45 cm.

c. Seed sown at the depth 6 cm.

7. Amount of manures and fertilizers:-

Which dose of nutrients recommended for application in one hectare of potato cultivation?

(dose NPK, 100-150,100,100)

C/IC

For recommended dose of nutrients which and how much quantity of manures and fertilizers are applied in potato crop for one hectare?

Manures

Amount q/hectare

FYM

I/IC

250q-300q

I/IC

Compost

I/IC

250q-300q

I/IC

Fertilizers are applied which and how much?

Fertilizers

Amount q/hectare

Urea

I/IC

300 kg

I/IC

DAP

I/IC

220 kg

I/IC

When did you apply the nutrients in your potato crop?

- a. FYM and compost 3-4 week before planting I/IC
- b. NPK and Zinc Sulfate at the of soil preparation I/IC

8. Irrigation:-

- a) How many irrigation are necessarily recommended for 1 hectare of potato crop?

6-9

I/IC

- b) Which is the most critical stage for irrigation in potato crop?

8-10 ays

I/IC

9. Intercultural operation:-

Please name the weeds which are mainly found in potato crop and their measures of controls.

S.No.	Weed	Weedicide	Quantity/ha
1.	Bathua	Basaline C/IC	0.75kg/haC/IC+800 lit. water C/IC
2.	Gajari	Metribusin C/IC	1-1.5 kg/ha C/IC+800 lit. water C/IC
3.	Chatri	Pendimethyline	3.31kg/ha C/IC + 800 -1000 lit.

		C/IC	water C/IC
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10. Plant protection measures:-

A. Insect/Pest control:

Please, give the names of 3 major insects who mainly affect the potato in this area with their control measure

S.No.	Insect/Pest	Insecticides/Pesticides	Quantity/ha
1.	Aphid	Actara C/IC	1.25 lit. + 1000 lit. water C/IC
2.	Cutworm	Monocrotofash 35 EC C/IC	1.25 lit. + 1000 lit. water C/IC
3.	Potato tuber moth	Adequate C/IC	1.25 lit. + 1000 lit. water C/IC

B. Disease Control:

Please, give the name of 3 major disease of potato crop occurring in your area along with control measures.

S.No.	Disease	Chemical	Quantity/ha
1.	Early blight	Thiram C/IC	3 g/kg C/IC
2.	Late blight	0.2 % Mancozeb C/IC 75 WP	2 kg/ha C/IC
3.	Potato wart	Sulfex 0.3 % C/IC	3 kg/ha C/IC

• Harvesting and post harvesting of potato crop:

What is the best time for harvesting of potato crop?

- Early maturity (At 80-85 DAS)
- Normal maturity (At 90-100 DAS)
- Late maturity (At 90-100 DAS)

(B) Adoption extent of farmers about potato cultivation

Please give the name of potato varieties sown by you in there in your field.

1. Improved varieties of potato :-

Early sowing varieties of potato

-
-
-

Normal sowing varieties

-
-
-

Late sowing varieties

-
-
-

2. Field preparation for potato crop:-

- a. When did you plough your potato field first?
- b. Before sowing of potato seed, how many ploughing did you do?

3. Seed rate:

- a. How much quantity of potato seed you used for one ha.?
 - i. For early sowing
 - ii. For normal sowing
 - iii. For late sowing

4. Seed treatment:-

- a) Which fungicide did you apply to treat the potato seed?
- b) How much fungicide did you use to treat one kg of seed?
- c) For how many hours before sowing, you treated the seed with fungicide?

5. Time of sowing:-

- a) At which time, did you sow potato crop?
 - i. Early sowing
 - ii. Normal sowing
 - iii. Late sowing

6. Spacing:-

- a) How much distance did you maintain for row to row and plant to plant?
 - i. Row to rowcm
 - ii. Plant to plantcm
 - iii. Seed sown at the depthcm

7. Amount of manures and fertilizers:-

For recommended dose of nutrients, which and how much manures and fertilizers you used/ha in your potato crop?

(A) Manures are applied, which and how much?

Manures	Amount q/ha
i.
ii.

(B) Fertilizers are applied which and how much?

Fertilizers	Amount q/ha
i.
ii.

(C) Manures and fertilizers both are applied which and how much?

Manures	Amount q/ha
i.
ii.
Fertilizers	Amount q/ha
i.
ii.

8. Time of application of manures and fertilizers:-

- When did you apply the nutrients in your potato crop?
- i. FYM and compost
 - ii. NPK and sulphur

9. Irrigation:-

- a. How much irrigation did you apply in your potato crop?
- b. At which time did you irrigation first?
- c. At which critical stage, you irrigate your crop(days)?

10. Intercultural operation:-

S.No.	Weeds	Weedicide	Quantity/ha
1.			
2.			

3.			

11. Plant Protection measures:-

Did you apply any control measure for insect/pest and disease in your potato crop?

Yes/No

If yes please state.

i. Insect control:

S.No.	Insect/Pest	Insecticides/Pesticides	Quantity/ha
1.			
2.			
3.			

ii. Disease control:

S.No.	Disease	Chemical	Quantity/ha
1.			
2.			
3.			

12. Harvest and Post harvest:-

a. When did you harvest your potato crop?

(i) Early maturity

(ii) Normal maturity

(iii) Late maturity

(C) Knowledge about Information and communication tools (ICT)

S.No.	General awareness	Response	
		Yes	No
A.	Please name 10 ICT tools that you know which provides the agriculture information.		
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
B.	Television provides agricultural information		

VF =Very Frequently, F = Frequently, R = Rarely, VR = Very Rarely
 DISK= Dairy Information and Services Kiosk, ATIC= Agriculture Technology Information Center
 KCC= Kisan Call Center

Constraints & Suggestions

S.No.	Constraints	Suggestions	
A.	Possession at farmer level		
1.		1.	
2.		2.	
3.		3.	
4.		4.	
B.	Access at farmer level		
1.		1.	
2.		2.	
3.		3.	
4.		4.	
C.	Utilization at farmer level		
1.		1.	
2.		2.	
3.		3.	
4.		4.	
D.	Function of ICT tools level		
1.		1.	
2.		2.	
3.		3.	
4.		4.	

DEPARTMENT OF EXTENSION EDUCATION
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Topic:- “Study on effect of Information and Communication Technology on farmers knowledge and adoption of potato production technology in Ayodhya district (U.P.)”

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ABSTRACT

The study was conducted in Milkipur block of Ayodhya district (U.P.) selected purposively. A sample size of 120 farmers was selected through proportionate random sampling technique from five villages on the basis of land holding. The interview schedule was developed keeping in view the objective and variables under study and respondents were contacted personally for data collection. The mean, standard deviation, percentage, correlation were used for calculation and drawing the inferences.

The study depicted that a highest number of respondents (49.16%) was found middle age *i.e.* 40 to 60 year. The majority of the respondents (87.50%) were found as literate and rest of (12.50%) respondents were found illiterate. The maximum number (51.67%) of the respondents belonged to other backward class and dominance of family type was joint family system (65.83%). The majority of the respondents had pucca houses and (30.83%) respondents had mixed houses. The majority (34.16%) of farmers were found having the size of land holding 2 to 4 ha. *i.e.* middle farmers. Most of the family (69.16%) reported agriculture (farming) as their main occupation and having annual income up to Rs. 2.0 lakh to 3.0 lakh (40.00%). Most (45.83%) of the respondents had member of one organization.

The extension contact was observed highest with Gram Pradhan (5.62 mean score) under formal sources, family members (7 mean score) under informal source of information and radio (5.9 mean score) & T.V. (5.6 mean score) under mass media information source. The overall material possession of the respondents were found medium level material possession. Scientific orientation and economic motivation were found medium level with (42.50) and (48.33%) respectively.

Most of the respondents had medium level of knowledge about ICTs tools (48.34%), followed by low level knowledge (27.50%) and high level knowledge (24.17%) respectively and medium utilization extent about ICTs tools (51.66%) followed by low level (30.84%) and high

(17.50%) respectively. Knowledge about potato production practices respondents had 40.0% fair knowledge followed by preparation of field (43.33%) and spacing (40.83%) respectively. Adoption extent of potato production practices in three categories viz. high, medium and low.

The variable like education and family annual income (lakh) were found positive and highly significant correlation with knowledge level of ICTs tools regarding potato production practices in agricultural development. The variables *i.e.* education and occupation were found positive and highly significant correlation with knowledge and utilization towards ICTs tools.

The major constraints faced by the farmers in getting knowledge about Information and Communication Technology were 'Insufficient knowledge about ICTs tools' 'Lack of commitment by officials for ICTs tools' 'Lack of conviction' 'Perceived malpractices at different level' and other constraints too.

The suggestions to overcome the problems were 'Excellent monitoring and supervision for economic motivation of ICTs tools.' 'There should be co-operation with potato farmers' 'All innovative technologies should be simplified' 'Provision of sufficient credit with low interest'' Eliminated malpractices at different level' and other suggestions too.

(Prakash Singh)

Major advisor & Chairman

(Aman Kumar Panday)

Student