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ASSESSMENT OF KNOWLEDGE LEVEL, NEED AND IMPACT OF ICTS AMONG FARMERS IN DIFFERENT ASPECTS OF AGRICULTURE AT TALERA BLOCK OF BUNDI DISTRICT IN RAJASTHAN

DR. SUSMIT JAIN
ASST. PROFESSOR
IIHMR UNIVERSITY
JAIPUR.

NEERAJ KUMAR PRAJAPATI
PROJECT IN-CHARGE
GAYATRI SEVA SANSTHAN
UDAIPUR

ABSTRACT

Agriculture is a major part of our economy and its allied activities play a vital role in provide employment to rural and urban people. Now a day's Agriculture depends upon timely and accurate Information about agricultural inputs, weather forecasting and markets access etc. But due to lack of physical infrastructure, awareness and Information, farmers do not get proper Information about market, weather forecasting etc. Information and Communication Technology (ICT) is an effective way for develop and raise the Agriculture standard. The main objective of this study was to access the knowledge level of ICTs among farmers for getting different Agriculture Information and to identify the need of ICT for farmers and measure the attitudes of farmers towards ICT based Agricultural Services. The study also suggested an ICT based model for developing and strengthening the Agriculture standards. The research was conducted at Talera Block of Bundi District in Rajasthan and reviews the applications of ICTs in Agriculture. The research was a descriptive research based on probability sampling of different farmers of selected villages of block. The study concludes that majority of respondents do not have access to ICT facilities. Some of the respondents have knowledge about ICTs but they could not use them due time constraint and improper scheduling of programmes.

KEYWORDS

ICT, Agriculture, information, farmers, network, awareness.

INTRODUCTION

INTRODUCTION OF INDIAN AGRICULTURE SCENARIO

India is the seventh largest country in geographical area, second largest country in population and twelfth largest country in economic wise. The economy of India is as diverse as it is large, with a number of major sectors including manufacturing industries, Agriculture, textiles and handicrafts, and services. Agriculture is a major component of the Indian economy, more than 75 % of our people have their livelihood as Agriculture and allied sector. Mahatma Gandhi said "Indian economy lives in rural villages", and many of the industries getting their raw material from Agriculture sector.

Indian Agriculture sector achieved green revolution during 1970s and then white revolution in milk production during 1980s. But despite some stagnation during the later modern era the policy makers were not concentrate the development of comprehensive agricultural program and rural development compare to urban development and industrial development. Nearly 21.1% of the entire rural population of India exists in difficult physical and financial predicament. But rate of poverty in urban population is 15%. In general, the Government controls the Indian economy, and there remains a great disparity between the rich and the poor. Due to urbanization and industrialization use of Agriculture land is reduced during the last one decade Agriculture lands are converted in to residential houses and factories hence the number of Agriculture labors lost their work and move to urban areas. This leads to low output in agricultural products, insufficiency and rise in food articles prices.

Infrastructure is also a significant factor in the process of development but country like our rural India has not possess the infrastructure such as roads, electricity, fertilizer and pesticides availability which caused the vulnerable damage to the growth of Agriculture. Farmer's access to markets is hampered by poor roads, rudimentary market infrastructure, excessive regulation and middlemen intervention in selling the products is very big problem in marketing the products.

AGRICULTURE INFORMATION NEED AND INFORMATION SOURCES

Agricultural extension services, Information network or agricultural advisory services, comprises the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; link to markets and other players in the agricultural value chain; and obtain Information, skills, and technologies to improve their livelihoods (Birner et al. 2009; Davis 2009). This definition has evolved since the T&V program, where the focus of extension was transfer of technology to improve productivity, especially for staple food crops. While transfer of technology still has relevance, agricultural extension is now seen as playing a wider role by developing human and social capital, enhancing skills and knowledge for production and processing, facilitating access to markets and trade, organizing farmers and producer groups, and working with farmers toward sustainable natural resource management practices (Swanson 2008).

Within this expanded role, the breadth of Information that agricultural extension can support—through provision and facilitating access and sharing—is much larger. In addition, as the Agriculture scenario has become more complex, farmers' access to sources of reliable and relevant Information has become increasingly important. Farmers require a diverse range of Information to support their farm enterprises. Information is needed not only on best practices and technologies for crop production, irrigation and inputs which the traditional public-sector extension system provided during the Green Revolution, but also Information about postharvest aspects including processing, marketing, storage, and handling.

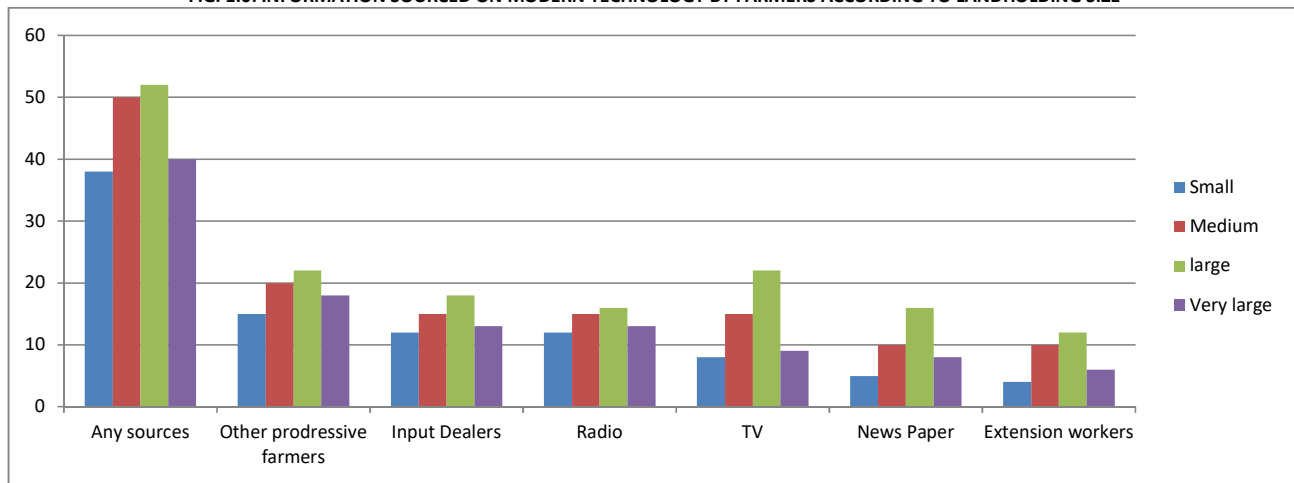
Farmers require Information related to the following (Van den Ban 1998):

- Most appropriate technological options
- Management of technologies, including optimal use of inputs
- Changing farm system options (mixed farming and diversification, animal husbandry, fisheries)
- Sourcing reputable input suppliers
- Collective action with other farmers
- Consumer and market demands for products
- Quality specifications for produce
- Time to buy inputs and sell produce
- Off-farm income-generation options
- Implications of changing policies (input subsidies, trade liberalization)
- Access to credit and loans

It has observed that the Information required will differ between categories of farmers and can be targeted to specific groups, based, for example, on landholding size or agro climatic region (Rivera 1996). In addition to needing different types of Information and using different Information sources, different farmers will have

different search behaviors. Factors such as literacy or access to resources will have a large impact on Information needs, searching behavior, access, and use. These categories can be described various in target groups: rural and farm women, small and marginal subsistence farmers, medium-scale farmers, commercial farmers, and rural youth (Swanson 2008).

FIG. 1.0: INFORMATION SOURCED ON MODERN TECHNOLOGY BY FARMERS ACCORDING TO LANDHOLDING SIZE



Source: Adhiguru, Birthal, and Ganesh Kumar (2009)

According to the 2003 survey (NSSO 2005), access to Information from any source increased with larger farm size (Figure 1.0). Most farmers sought Information on seed for cultivation, followed by veterinary care in animal husbandry, and then management and marketing in fisheries. The main Information source was other farmers (16.7 percent), followed by input dealers (13.1 percent), radio (13 percent), TV (9.3 percent), and newspapers (7 percent). Public-sector extension was used for Information by only 5.7 percent of survey respondents. In terms of differences in sources of Information for the 40 percent of farmers who had accessed Information, smallholder farmers relied primarily on other progressive farmers, input dealers, and radio for Information, while medium-size and large-scale farmers equally used radio, TV, and newspapers. Contact with extension workers for medium-size and large-scale farmers was almost double that of smallholder farmers.

INFORMATION NEEDS OF FARMERS

In each and every aspects of Agriculture farmers need various kinds of Information. The needs of farmers can be classified in two groups generally. These are as follows

Felt Needs of Farmers-

- Problem perceived by the farmers in their day-to-day operations like scarcity of water, Agri inputs, Agriculture Information and subsidy etc.
- Problem with respect to immediate economic loss like seasonal and caused disease of crops etc.
- Recurrent problems (eg. Wilt of tomato)

Unfelt Needs of Farmers-

- Potential innovations of research institutes to which farmers are not exposed like new varieties of plants, seeds and fertilizers (eg. Hybrid rice)
- New schemes/policies about which farmers are not aware (eg. Heavy subsidy on Drip Irrigation System, Rastriya Krishi Bima Yojana etc.)
- Use of long-term effect (eg. Sustainability and environmental concern)

Problem with Present Mode of Information Network

- Poor infrastructure facilities in rural areas
- A very serious problem farmers generally face is generic Information of Agriculture
- Supply chain orientation in Agri inputs and outputs is very poor in rural areas
- No perfect mechanism of problem solving
- Most credible-least accessible Agriculture facilities
- Not backed by diagnostic services for Agriculture
- Lack of Information network
- Information not backed by material and support services

ROLE OF ICT IN AGRICULTURE AND DEVELOPMENT

ICT can be interpreted broadly as “technology that facilitates communication, processing and transmission of Information by electronic means. ICTs play a vital role in the social transformation to realize the concept of “Knowledge Society”. India will have to be recast to take full advantage of the knowledge availability to achieve the multiple goals so income, food, jobs etc (Swaminathan1993). The brilliant innovations in Information and Communication Technology prove that with proper support and encouragement, we can bring about a directional change that can eventually benefit the humanity at large (Mashekar 2004). A number of initiatives have been taken by Government and Non-Government Organizations. The mention may be made about Warnawired, Gyandoot, e-choupal, Info village project, Tarahaat.com, e-Sagu, Agropedia, Rice Knowledge Management Portal, In DG Portal etc. India has taken up praiseworthy initiative for establishing 1Lakh common service e-center (CSCs) across the country. These CSCs serve as front end delivery point for the services of government, non-government and private sector business organizations.

The technological development in the field of computer, communication and space technology has given an opportunity for technological convergence. The same Information can be accessed through LAN, WLAN, Internet and Mobile phones. With quantitative and qualitative improvement in informatics infrastructure, the Information flow has become faster and seamless.

The ICT penetration in to rural area has been a good sign which is evident from the fact that telecommunication density has increased up to 24.29 percent with the quantum rise of 9.36 percent (TRAI Annual Report, 2009-10).

IMPACT OF ICTS USE IN AGRICULTURE

There is a noteworthy impact of ICT in each and every area of Agriculture and its allied sector. These are as follows:

- Providing quick access of Information to farmers for timely action taking
- Average yield gain 4-5 % covered in recent years
- ICT technologies have reduced cultivation cost by 2-14 percent

- ICT saves traveling time and transportation costs by 80 percent
- Tools of ICTs are very useful in providing important data and information to development professionals during different projects of Agriculture
- Mobile phones are increasing rapidly in rural areas and it made information network more easier for Agriculture
- Daily revenues have risen by three times
- Profits jumped by almost 9 percent in recent years
- New markets have emerged, average 30–40 percent fishermen could sell fish outside their market
- Reduction in price dispersion from 60-70 percent to less than 15 percent
- About 2 percent increase in per capita GDP from one market alone

Jensen, Robert. 2007 "The Digital Provide: Information (Technology), Market Performance and Welfare in the South Indian Fisheries Sector". The Quarterly Journal of Economics; Vol. CXXII August 2007 Issue 3

VARIOUS TOOLS AND TECHNIQUES USING IN ICT MODELS

ICT enabled extension initiatives and services of the country could be broadly classified based on the ICT tools that are being employed, such as computer networks, community radio, audio video conferencing, mobile telephony, I-TVs (Internet TVs), automated tools etc.

The focus of nineties had been on harnessing the computer networking in making ICT services available to the farmers. Earliest efforts in this category are Gyandoot project (Madhya Pradesh), Warana Wired Village Project (Maharashtra), Information Village Project (Pondichery), e-choupal models (ITC-for Soya and aqua regions) etc., These initiatives essentially aimed at providing the Computer network infrastructure at village level and provision of Information and service needs of stakeholders.

Other kind of initiatives that could be brought under this category are development of websites providing agricultural Informations such as www.agriwatch.com, www.planters.net, www.haritgyan.com, e-sugam (a grievance box on internet for farmer) etc. The Ministries of Agriculture has also developed the model, channels and TV and radio Programme for awareness of people like *Krishi Darshan*, *Chopal*, *Kheta re bata* etc. In December 2002, the Government of India approved a policy for the grant of licenses for setting up of Community Radio Stations. Since then various NGOs, SAUs and other agencies have initiated Community Radio mediated extension efforts. Deccan Development Society, *Sauras* Crane of Kutch, UAS *Dharwad* etc., have these Community Radios in place. On other side in the era of mobile telephony, all the ICT initiatives are redefined. Provision of information, question-answer services, SMS alerts etc., are gaining importance. Majority of the mobile manufacturing companies such as Nokia have initiated ambitious projects such as Nokia Life tools targeting the rural India. On the other hand, service providers such as IL&FSE education, Handygo, Airtel aim at reaching out to farmers through Mobile extension initiatives.

In spite of the aggressive campaign for mobile telephony the *Kisan Call Centre* initiative of GOI can never be undermined. The KCC aims at providing the expert answers at various hierarchical levels suiting to the contexts of farmers.

Extension efforts have been started in Agriculture and allied sectors that essentially harness the automated tools. One of the earliest examples is the use of Automated Milk Collection Centers (AMCC) of AMUL. This kind of initiatives is best example of providing extension advisory on the printed receipts. Recent ICT project realized the importance of blending two or more of the stools in reaching out to the farmers. Striking examples are Agrinet of DAC and Rice Knowledge Management Portal of NAIP. Processes The ICT enabled extension initiatives can also be classified based on different processes adopted in delivering the services to the farmers. Broad categories that could be considered are; Hub & Spokes Process, Knowledge Management processes, Open and Distance Learning Process and Kiosk based process.

From the above references a research was conducted at Talera Block of Bundi District in Rajasthan to review the applications of ICTs in Agriculture. The study was focused on to access the need and awareness of ICT among farmers. The findings of study also suggested a model for developing and strengthening the Agriculture Standards through bridging the gap and scope.

REVIEW OF LITERATURE

Many studies have been conducted in deploying ICT in Agriculture in various parts of the world. Some of the studies conducted and their major findings have been shown below.

A study on "Potentials of New Information and Communication Technologies (ICTs) in Agriculture Sector" was conducted by M.S. Allahyari I and M. Chizari in 2010. The purpose of this study was to identify potentials and roles of new information and communications technologies in agricultural and rural sector. The findings of the study revealed that the most applications for these ICTs in rural and agricultural sector were: E-trade of inputs and outputs, extension and training activities for rural dwellers, advertisement of rural tourism products, knowledge transfer from urban to rural and vice versa, official procedures and Geographic Information System (GIS) for management of natural resources. The study also emphasized on use of these ICTs media for not only the improvement of agricultural products or post harvesting activities, but the final goal is to reduce rural poverty in an environment where their livelihood should be improved.

A study on "Information and Communication Technology in Agricultural Development: A Comparative Analysis of Three Projects from India" was conducted by Shaik. N. Meera, Anita Jhamtani, and D.U.M. Rao in 2004 for examination of the performance of three ICT projects in India. The projects had quite different origins and purposes, but all were concerned with improving the delivery of information to farmers and other rural dwellers. The study describes the organization of each project; discusses the types of farmers involved and assesses their utilization of the services; and looks at the backgrounds and performance of the functionaries who manage the projects. The projects studied varied with respect to the type of services provided, but these included marketing information, extension advice, information about rural development programmes, and other information from government and private sources. The major findings of the project were that the state government project, users most valued access to market information, land records and information on rural development programmes. In cooperative project, question-and-answer services, accounting, and farm management information were valued most. In the private company experiment, participating farmers valued various types of information on practices, management of pests and diseases, and rural development programmes.

A study on "Role of Information Technology in Agriculture and its Scope in India" was conducted by S.C. Mittal at IIFCO, India. The study concluded that information of the required quality always has the potential of improving efficiency in all spheres of agriculture. The emerging scenario of a deregulated agriculture, thanks to WTO, has brought in a greater 'need' and urgency to make it an integral part of decision making by Indian agricultural community. Information Technology (IT) has a major role to play in all facets of Indian agriculture. In addition to facilitating farmers in improving the efficiency and productivity of agriculture and allied activities, the potential of IT lies in bringing about an overall qualitative improvement in life by providing timely and quality information inputs for decision making. The personnel who work for the welfare of Indian farmers, such as extension workers, do not have access to latest information which hinders their ability to serve the farming community effectively. This study focuses on the scope for e-powering people who live in rural India as well as those who work for their welfare. The latest developments in IT that facilitate effective IT penetration to rural India, changing pattern of information requirements & role of IT, type of systems required in the post-WTO environment, the bottlenecks in e-powering rural India along with possible solutions were examined.

A study on "Information and Communication Technology for Rural Farmers Market Access in Tanzania" was conducted by Agnes Godfrey Mwakaje of University of Tanzania in 2010. In this study two hundred farmers were selected randomly to provide information about ICT use for accessing agricultural market information. Findings depict that market information sources are still dominated by the farmers themselves, relatives and traders. Nevertheless, a considerable number of farmers (23%) used ICT to access market information, weather forecasting and information of farming technologies. The use of ICT by farmers was significantly related to the quantity produced, income level, type of crop marketed and gender. Farmers who used ICT obtained higher prices than farmers who did not use ICT for accessing market information and other information; weather, fertilizers etc. The use of ICT is constrained by costs, accessibility and reliability.

After referring all these studies, it has been observed that IT plays a major role in the development of agriculture and there is a scope of similar research which could be carried in Rajasthan. Hence, as per the identified need, the current research will be carried out in Talera block of Bundi District.

NEED/IMPORTANCE OF THE STUDY

Agricultural success depends upon timely and accurate Information about weather, markets, Agriculture inputs etc. which could be assessed by ICTs. Hence the current research creates valuable literature and accesses the knowledge of farmer, identifies the need of ICT and suggests an effective ICT model for strengthening Agriculture. It could be beneficial for the Policy Makers like (Members of Planning Commission, Funding Agencies, Development Organizations etc.), Government Institutions (NARBARD, ICAR, SIAM etc.) and Others (Corporate organizations, NGOs, Banks etc.).

STATEMENT OF THE PROBLEM

What is the Knowledge Level, Need and Impact of ICTs among farmers in different aspects of Agriculture at Talera Block of Bundi District in Rajasthan?

OBJECTIVES

The study was carried keeping in mind following objectives:

1. To access the knowledge level of ICTs among farmers for getting Information on weather, market, agricultural inputs etc.
2. To identify the need of ICT in different aspects of Agriculture including farming, production etc
3. To measure the attitudes of farmers towards ICT based Agricultural Services
4. To suggest (design) the effective and suitable ICT model or idea to strengthen the Agriculture.

HYPOTHESIS (ES)

H1a: That the income level of the farmers influences the knowledge level of ICT

H1b: That age and education of farmers influence the knowledge level of ICT among farmers

RESEARCH METHODOLOGY

This Research described effective use of ICTs in Agriculture and main objective of this study was to understanding the use of ICT in Agriculture. The study also explored various studies of ICTs and Agriculture and it also focused on gaining insights and familiarity objectives. Hence the current research was Descriptive and Exploratory in nature which would involve both quantitative and qualitative analysis.

SAMPLE SIZE AND SAMPLE DESIGN

Total population of Talera block= 2.59 lakh (Census 2011)

Average size of family =6 (Planning Commission Report 2010)

Approximate no of farming unit or household= $\frac{2.59}{6} = 41,600$ (Which could be taken as population size)

The Sampling Technique was multi-stage Sampling. In first stage researcher used simple random sampling for selection of villages and in second stage researcher used Sampling with Probability proportional to size of village for selection of respondents from particular village. The sample size determined as shown below

$$n = \frac{Z^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N-1) + Z^2 \cdot p \cdot q} = 79 \approx 80$$

Where

n = sample size

Z= normal variation corresponding to the desired confidence interval (1.96) for the 95% confidence interval

p= sample proportion (0.5) (in which case "n" will be maximum or for most conservative sample)

q= 1-p (0.5)

e= accepted error (0.15) (which was taken as 15% or 0.15)

LOCATION OF STUDY

The study was conducted in Bundi District of Rajasthan. There were five blocks in Bundi district named as Nainwa, Hindoli, Talera, Keshawrai Patan and Bundi (newly emerged in census 2011). For this study, specifically Talera block was chosen. In that block crops like pulses, wheat, gram, barley, cotton, tobacco and oil seeds were grown. Among oil seeds, mustard and rape were the most commonly produce. Important fruit trees of that block were orange, pomegranate, lemon, guava and mango. The annual rainfall was almost 75cm. The Block also had three small rivers, two dams and 6-7 ponds which provide enough water for irrigation. Most of the villages were connected with roads.

The below maintained table gives some demographic profile (as per the Census 2011) for better understanding of the block.

TABLE 1.1: DEMOGRAPHIC PROFILE

Particulars	Data
Area	1,229 sq.km
Population	2.59 lakh
Gram Panchayat	31
Villages	106

Source: District Census Department, Bundi

The below table describes sample distribution of different villages selected for data collection.

TABLE 1.2: SAMPLE DISTRIBUTION OF DIFFERENT VILLAGES

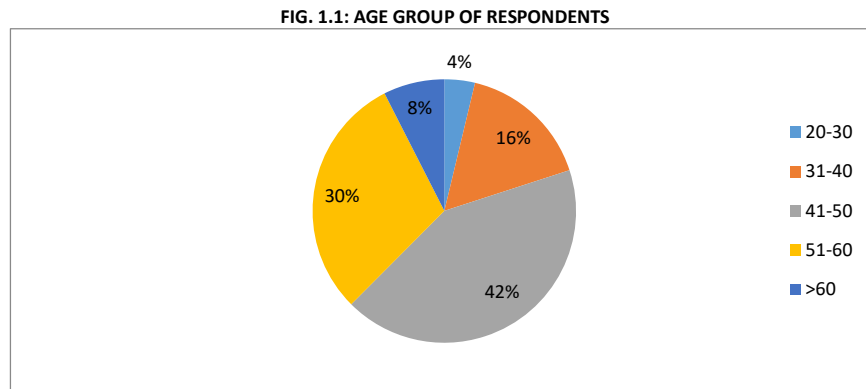
S.No.	Village	HH	Population	Sample size (n=80)
1	Daboosar	39	190	1
2	Dhorela	122	624	4
3	Jawahar Sagar	470	2345	12
4	Naya Bardha	189	1238	9
5	Alphanagar	113	513	9
6	Talera	919	5402	21
7	Sapteeja	63	428	2
8	Dehit	500	2990	8
9	Badoonda	279	1678	9
10	Gopalpura	162	818	5
	Total	2966	16894	80

RESULTS & DISCUSSION

Following findings and analysis were based on collected Information from a survey conducted thought questionnaire of 80 farmers during field visit and data collection.

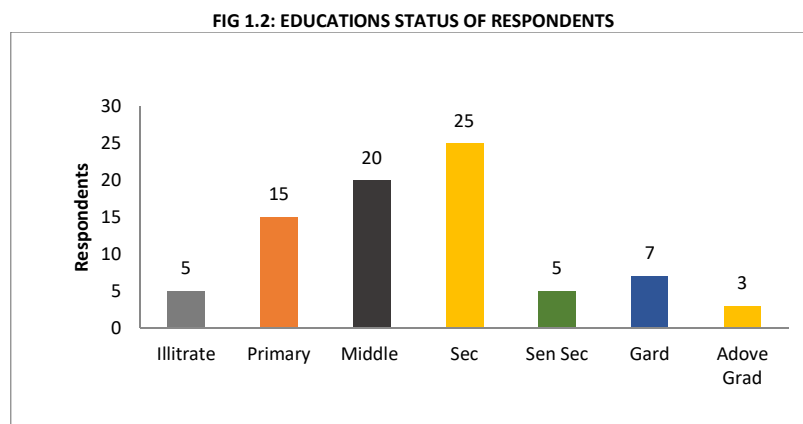
ANALYSIS FROM DEMOGRAPHIC DATA

1. After observing the below pie chart it could be analyzed that age group of respondents was quite varying. Majority of the respondents (42 percent) were from age between forty one to fifty and 30 percent from age between fifty one to sixties.



Sources- Data collected form survey

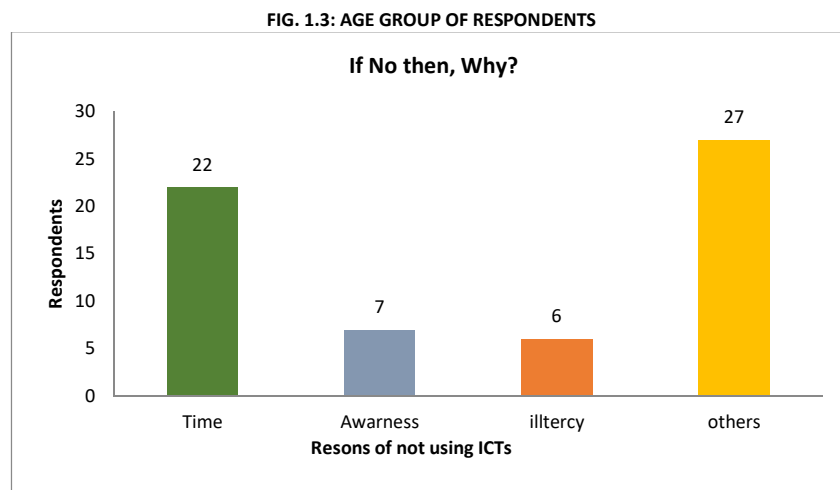
2. Education status of respondents plays a vital role in research. During the data collection all the population was classified into seven sub categories as shown in fig 1.2.



Sources - Data collected form survey

From the fig 1.2 it could be inferred that in the education level of respondents was very less. Hence the use of ICT has to be carefully deployed keeping in the account their education and knowledge level in Talera Block.

3. From the collected data, it was analyzed that only 44 percent respondents were using ICT services for Agriculture purpose. While exploring the reasons of not using ICTs in Agriculture, the result depicted that time constraint, awareness of ICTs, illiteracy and hesitation to use ICT in technologies and new practices and more trust on other villagers for Agriculture Information were main reasons of not using ICT.

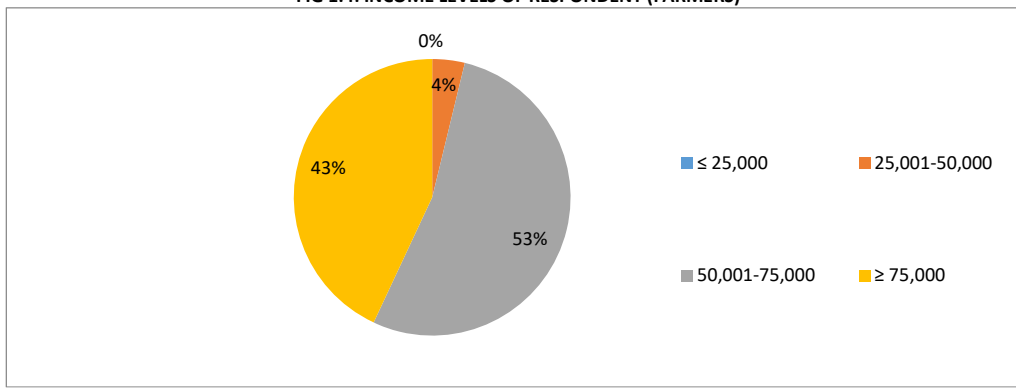


Sources- Data collected form survey

From the fig 1.3 it can be derived that the main reason behind not using the ICTs was time constrain and awareness. There are other reasons also exist like more friendly towards traditional Information methods, socio economic barrier etc.

4. ICTs had significant impact on income level of respondents. From the collected data it could be inferred that most of the farmers had annual income of between 50,000- 75,000. And there were fifty three percent people who had income up to 75,000 or more than it.

FIG 1.4: INCOME LEVELS OF RESPONDENT (FARMERS)

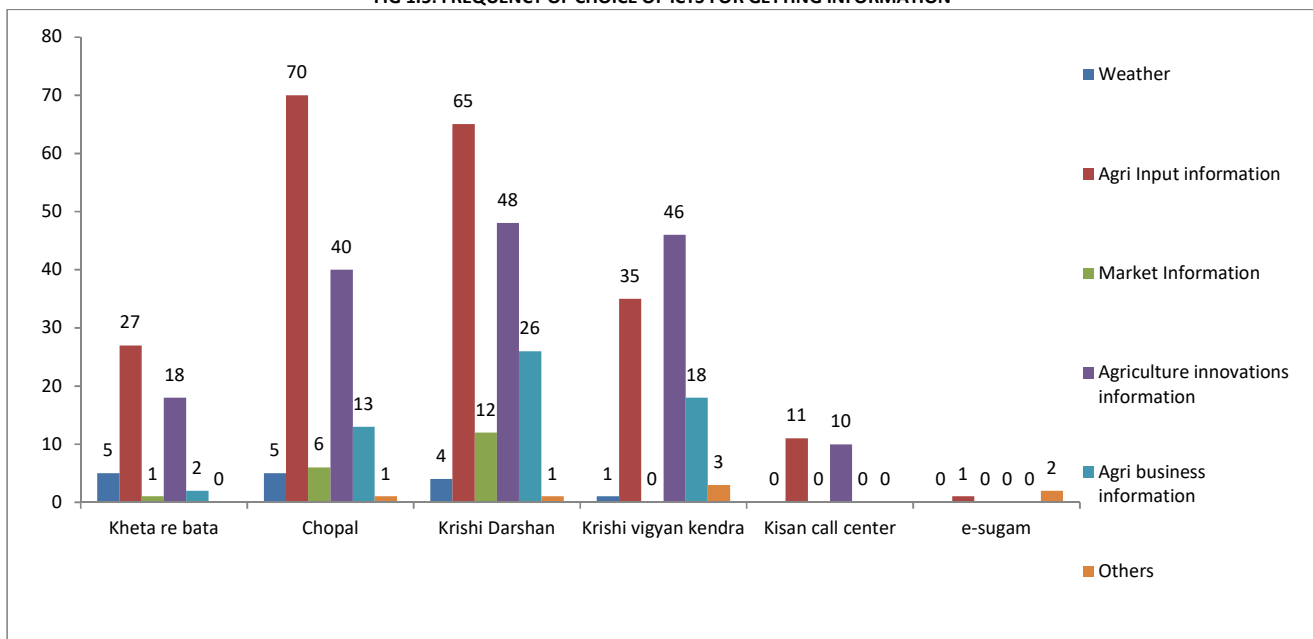


Source- from collected data

FREQUENCY OF CHOICE OF ICTS FOR GETTING AGRICULTURE INFORMATION

Although a huge no of farmers is friendly towards traditional methods of Information in Agriculture. But even then ICTs are major source of Agricultural Information in rural areas. It provides different types of important and timely Information to farmers for facilitating Agriculture.

FIG 1.5: FREQUENCY OF CHOICE OF ICTS FOR GETTING INFORMATION

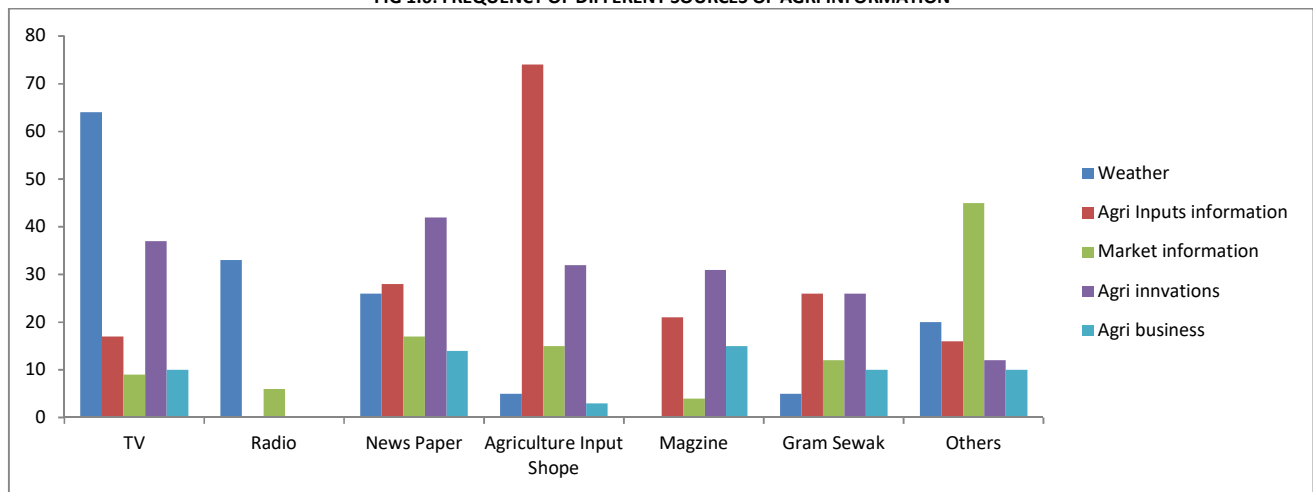


From the above fig 1.5 it could be inferred that majority of respondent use ICTs like Chopal, Krishi Darshan and Krishi Vigyan Kendra for Agri Information and Agri innovations. And few respondents were in favor use of ICTs like *Kheta re bata*, Kisan Call Center for Agri Information.

FREQUENCY OF DIFFERENT SOURCES FOR AGRICULTURE INFORMATION

There is different source of Agriculture Information available in Talera block like TV, Radio/FM, Newspaper, Magazines, Gram Sewak, Agri inputs shops etc. farmers use different sources of Information according to their need.

FIG 1.6: FREQUENCY OF DIFFERENT SOURCES OF AGRI INFORMATION

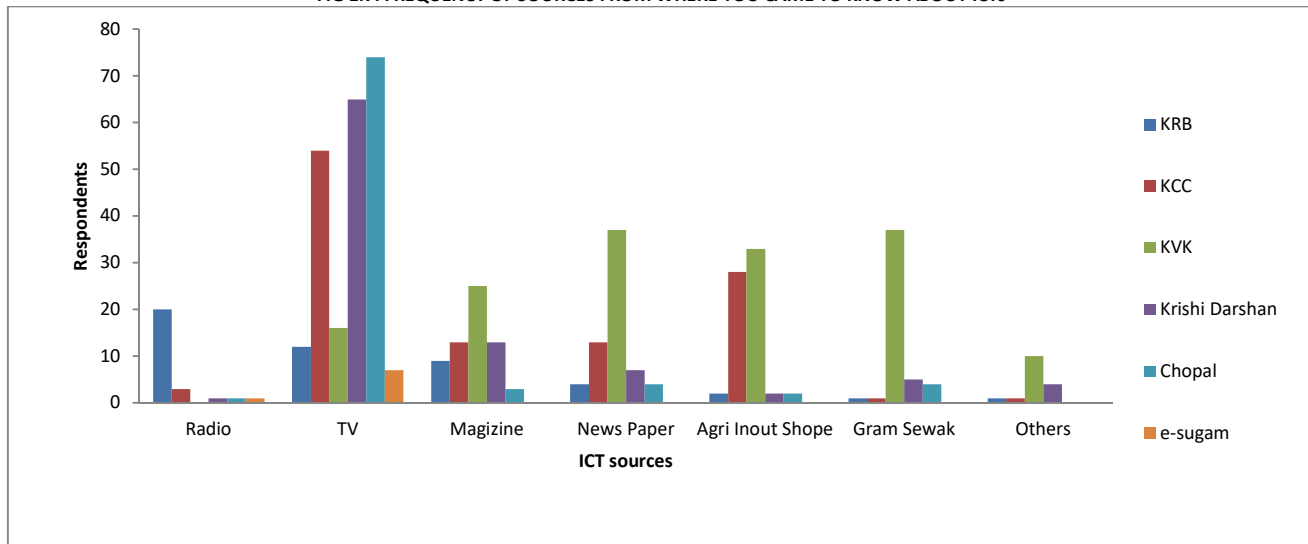


From the fig 1.6 it could be depicted that Agri input shops are key source of information. TV and Radios were major sources of information like weather and Agri innovations. Newspapers and Gram Sewak were other sources of information they provide all types of Agri information. There were some other sources of information also exist in rural areas like Villagers, Patwaris, Relatives, Traditional methods etc.

FREQUENCY OF SOURCES FROM WHERE DO YOU CAME TO KNOW ABOUT ICTs?

There are many sources of information (TV, Radio, Newspaper etc.) available in rural areas for providing knowledge about ICTs like *Kheta re bata*, Kisan Call Center, Krishi Vigyan Kendra, Kishi Vigyan Kenda, Chopal, e-sugam etc.

FIG 1.7: FREQUENCY OF SOURCES FROM WHERE YOU CAME TO KNOW ABOUT ICTs

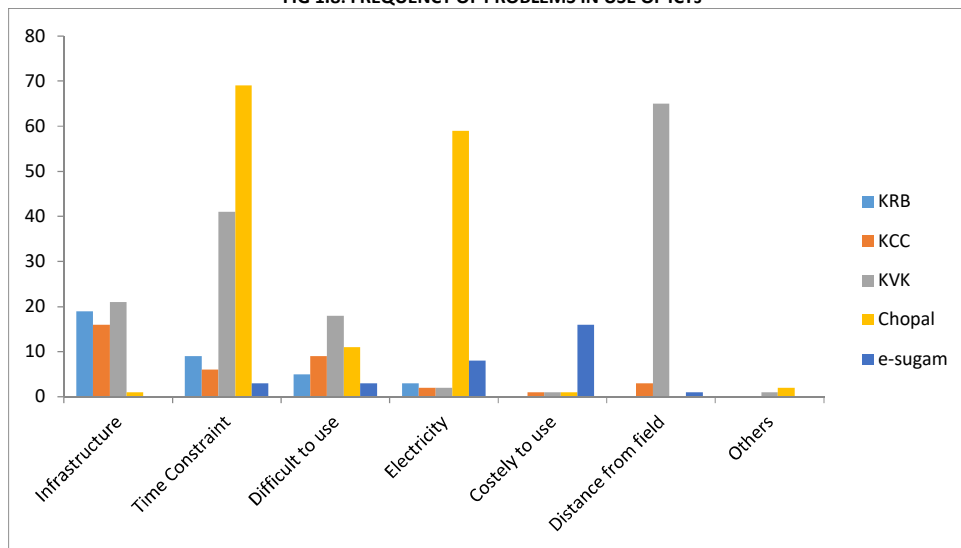


According to fig 1.7 shown above it could be inferred that TV magazine and Newspaper were key source of all ICTs. Radios were only source of *Kheta re bata* and Kisan Call Center. Agri input shops also gave information about Krishi Vigyan Kendra and Kisan Call Center mainly.

FREQUENCY OF PROBLEMS IN USE OF ICTs

There is various problem occurred in use and access of ICT tools. These problems can be categories in Infrastructure, Time constraint or Scheduling of programmes, Difficulty to use, Electricity, Costly to use, Distance from field etc.

FIG 1.8: FREQUENCY OF PROBLEMS IN USE OF ICTs

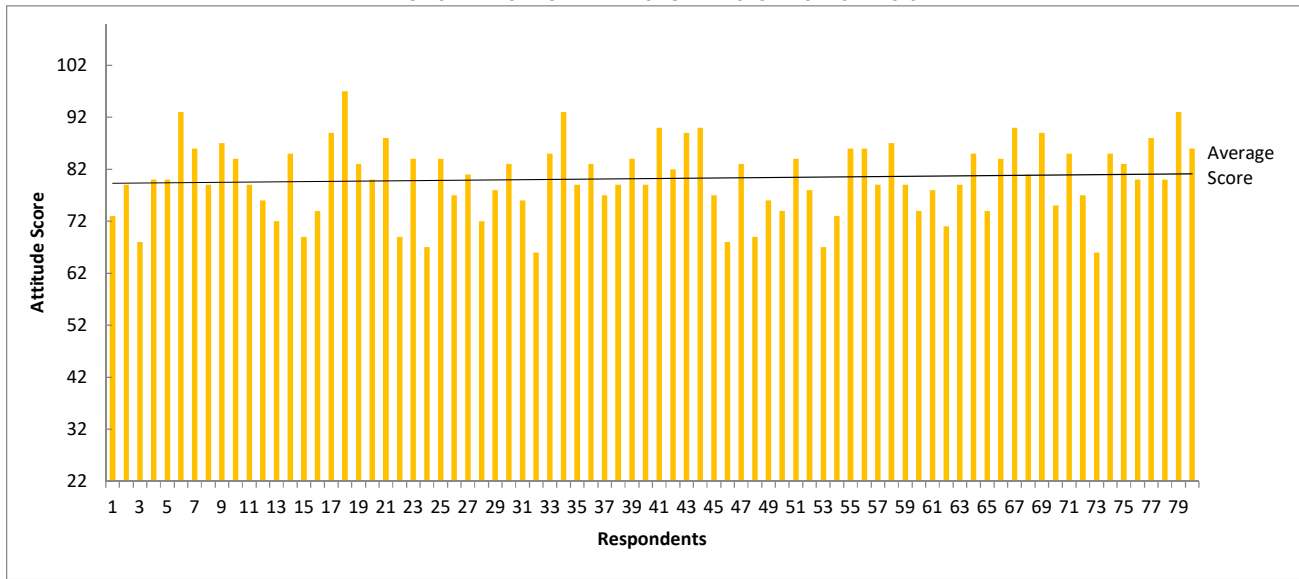


Form the fig 1.8 it could be inferred that time constraint and electricity was a major problem in use of ICTs. The programmes which were telecasted on TV have common problem of scheduling and electricity. KVK is located far from block so farmers couldn't access frequently.

ATTITUDE MEASUREMENT

The attitude measurement scale consists of 22 statements were used for the measurement of attitude towards ICT based services. The responses were recorded on a five point *Likert* scale representing strongly agree, agree, undecided, disagree, and strongly disagree with scores of 5,4,3,2, and 1 for positive statements and vice-versa for negative statements. The attitude score of each respondent could be calculated by summing the scores obtained by him on all the items. The attitude score on this scale was range from 22 to 110. The higher score indicated that respondent had more favorable attitude towards ICTs based services and vice-versa.

FIG 1.9: ATTITUDE OF FARMERS TOWARDS ICT BASED SERVICES



Source- from collected data

After observing the collected data and above fig it could be inferred that the score of farmers is 80 which shows that farmers were agree with the ICT services. But there were very few people who strongly agree with ICTs services. And percentage of undecided (UD) score was also high which depicts that people were not that much satisfied with ICT services.

HYPOTHESIS TESTING

H1a: That the income level of the farmers influences the knowledge level of ICT

TABLE 2.1: RELATION BETWEEN USE OF ICT AND INCOME LEVEL

Income	Use of ICT		Total
	Yes	No	
≤ 25,000	0	0	0
25,001-50,000	0	4	4
50,001-75,000	20	23	43
≥ 75,000	15	18	33
Total	35	45	80

From the above table 2.1 this hypothesis could be proved by using chi square method. In this method two variables income and with use of ICT were compared. The calculated chi square value (table 2.1) for three degree of freedom was 3.38. The calculated value of chi square was less than their table values for 5 percent level of significant, hence the result of study support hypothesis. So it could be concluded that income of farmers does not has any significant relation with use of ICT in Agriculture.

H1b: That age and education of farmers influence the knowledge level of ICT among farmers

TABLE 2.2: RELATIONS BETWEEN USE OF ICT AND AGE

Age	Use of ICT		Total
	Yes	No	
20-30	2	1	3
31-40	9	4	13
41-50	15	19	34
51-60	7	17	24
>60	2	4	6
Total	35	45	80

TABLE 2.3 RELATIONS BETWEEN USE OF ICT AND EDUCATION

Education status	Use of ICT		Total
	Yes	No	
Illiterate	1	4	5
Primary	3	11	14
Middle	5	17	22
Sec.	15	9	24
Sen. Sec	2	3	5
Graduation.	6	1	7
Above graduation	3	0	3
Total	35	45	80

From the above table 2.2 and 2.3 this hypothesis could be proved by using chi square method. In this method two variables education and age were compared with use of ICT.

The calculated chi square value (table 2.2) for four degree of freedom was 6.41. The calculated value of chi square was less than its table value (9.48) for 5 percent level of significant, hence the result of study supports hypothesis. So it could be concluded that Age of farmers do not has any significant relation with use of ICT in Agriculture.

The calculated value (table 2.3) for six degree of freedom was 20.25. The calculated value of chi square was higher than its table value (12.59) for 5 percent level of significant, hence the result of study does not support hypothesis. So it could be concluded that **education status has significant relation with use of ICT in Agriculture.**

FINDINGS

ICT initiatives are intended to address the needs of the farmers for their actual usage and ability to bring significant impact on the crop productivity and socio-economic development of society. The common problems addressed in adoption of ICT in Talera Block are ICT illiteracy, availability of relevant and localized contents in their own languages, easy and affordable accessibility and other issues such as awareness and willingness for adoption of new technologies among the people etc.

The result of this study says that majority of farmers know about ICT programme like KCC, KRB, Chopal etc. And the farmers also agree that ICTs are helpful for Agriculture but they could not use it frequently. There were various problems observed during the use of ICTs in Agriculture in Talera block. These are time constraint, difficulty to use and understanding, electricity etc. the major problem occurred in use of ICT unwillingness of people. Many respondents had huge faith on traditional methods.

One critical aspect in the usage of ICT’s for farmers and their groups, as seen in some of the ICT driven initiatives, is the involvement of human interface at the last mile indicating that there is a human dependency in transmission of Information/Knowledge to farmers like in Kisan Call Center and Krishi Vigyan Kendra. So, there is a need to understand as to how far the ICT initiatives are able to address the farmers need so that better solutions can be developed to address those unmet needs.

RECOMMENDATIONS/SUGGESTIONS

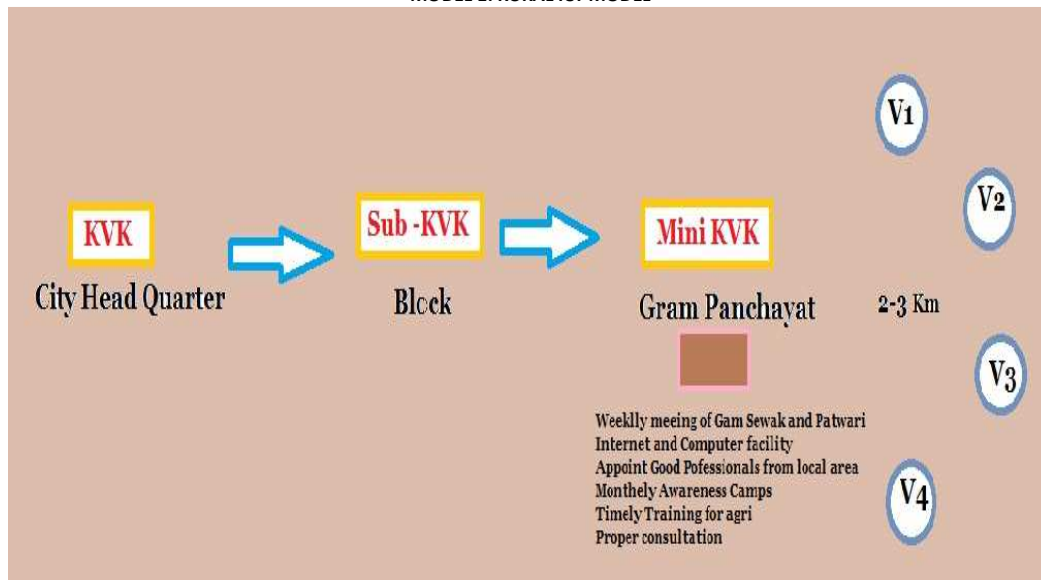
As we know ICT initiatives are unmet models for social transformation. Although these extension services are very prone in Talera block, but there are some possibilities to change and make them more strengthen. There are some recommendations as follows:

- There is always a need of specific Information to farmers, so ICT tools should be well managed for providing timely and regular Information
- The Krishi Vigyan Kendra is located very far from particular block (Talera). So there is a problem of access to there. There could be alternate to locate a common *Kisan Sewa Kendra* on Gram Panchayat level. Kisan sewa Kendra will be like Aanganwari center at village level or Sub Center at Gram Panchayat level
- All the ICT’s progammes which provide extension knowledge to farmers are mechanized in Hindi or English language which is a problematic to farmers to understand. If these ICTs will also telecast in local language, it will more helpful for farmers
- The major problem in use of ICT services is time constrain. Most the Agriculture programmes are generally telecast in evening and morning, which always clash the schedules of farmers. There should be more focus on use IEC material for Agriculture
- In *Kisan Sewa Kendra* a person who has good Agriculture knowledge should be appointed. This person should have proper schedule of visit villages for make people aware for effective use of Agriculture
- There should be more IEC material panted or distributed on Agriculture inputs shop for awareness
- Associating Farmer Friend/SHG/PRI representatives with Agriculture schemes and projects so they can get more and more benefits
- Today maximum villages have access of mobile phones. So more Information coverage should be through Mobile phones to SMS services
- Special training and camps should have held regularly for farmers and Agri input vendors to get update about Agri Information and innovations

CONCLUSIONS

Rural Model ICT model: During the field visit and data collection it was identified that due to lack of hard infrastructure there is a big of Information network in villages. The Agriculture inputs shops and mandies are generally located on district or block level only. If there is any center on Panchayat level, it is not well equipped and managed. To access all the Agriculture Information farmers have to reach or go to block level or district which is not possible frequently. The main problem which farmers generally face is time constrain. Due to this problem they cannot go far from field to get proper and better Information. After observing the villages of Talera block it was observed that Krishi Vigyan Kendra is located to district head, which covers reach of only 10-15 villages come under its territory. But it’s not possible for other villages far from it to reach their regularly. Hence, a **model to form an Information and communication network** could be developed. The process of KVK can be divided in decentralization manner. There should be Sub- KVK at block level and a Mini -KVK at Gram Panchayat level. This process should be managed by Head KVK or district KVK. Mini- KVK will be work as a key resource center for villagers. They can reach easily over there and access the require Information. M-KVK will be well equipped with internet and Computer. A local professional should be appointed there to access the computer and aware people and give needful knowledge to farmers. This has been depicted below:

MODEL 1: RURAL ICT MODEL



LIMITATIONS

Some of the limitations of the study are mentioned below:

- As the research has been undertaken by single researcher and the scope of the study is vast, it would be practically impossible to cover all the aspects of the study. There is also a limitation of time as the research has to be carried within two months
- Main problem occurred was community support. Most the farmers were busy on fields during data collection and they didn't respond properly
- Many farmers were not friendly with terminology used in questionnaire
- In some villages farmers responded very badly and behave very rudely

SCOPE FOR FURTHER RESEARCH

The study has great scope and can be done on different locations of Rajasthan as well as India. This type of study would definitely help the agricultural scientists to measure the performance of ICT in different locations.

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APPENDIX/ANNEXURE

QUESTIONNAIRE

Assessment of Knowledge Level, Need and Impact of ICTs among Farmers in different aspects of Agriculture

1. Personal Details

.1	Name:	.2	Village:
.3	Contact No. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	.4	Gram Panchayat:
.5	Age of Respondent (in years)	.6	Education Level
	a) 20 – 30 <input type="checkbox"/>		Primary <input type="checkbox"/>
	b) 31 – 40 <input type="checkbox"/>		Middle <input type="checkbox"/>
	c) 41 – 50 <input type="checkbox"/>		Secondary <input type="checkbox"/>
	d) 51 – 60 <input type="checkbox"/>		Senior Secondary <input type="checkbox"/>
	e) > 60 <input type="checkbox"/>		Graduation <input type="checkbox"/>

2. ICT in Agriculture Assessment

2.1 Do you use ICT (communication media for Information on weather, market prices, seeds, fertilizers, pesticides etc.) in Agriculture?

Yes No

If, No, then why are you not using ICT:

2.2 Please indicate the number of years you have been using ICT in Agriculture:

a) 0 – 3 b) 4 – 6 c) 7 – 10 d) > 10

2.3 Please tick (☑) on the type of agricultural Information which you take from below mentioned ICTs:

	Weather	Agri. inputs	Market Info.	Agri. Innovations	Agribusiness	Others (pl. specify)
<i>Kheta re bata</i>						
Kisan Call Center						
Krishi Vighyan Kendra						
<i>Krishi Darshan (DD1)</i>						
<i>Chopal (DD1)</i>						
<i>e-sugam</i>						

2.4 Please tick (☑) the source of the below mentioned agricultural Information:

	Agriculture Inputs Shops	TV	Radio	News Paper	Magazine	Gram Sewak	Others (pl. specify)
Weather							
Agri.inputs							
Market Info.							
Agri. Innovations							
Agribusiness							

2.5 Please tick (☑) the source of the below mentioned ICTs in Agriculture:

	Agriculture Inputs Shops	TV	Radio	News Paper	Magazine	Gram Sewak	Others (pl. specify)
<i>Kheta re bata</i>							
Kisan Call Center							
Krishi Vighyan Kendra							
<i>Krishi Darshan (DD1)</i>							
<i>Chopal (DD1)</i>							

2.6 Are there any problems in using ICTs in Agriculture, If Yes, please tick (☑) the below mentioned causes:

	Infrastructure	Difficulty in use and under-standing	Costly to use	Time constraints	Distance from fields	Electricity	Others (pl. specify)
<i>Kheta re bata</i>							
Kisan Call Center							
Krishi Vighyan Kendra							
<i>Krishi Darshan (DD1)</i>							
<i>Chopal (DD1)</i>							
<i>e-sugam</i>							

3. Attitude Measurement towards ICT

3.1 Please indicate on the extent to which you agree or disagree on following statements towards ICT based services.

S. No.	Statements	SA	A	UD	DA	SDA
1.	ICTs provide possible solutions to the present agricultural situation.					
2*	ICTs cannot meet location specific needs of the farmers.					
3	ICTs are potential tools to reach the needy farmers.					
4	Farmers feedback is fast through ICTs than traditional methods					
5*	Illiteracy will not deter farmers in availing ICT services.					
6*	ICTs cannot deliver personalized Information.					
7	ICT based extension services assist the farmer in planning and decision making aspects in Agriculture.					
8*	'ICT services' is a distant dream for resource poor farmers.					
9	Farmers can get remunerative prices to their produce through ICT based market Intelligence					
10	Expert advice makes the farmers enterprise/activities productive.					
11*	All kinds of Information exchange are possible only through ICTs.					
12	Existing infrastructure of ICTs is not enough to meet the needs of the farming community.					
13*	Only resourceful farmers can get the benefit of the ICTs					
14	Access to Information centre at village level is boon to the farming community.					
15	Phone-in-live with scientists gives first hand Information about queries.					
16*	ICTs alone would solve the problems of farmers.					
17	ICT based Pest/disease outbreak warning system facilitate farmers to take preventive measures.					
18*	ICT extension services avoid the personal extension contact.					
19	ICTs based extension services provide new opportunity to build a skilled and knowledge community.					
20*	ICT is a valuable tool, but it will never influence farmers' own decision making.					
21	Weather forecasting through ICTs assists farmers in timely decisions.					
22*	ICT based extension services are alternative to the present extension system.					

* Negative statements.

SA: Strongly agree A: Agree UD: Undecided DA: Disagree SDA: strongly disagree

4. Agriculture Productivity Measurement

4.1 Please specify the yield per hectare, of the crops, if applicable in your field:

	Approx. Yield (This Year)	Approx. Yield (Previous Year)
Cereals		
Pulses		
Oilseeds		
Fodder		
Others (pl. specify)		

4.2 Please specify your Annual Income (in Rs.)

- a) ≤ 25,000
- b) 25,001 – 50,000
- c) 50,001 – 75,000
- d) ≥ 75,000

Date: _____

Place: _____

(SIGNATURE)

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