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Communication for Social Change: ICT Scenarios in Agriculture and Rural Development Sectors in Chitwan, Nepal



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**Communication for Social Change: ICT Scenarios in
Agriculture and Rural Development Sectors in Chitwan,
Nepal**

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**Master Degree in Management of Development
Specialization: Training, Rural Extension and Transformation**

Wageningen, The Netherlands, 2009

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BIOGRAPHICAL SKETCH

The author was born on August 10, 1969 in Nepal. He is the youngest son of late Sitaram Sapkota and Mrs. Gauri Devi Sapkota.

The author finished his School Leaving Certificate (SLC) in 1986 from Balkumari Higher Secondary School, Narayangarh, Chitwan, Nepal.

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During his tenure with *CARE* -Nepal, he worked in projects in different positions. He started his work with *CARE*- Nepal from Begnastal Rupatal Watershed Management Project (BTRT-WMP) in Kaski district. Later he transferred to Remote Area Basic Needs Project (RABNP) in Bajura district.

After 4 and half years work with *CARE*- Nepal, he joined the civil service job as an Agriculture Extension Officer in 1998. After getting field level experiences in the districts since last 8 years he has been working in central level offices under the Ministry of Agriculture and Cooperatives. He developed his expertise in information and communication sectors. His main areas of interest are communication for social change, poverty alleviation, and environment management.

In 2008 he was awarded a Netherland Fellowship (NFP fellowship) to take up his Master Degree in Management of Development at the University of Applied Sciences, Van Hall Larenstein, a part of Wageningen University, Wageningen, The Netherlands.

Besides his regular works with Agriculture Information and Communication Centre (AICC), he also worked as a news-editor and news-reader of Agriculture weekly news bulletin in national Nepal Television (NTV) for four years. He worked as a presenter of agricultural discussion programs in NTV. He is competent in producing video documentaries and scripting of farm radio programs.

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ACRONYMS

ADB:	Asian Development Bank
AICC:	Agriculture Information and Communication Centre
AKIS:	Agricultural Knowledge and Information Systems
CAN	Computer Association of Nepal
CBOs:	Community Based Organizations
CBS	Central Bureau of Statistics
DAE	Directorate of Agricultural Extension
DADO	District Agriculture Development Office
DDC	District Development Committee
DLSO	District Livestock Services Office
DOA:	Department of Agriculture
FAO:	Food and Agriculture Organization of the United Nations
FA:	Farmers Association
GTZ:	Deutsch Gesellschaft Fuer Technische Zusammenarbeit
ICTs:	Information and Communication Technologies
ISP	Internet Service Provider
ISPAN	Internet Service Provider's Association of Nepal
IT:	Information Technology
IPM:	Integrated Pest Management
LAN:	Local Area Networks
MOAC:	Ministry of Agriculture and Cooperatives
MOST	Ministry of Science and Technology
NGO	Non Governmental Organization
NPC	National Planning Commission
NTC	Nepal Telecommunication Corporation
NTV:	Nepal Television
PC	Personal Computer
SMS	Subject Matter Specialist
VSAT	Very Small Aperture Terminal
PRA	Participatory Rural Appraisal
UNDP	United Nations Development Program
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UUCP	UNIX to UNIX Communications Protocol
VDC	Village Development Committee

ABSTRACT

Knowledge and information are basic ingredients of food security and are essential for facilitating rural development and bringing about social and economic change. ICT are increasingly looked at as a potential source of information, knowledge and skill to the rural people of Nepal.

In this age of technology it is very difficult to compete in any form of business undertaking if one is not up to date with technological advancement. Engagement of the rural young people in agriculture with full utilization of ICT can improve their livelihoods and eventually it reduces the poverty levels. However the government should play its part in terms of good policies, by ensuring that ICT is accessible and affordable in rural areas so as to meet their information needs in agriculture and rural development sectors. Access of ICT reduces the information gap that currently lies between the farmers and the potential markets. There is therefore need to assist build local capacity among farmers to support Internet connectivity.

This study analyses the affecting trends and factors of ICT use in Chitwan district, Nepal with the purpose of constructing scenarios. Altogether three scenarios have been constructed and assessed during a stakeholder workshop. During the workshop, three different groups of participants made their presentation on the basis of affecting trends and factors of ICT scenarios. During the discussions participants recognized and practiced the scenarios especially regarding the use of ICT in agriculture and rural development sectors in Chitwan.

After desk study, the research embarked on studying three spaces such as private- space, public-space and institutional-space have been identified for areas of information collection. Farmer's field, government offices and cybercafés are also identified of specific units of three spaces respectively. The information from those units gave a way to generate affecting trends and factors of ICT use in Chitwan. On the basis of recognized trends and factors three possible scenarios have been constructed. The scenarios were assessed on the stakeholder workshop during August 2009. Among three scenarios, the workshop's participants recognized that the 'digital divide' is the prevailing scenario regarding the use of ICT in agriculture and rural development sectors in Chitwan.

Analyzing the results indicates that there is a gap between rich and poor and educated and uneducated people in Chitwan especially in access and use of information and communication technology. The research shows that farmers are interested to use phone, computer and internet services as a source of information and knowledge. But 2 VDCs (Village Development Committee) are still totally out of touch from mobile phones and internet facilities in Chitwan district.

The policy implication of these findings is that the advantages of ICT are only benefited by the rich, educated, and higher caste people in Nepal. The disadvantaged and underprivileged sectors are left behind. In addition, the result shows that there is less impacts of ICT in agriculture and rural development sectors in Nepal. The National Agriculture Policy 2004 envisaged the use of ICT in agriculture sectors. To achieve the government's objective of deployment of ICT for social and economic change, it is necessary to bring favourable policy that guarantees the access and use of ICT for the people belongs to the different socio-economic strata of Nepal.

The scenario analysis strategy made participants engage in the process of social change. Scenario analysis is not a new terminology in the discourse but it is a new for a research strategy in a thesis research project. The findings show that it works well which gives a different taste in carrying out a research project. It also gives a new flavour in the text where the readers can get some of the novel-elements in the discussion.

CHAPTER ONE - INTRODUCTION

1.1. Background

Nepal is an agrarian country and more than 65 percent people are directly related to Agriculture. Around 80 percent people are making their livelihoods with agriculture sector where about 60 percent of industrial raw materials come from agriculture (CBS 2008). Nepalese society is characterized as a farming society or farming community.

Nepal is an extremely diversified and pluralistic society. It is stratified according to ethnicity/caste, gender, income, wealth, age and occupation. The lower caste people are discriminated from all aspects of social activities and social networking. Its highly patriarchal organization has put women in low status and excluded them from public domain. The disparity between male and female children starts from houses and schools. The gap between rich and poor is widening day by day as poor suffer from a variety of cultural exclusions (Dhakal 2008 p. 547).

In total Nepal has 75 districts and Chitwan is one of them basically famous for crop production, vegetable production and livestock production.

Chitwan district, a Terai (flat area) district of Nepal, has total population around 472048 and an area of 2239 km². Among which the urban population is around 27% of the total population. The total household number is around 93000 where average household family member is 4-5.

Chitwan is located at the central part of Nepal which is around 130 KM far from the capital city Kathmandu. The district has surrounded by many rivers and lakes and majority of the areas (63%) covered by jungles and forests (DDC, 2008).

Bharatpur is a district's headquarter of Chitwan. It is a commercial and administrative place of central south Nepal. This district is equipped with higher education, transportation and health service facilities. Narayangarh, on the bank of the Narayani river, is a main town with having numerous shopping zones.

There are 36 Village Development Committees (VDCs) in the district and each VDC has nine wards or the villages. Besides these, there are one sub-metropolitan city and a municipality and each has more than nine wards or urban areas.

The average rate of literacy in the district is around 71%; however, the female rate of literacy is still low. Nepalese language is used to communicate as an official language where other local languages are used for day to day communication.

Regarding to economic development, agriculture production is the main sector. This sector has more than 65% of population and about 90% of labours forces (DDC Chitwan 2008). Rice, maize, wheat and millet are the main food crops of Chitwan. Vegetable production in the district is considered as one of the profit making business. The living of people is strongly depending on the agriculture and livestock production.

1.2. Statement of the problem

Agriculture is the backbone of Nepalese economy. Since, ICTs are the promising technologies for the social and economic development of societies, the scenarios of ICT-use requires an in-depth understanding. From past experiences, technology creates economic

divides in societies just as the industrial revolution has created two distinct classes in the society: the rich and the poor. It is essential, therefore, to analyze the potential impacts of ICTs to societies (Khatiwada & Tolentino 2005 p. 206).

ICT is increasingly looked at as a potential source of information, knowledge and skill to the rural people. It is also considered as one of the change forces of the society. Realizing its potentials, Nepal government has implemented long-term policies and strategies for achieving rural development with the deployment of ICT in the communities (Subba, 2009).

Now, it has almost 6 years that Nepal government has implemented the ICT long term policies. The policy paper emphasizes the access and benefit from ICT in both rural and urban areas of Nepal. However, the Nepal government lacks the information of social consequences and impacts of ICTs in Nepalese society. National Agriculture Policy- 2004 also recognizes the importance in using ICT in agriculture (AICC, 2004). But, Ministry of Agriculture and Cooperatives (MOAC) lacks the information about the uses and impacts of ICT on agriculture and rural development sectors. Thus, the objective of this research is to assess the prevailing scenarios of ICT in strengthening communication and information services to agriculture and rural development sectors in Nepal.

1.3. Research Questions

Based on the above information the researcher came to the main research question in order to understand the prevailing scenarios of ICT use in Nepalese rural communities.

What scenarios are prevailing in Nepalese rural communities regarding the use of ICT in agriculture and rural development sectors?

To answer the main research question, the sub-research questions need to be explored, they are:

1. What is the role of ICT in people's daily activities among rural communities?
2. What are the scenarios that are recognized and practiced using ICT in agriculture and rural development sectors?
3. What scenario is most likely to happen in rural communities regarding the use of ICT in agriculture and rural development sectors?

To answer these questions scenario analysis is considered as one of the appropriate strategies. Because the research questions demand future predictions and that is possible by scenario analysis. In this research the use of ICT denotes the use of internet and mobile phones in the rural areas especially in agriculture and rural development sectors in Nepal.

1.4. Limitation of the study

Modern ICTs are very new for Nepal and there are very few areas where ICTs are being adopted. Because of this, the findings of this study may not represent the entire country's reality. Another limitation of the study is that there are very few literatures about ICTs in Nepalese perspectives.

1.5. Outlines of the chapters

The first chapter explains the background, the objective and problem of this research. Literature reviews related to this research are presented in Chapter 2. Chapter 3 concentrates on research strategy. Chapter 4 presents the results on the basis of affecting trends and factors of ICT scenarios in Chitwan. The assessment of scenarios regarding the use ICT in agriculture and rural development sectors is presented in Chapter 5. Finally the analysis, discussion and conclusion of the research are mentioned in Chapter 6. Some additional information is presented in annexes.

CHAPTER TWO - LITERATURE REVIEW

In this chapter, major concepts such as communication, development communication, information and communication technologies and their relation to social change are described. This chapter provides the theoretical concepts of communication and its use in agriculture and a rural development sector which prepares the grounds in finding the trends and factors of ICT scenarios in Chitwan. With this theoretical insight the information from three spaces such as private-space, public-space and institutional-space has been analysed. In results, on the basis of affecting trends and factors three scenarios are constructed and assessed in the workshop. This chapter provides the in-depth theoretical knowledge about ICT and scenario analysis process. The main objective of the research project is to analyse the scenarios regarding the use of ICT in Nepalese rural community.

2.1. Communication

Communication is a process of transferring information from one source to another. It gives the way to interchange thoughts, opinions, or information by speech, writing, or signs languages. Communication is for the sharing of knowledge to reach in a common consensus for action that takes into account the interests, needs and capacities of all concerned (Servaes 2002 p.1).

The twenty-first century is characterized as information and communication age. The advancement of science and technology has brought new hope and promises for the human development. Due to the access of digital technology now the world is becoming a small village. The world is moving away from economic survival based on land, energy and matter towards information and knowledge societies. Khatriwada & Tolentino (2005 p. 205) explain that the old capital bases are becoming outmoded and knowledge becomes the key raw materials. Information and communication technology (ICT) provides knowledge, skills and opportunities to the people. It supports the knowledge sharing process in the field of agriculture and rural development sectors.

Leeuwis (2008 p. 189) explains that media is a device for transportation of message from source to clients. He divides the media into three main categories such as conventional mass media, interpersonal media and hybrid media. He puts "currently, these diverse media are more and more combined into new packages, so that the boundaries between the categories of media are becoming more vague". He argues that though some Medias are combined but separate look is needed to the specific categories as it has its different impact in interactive learning. Again he puts "it is a mistake to talk about media as if they have fixed qualities and characteristics, because the specific context affects whether such characteristics as actually realized".

According to him, human interaction is important in using technologies. For example, he explains that email is not fast and interactive if the respondents delay in answering. The impact of the technologies is based on the people's involvement in interacting with the technologies. As Leeuwis (2008 p.189) says that technology is a means of 'transportation' and thus the content or message is important to the recipients. If content is not interesting than the technology can not do the best for people. For example if farmers do not get relevant information about agricultural practices and marketing of the agricultural products in the internet they do not want to keep using the internet. The content is even more relevant if the target clients are marginal farmers. Meera et al. (2004 p.13) puts "since small and marginal farmers are using ICT services, more emphasis should be given to providing information relevant to their farming systems".

Prasad (2009 p. 7) says that current arguments claim that it is not technology itself that generates value; rather how it is used that contributes to organisational performance. The internal environment of the organization such as physical facility, motivation of the staff and attitudes of people in the organization is important. The external environment such as social, environmental, political economic and technological can play vital roles for organizational performance. Technology can support the process of sharing the knowledge and skills to farmer with service providing organizations. It gives the outcomes such as availability of information and skills to the farmer when it is used effectively.

2.2. Communication for development

Mefalopulos (2008) argues that too often the most important missing element in development programs was genuine (two-way) communication between the decision makers, the experts, and intended clients. Media, no matter how technologically advanced; messages, no matter how skillfully packaged; and information, no matter how relevant, are not enough to bring about meaningful and sustainable results. These results can only be achieved if the people involved (stakeholders) are part of the process leading to change. This realization shifted professional focus from media to people, from the products to the process.

It is necessary to intend to make clear the seemingly straightforward distinction between “communication about development operations and results” and “communication for development operations and results.” In the first case, communication is used to inform audiences about development initiatives, activities, and results. It is about transmitting information and messages. In the second case, communication is applied to engage stakeholders, assess the situation, and devise effective strategies leading to better and more sustainable development initiatives. It is more than transmitting information; it is about using communication to generate new knowledge and consensus in order to facilitate change. Both are important and require a different body of knowledge and different set of skills.

The emerging paradigm in development communication, focused on participation and two-way communication. It makes the case about the importance of incorporating communication practices into the policies and practices of development. It intends also to offer a broader conception of communication that would take into account other purposes and functions than the usual ones. Communication is not only about raising awareness, informing, persuading, or changing behavior. It is also about listening, exploring, understanding, empowering, and building consensus for change. Two-way communication, used to understand, assess, explore, and facilitate decision making related to change, combined with the effective use of one-way communication approaches, has been proven to significantly enhance results and the sustainability of development initiatives (Mefalopulos 2008). Thus, it is relevant to take a closer look at how the specific opportunities presented by the new and converging information and communication technologies can be used to support the processes of rural development.

2.3. Communication for social change

The concept of ‘communication for social change’ is the sharing of knowledge aimed at reaching a consensus for action that takes into account the interests, needs and capacities of all concerned. Communication media are important transportation means in achieving this process. In some cases interpersonal communication can play a fundamental role in message delivering process. Communication researchers assumed that the introduction of media and certain types of educational, political, and economic information into a social system could transform individuals and societies from traditional to modern (Servaes 2002 p.1-2).

FAO's Communication for Development Group has been one of the foremost practitioners of applied communication for improving agriculture and related sectors in the developing world (e.g., forestry, environment, and nutrition). FAO focuses the model of participatory communication. It is a two way communication process where the farmer, researchers and the extension workers involve in the information sharing process. Servaes (2002, p 14) focuses on in recognizing the rural people at the heart of development, by seeking their views and involving them from the start. Participatory communication has become a link between farmers, extension, and research for planning and implementing consensus-based development initiatives.

Society is right in the middle of a change. The industrial society is gradually being replaced by a knowledge-based society. Widespread diffusion of personal computers and growth of the Internet have moved ICT into the mainstream of the most developed culture, where people and organizations look to ICTs to solve all manners of problems. The technological development in the ICT sector is one of several factors that have contributed to the society's transformation into a knowledge-based service society in recent decades. Subba (2009 p. 02) says, although ICT has not been the direct cause of change, the technology has often acted as a catalyst, and has reinforced ongoing processes, such as the globalization of the economy. ICT facilitates the transfer of technology and knowledge sharing process in the field of agriculture and rural development sectors.

Thomas (quoted by Servaes 2002 p.7) argues that the worldwide poverty situation could be solved by participatory communication, an approach derived from FAO (Servaes 2002 p.1-2). The use of participatory communication education mechanisms could bring about social change and development through sustained improvements in agriculture, health, education, politics and economics over a sufficiently long enough time to make a considerable proportion of the population less poor, both in material as well as immaterial ways. Participatory communication approach is useful in the places where the issues are related to poverty and insufficiency of food for people. The model helps to negotiate the problems in the societies.

According to Sohoo (2008 p. 923) the development of ICTs in South Asian Association for Regional Cooperation (SAARC) region has revolutionized the entire agriculture field, generating new market, changing the new structure of the agricultural channel and reengineering all processes. ICT in agriculture plays a vital role in learning transformation related to delivery of services as well as agricultural products. The demand of agriculture sector is now stronger than ever before. SAARC agricultural Centre (SAC) proposes that ICT needs to be conceptualized in its many facets, perceptions, and in its manifold impact in farming society.

Joseph & Andrew (2007) argue that the rural women's lack of mobility and less hands-on computer experience might hinder women's welfare and empowerment. The use of the telephony (both cellular and land line), internet and other ICTs can benefit rural women in educational, business and economic sector. Women in rural India and rural South Africa were marginalized partly due to their lack of ability in being vocal when it comes to empowering themselves using ICTs due to cultural norms in India, and apartheid in South Africa.

Vanek et al (2007) have an Australian experience about ICT and its impact in society. They explain that ICT is becoming increasingly prevalent in the Australian dairy industry, primarily in the area of herd management and dairy shed automation. First use of new electronic identification-based ICT often coincides with a stressful period for farmers and ICT learning is subsequently not prioritized.

Talwar et al (2005) have also same experience in Indian context. They mention that the potential for application of ICT in the agro-sector is high. New tools and techniques are evolving and the implications of this are clearly visible at a global scale. But the level of penetration of ICT is very low in India since the rural masses are not aware of the new technological innovations. The private initiative taken by Tata Chemicals Ltd started with an objective of providing the farmers with infrastructure support, operational supports, coordination and control of farming activities, and strategic support.

Rao (2007) argues that knowledge is an increasingly significant factor of production in modern agriculture. ICTs can accelerate agricultural development by facilitating knowledge management. Tiwari (2008) says that both profit-motive and business augmentation on one hand and community services and rural welfare on the other have been the objectives of ICT-based models in agriculture in India. The ICT endeavours for agriculture belong to a wide array of agencies, viz private sector, public sector, self-help groups and NGOs. ICT could also be one of the potent tools to bring about gender mainstreaming. E-Learning is being integrated into the existing organizational and educational structure as a hybrid system that can be called 'ICT-supported learning'.

ICT is accessible to the people in urban areas and still the rural people are lacking behind the availability of the mobile phone and internet. The rich who live in the city area have good connectivity in mobile phone and internet facilities but the villages are suffering from bad connectivity. Rao (2007) pointed out the future scenarios of ICT and indicated that, as ICT infrastructure grows and connectivity and hardware costs decline, the critical constraints are likely to be the development of appropriate policy and institutional environments for the creation and delivery of information and knowledge to the end users. Significant policy, institutional networking and capacity building initiatives will be required at various levels to overcome the constraints and effectively integrate ICTs into the agricultural and rural development process (Rao 2007).

Joseph & Andrew (2007) put an example of South African case of women regarding the use of mobile communication in the agriculture and rural development sectors. They argue that access to ICTs can have dramatic impact on poverty alleviation for rural women and for achieving socio economic development goals. Rural women need to treat ICTs as an empowerment tool and a means to a living. The use of mobile communication devices and internet are changing the way agricultural activities are managed by farmers nowadays.

Thus, it is necessary to observe the communication and social elements together to get the proper understanding of the concepts.

2.4. ICT and Social Change

The human society has always had the means to express ideas and emotions through forms such as storytelling, dance, music and art. These are the means of communication where the knowledge sharing is possible. Modern media have extended those capacities, in terms of realism, reproduction and distribution to mass audiences. The institutional questions which arise are not necessarily 'new', but they arouse concern and interests because their potential impact is so great (Branston, & Stafford 2007, p. 119).

Past experiences show that technology has new consequences in the society, which sometimes creates social and economic divisions. Places where the society is extremely stratified according to gender, caste, income and education, the probability of social-economic division is even higher. Khatiwada and Tolentino argue that technology is making the gap wider between the poor and rich in developing countries.

Cyber extension, the use of ICT, is a useful practice to improve rural livelihoods in key areas, which has potential to change the economy of the rural sectors. It can derive the advantage of ICT to provide effective delivery of information related to agricultural sector. Provision of accessible version of information through cyber extension backed by appropriate text and audio-visual illustrations in local languages highlighting the agricultural technology would prove to be cost effective and powerful tool in building up of the capacities of the farmers (Sasidhar and Sharma 2006 p. 01).

It is not easy to predict the relations and their changes in time in communication technology. This approach comes closer to the reality of everyday life where people select new, traditional, and/or geo-ethnic media and interpersonal modes of communication from all of the options they have available to them. Change is never linear or direct. Bruijn (2008) argues nevertheless in the discussion on the relation between technology and the development of society optimism that prevails about this relationship in less well-developed areas of the world (i.e. the margins). The development discourse states that improvements in communication lead to direct improvements in the situation of poor people. This discourse refers to the process of articulating knowledge and power through which particular concepts, theories, and practices for social change are created and reproduced. The introduction of ICT is the ultimate way in which the world's margins can be involved in the whole progressive development project.

Processes of technical and social integrations are difficult, but needed for agriculture and rural development process. It seems necessary to try and combine technical perspectives with user and social perspectives. These kinds of interdisciplinary processes incorporate understanding, respect and negotiation. It is important to realize that crossing disciplinary borders lies in more than one field and that it is important to identify these fields for each particular socio-ICT project. Lie & Balasubramaniam (2006) put "it is often not one border that needs to be crossed, but many. Topics and questions that were learned from OSCAR project (Open Source Simple Computer for Agriculture and Rural Development) in the field of 'ICTs for agricultural development' relate among other things, to using appropriate ICTs, ICT applications and crossing knowledge borders". For appropriate ICT applications and in the field of development and social change, it is necessary to think about combining situations from inside and outside agriculture and rural development.

The deployment of mobile phones has a positive impact on sustainable poverty reduction. In order to achieve the maximum impact, it remains vital to continue the evaluation of the development impact of mobile phones on sustainable poverty reduction to help identify relevant applications, which would maximize the economic and social benefits. Bhavnani, Wai-Chiu, Janakiram & Silarszky (2008) explain that the measurement of economic and tangible benefits of social change, a clear, sophisticated methodology is yet to be developed. Yet, in rural communities, where family, kinship and societal ties are often stronger than in urban communities, these benefits remain the compelling yet untold story.

Bowonder (2005) have an experience of using ICT in agriculture and rural development sectors in India. After involvement of private sectors, the farmers have got exposed to the use of ICT in the farm business. Farmers are able to access a wide range of information from using ICT such as climatic conditions, knowledge about inputs and cropping patterns. They claim that the company launched ICT initiative project in India made a pivotal support to increase the yield and reducing the expenditure for the farmers. The Indian experience using ICT in agriculture can be useful in Nepalese context because the social and geographical situations are much similar between two countries.

The communication process is changing due to the invention of new technologies. This is most obvious in science and technology – ICT in particular. ICT such as internet and mobile phone have impact in agriculture (Bowonder 2005 p. 322). Technology has links with social,

political, economic and cultural changes in the societies. New technology brings changes in the nature of work, communication, family, community, and specially life styles of the people (Jarvis, Holford, Griffin 2008, p. 14). These changes and forces are sometimes very deep in the societal level as they have certain impacts on people and places. They reflect the balance of power in the world and in society, new direction of social and economic policy, and the information and communication possibilities opened up by new technology. Jarvis et.al (2008 p. 14) put “indeed change has become one of the most universal of human experiences, and the concept of life long learning has to be understood in this light”.

In reality social norms and rules are not fixed, but adapt and change with the evolving circumstances that confront individuals in a wider social and economic context. Ellis (2000 p. 20) says this process involves a renegotiation and redefinition of social roles, and it allows women, in particular, ‘voice’ in redefining outcomes that is absent when the social relations of the household are treated as an unvarying backdrop to fixed bargaining rules.

Thus, the communication process or ICT can also address the issues related to gender and women in the societies.

2.5. Scenario analysis

Ritchey (2009 p. 2-3) says that scenario analysis is a general morphological analysis which is based on the fundamental scientific method of alternating between analysis and synthesis. For this reason, it can be trusted as a useful, conceptual modeling method for investigating problem complexes which are not meaningfully quantifiable and which cannot be treated by formal mathematical methods and causal modeling.

Thus, scenario analysis is a strategy for structuring and analyzing the total set of relationships contained in multi-dimensional, non-quantifiable problem complexes, and for synthesizing solution spaces.

CHAPTER THREE - RESEARCH STRATEGY

Inspired by the concepts of communication, communication for development, communication for social change, ICT and social change, and scenario analysis, this research has been designed to apply those concepts to explore the prevailing scenarios regarding the use of ICT in agriculture and rural development sectors. The main aim of this chapter is to develop the research strategies for conducting the research, which includes research methodology, conceptual framework and research area.

To answer the research questions sets in the thesis project, scenario analysis is considered as one of the appropriate strategies. Because the questions demand future predictions and that is possible by scenario analysis. Specifically it assesses the trends and factors of use of ICT and their affects in rural farming society. In this research the use of ICT denotes the use of internet and mobile phones in agriculture and rural development sectors in Chitwan.

Scenario analysis is chosen as a research strategy of this project. The following descriptions explore the reasons why this strategy is selected for this purpose.

3.1. Scenarios

A scenario is a description of an event or series of actions and events. It has its outline of entrances, exits, and action describing the plot of a story. This is also an account or synopsis of a projected course of action, events or situations. Scenario development is used in policy planning, organizational development and generally, when organizations wish to test strategies against uncertain future developments. It is also a narrative describing foreseeable interactions of types of users (characters) and the system. Scenarios include information about goals, expectations, motivations, actions and reactions. Scenarios are neither predictions nor forecasts, but rather attempts to reflect on or portray the way in which a system is used in the context of daily activity.

Scenarios are frequently used as part of the systems development process. They are written in plain language, with minimal technical details, so that stakeholders such as designers, specialists, programmers, engineers, managers and marketing specialists can understand the issues in the better way. Scenarios are widely used by organizations of all types to understand different ways that future events might unfold. Scenario planning or scenario analysis is a complex process related to future studies.

Schnaars & Ziamou (2001) explain that scenario can be written rather than calculating it to four significant decimal places. It is more in keeping with the messy future encountered in real world forecasting- especially long term forecasting of radically new products and technologies, on which data are few and uncertainty is rife.

Scenario writing is an idiosyncratic practice as like a fiction writers are free to write according to their imagination. Prediction of the future is hard, but putting together a process of imagination on the basis of trends and factors can give a picture of uncertain world.

Basically the construction of the scenario comprises three defining characteristics such as stylized narratives, multiple and tracing progression of present to future. In scenario analysing process these characteristics need to take into consideration. Each characteristic have its specific features such as 'stylized narratives' can provide a vivid image, the situation can be contextual and have a series of interrelated events connected by a plot. Next, the 'multiple' characteristics usually comes in sets, most often groups of three or four and it shows possible futures, rather than one likely end-state. The third characteristic, 'tracing

progression of present to future' has two features in scenario analysis. First it determines what path the present will take and the second, one thing follows another as a necessary consequences.

According to Ritchey (2009), scenario analysis is a strategy for identifying and investigating the total set of possible relationships or "configurations" contained in a given problem complex. This is accomplished by going through a number of iterative phases which represent cycles of analysis and synthesis – the basic method for developing (scientific) models. The method begins by identifying and defining the most important dimensions (or *parameters*) of the problem complex to be investigated, and assigning each dimension a range of relevant values or conditions.

The above descriptions indicate that scenario analysis strategy is used in research project with certain purposes. In this study also the research questions demand the prevailing ICT scenario in Chitwan context. To answer these questions it is necessary to seek the integrative relationships between different spaces. In this research three spaces - private-space, public-space and institutional space are identified where it is necessary to identify the conditions and parameters of ICT use in Chitwan. It also requires defining the limits and extremes of different parameters within the problem space. As a process, the strategy demands parameters, conditions and the issues. In other words it demands affecting trends and factors of the concerned issues.

For this research project, after the literature reviews, three spaces are identified and the research is carried out on the basis of information gathered from these spaces. The first space is the private-space which covers the farmers and their involvement in ICT related activities. The second space is the public-space and this space is related to the government offices and their ICT related activities. The last space is the institutional-space and this covers the cybercafés, its services, infrastructures and activities. These spaces have also their specific units. To narrow down the research area only one unit from each space is selected for study for example farmers from private-space, government offices from public-space and cybercafés from institutional-space.

All total 9 intensive interviews were carried out in all these three spaces. In addition, cybercafé activities are seen regularly for a week as a process of information collection. This information along with other secondary information is taken into consideration as raw materials for generating trends and factors of ICT scenarios in Chitwan. In between the scenario generating process the variables from trends and factors were put together in groups. On the basis of the gathered information the affecting trends and factors were identified and this is the first results of the thesis project. On the basis of affecting trends and factors, the possible three scenarios were constructed.

For scenarios assessment a workshop is considered as a proper place to discuss with the concerned stakeholders. During discussion people can recognized and practiced the issues regarding the use of ICT in agriculture and rural development. The workshop is useful for justifying the gathered information from different sources using different methodologies. In this research project, a workshop was organized in Chitwan for scenarios assessment.

3.2. Research Methodology

This research was conducted during July and August 2009. The work was started with desk study and later field activities during a period of four weeks in Chitwan, Nepal. The field activities are complement to the researcher's gained theoretical exposure from literature on communication and to generate primary data on how the uses of ICT in farming society is perceived and / or experienced in comparison with the real field situation in Nepal.

In order to carry out this research activities, the researcher made a consultation meeting with different stakeholders in the capital as well as in the district. Meeting with AICC in Kathmandu and DADO in Chitwan are considered as most informative and supportive for this research project. Meeting with Subject Matter Specialists (SMSs) in DADO Chitwan gave a way to make a framework for identifying the potential farmers, youths and farmers' group for interviews and discussions. Researcher made visit to the selected people in their households for intensive interviews. After rapport building, a process to make the clients ready for sharing the ideas, the researcher started to put questions in normal way. The researcher tried to get feelings, emotions and ambitions of the people during the interviews. A suggestive questions were avoided because such questions can stop produce the internal feelings of the people.

To conduct the interview the researcher introduced himself and explained the procedure, the objective of the research and the use of the information of research are mentioned. Once the respondents give a verbal consent to be interviewed and audio recording than the interview is carried out. The interview is conducted in the Nepalese language as majority people can speak and understand this language in Chitwan. Likewise, additional ethical consents have been taken before recording the interviews with respondents and informants.

During the period of data collection, the researcher made regular visit to a Cybercafé in Bharatpur to get the general observations about the access of internet, types of users and the types of information people searched. The researcher also made a visit in public and other common places such as vegetable collection centre, milk collection centre and open markets to observe the day to day activities of the people. Researcher paid attention to observe some of the activities of the people used by mobile phones in their day to day activities. Some secondary information has been taken from other sources such as agricultural university, central agricultural library and other academic institutions from Chitwan. The researcher made visits to UNDP information centre and Central Bureau of Statistics in Kathmandu for further information about ICT in Nepal.

On the basis of collected information affecting general trends and factors were identified regarding the use of ICT in agriculture and rural development sectors. Those identified trends and factors were used as a source of scenario-writing in the context of Chitwan district. Three future scenarios were prepared in writings and put them on discussion during the workshop (see chapter 6) with the objective to assess the future context regarding the use of ICT in agriculture and rural development sectors in Chitwan. Both primary and secondary information are taken into consideration during scenario-writing process. Reports and documents from DADO, CBOs and other local organizations were collected for additional information. The trends and factors along with other collected information were taken into consideration as important assets for information analysis process during research period. Some quotes from farmers and other stakeholders are also included in the scenarios writing process to enhance the authenticity of the scenarios.

3.3. Study area

This research is conducted in Chitwan district. This is one of the flat (Terai) districts in the central development region of Nepal. This district is considered as one of the fertile district of the country. Politically, the district is divided into 36 Village Development Committees (VDCs), one municipality and one sub-metropolitan city. Majority of the people are engaged in agriculture and they supply vegetables and other food items to domestic and the central capital markets. Chitwan has a mixed castes and cultural societies. The following figure shows the Chitwan district of Nepal.

3.4. Map of Chitwan, Nepal



Fig. 3.1: Research area

Source: http://en.wikipedia.org/wiki/File:Nepal_zones.svg

3.5. Conceptual framework

ICT is a carrier of new information, knowledge, and opportunities. These information, knowledge, and opportunities have new consequences in society. Continued access to this technology by gender, caste, age, education, and wealth may have impacts on social life of people in family or societal level. Specifically the impacts can be seen in technology selection, people to people relation, knowledge sharing and improved agricultural practices. Scenarios look past present and the future consequences, problems and prospective of the society. With this background, the following figure shows the conceptual framework of this research project.

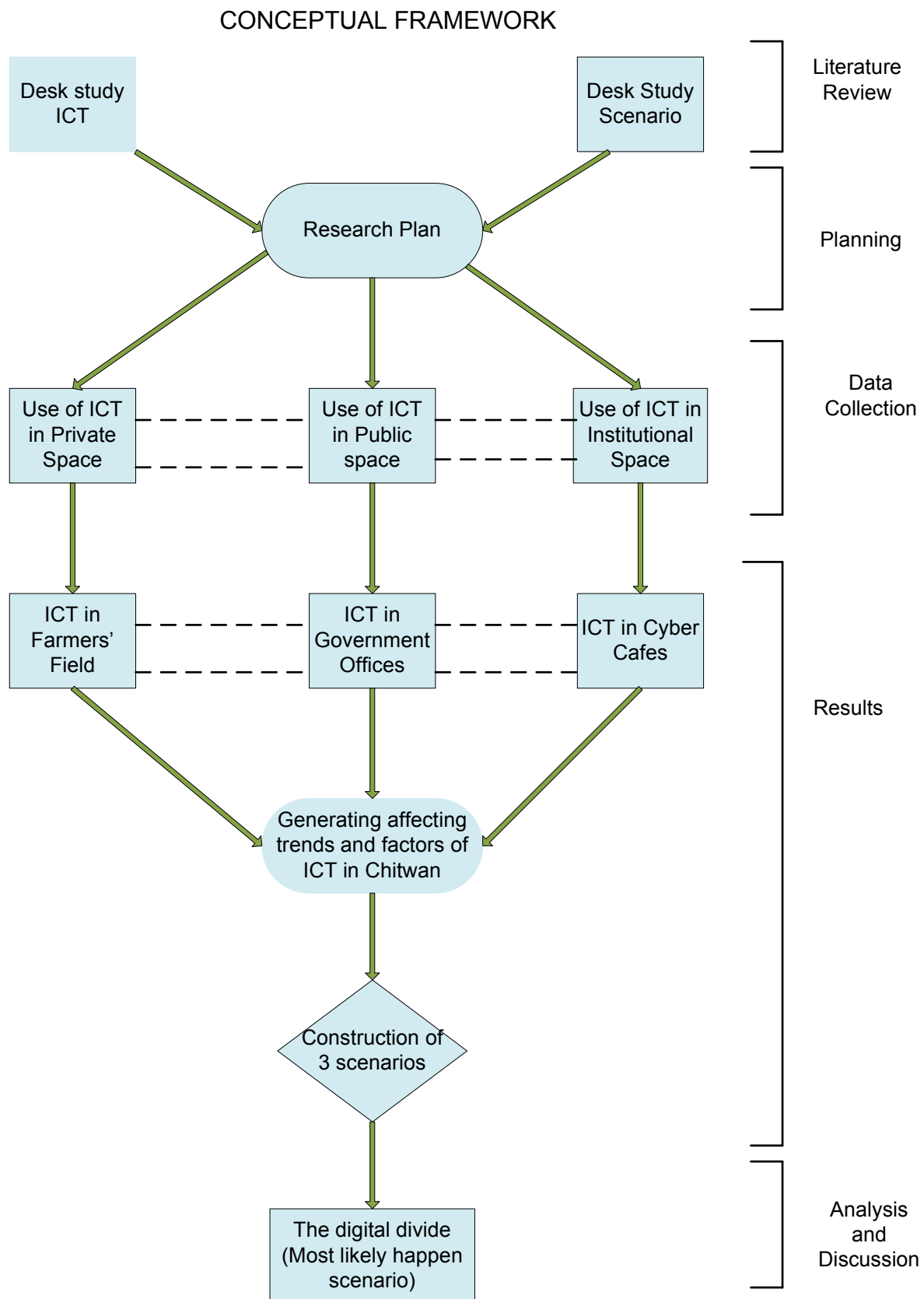


Fig. 3.2: Conceptual framework of the research project

The above conceptual framework showed the different levels of field activities and their relations to the process of scenarios construction and assessment. The literature review is an iterative process which provides the basic theoretical concepts to formulate and to understand the research problems. For this research project, three spaces were identified and possible affecting trends and factors of ICT were collected. On the basis of driving trends and factors the possible three scenarios of ICT use were prepared. These scenarios were assessed on the stakeholders' workshop.

Scenarios assessment is one of the major activities of this research project. The following paragraphs describe the information about scenario assessment workshop (stakeholder workshops) and its methodologies.

This scenario assessment workshop was jointly organized by DADO Chitwan and the researcher from University of Applied Sciences, Van Hall Larenstein for answering the research questions sets in his master thesis. The workshop was divided into 3 parts; introduction, group discussion and plenary sessions. In total 20 people were expected but 15 people were participated in the workshop. Participants from remote areas were not able to come in the workshop because of the transportation problems as some parts of the roads damaged by the floods due to the heavy rain which stated very late this year. Participants from three spaces such as farmers, youths, agriculture extension workers, DADO staffs and NGO representatives were invited in the workshop.

The three scenarios were presented in the workshop and on the basis of issues on different scenarios three group discussions and presentations were made by groups of participants. In addition, a separate discussion was made in finding the roles and responsibilities of different stakeholders specifically in policy making, implementation and monitoring processes regarding the use of ICT in agriculture and rural development sectors. The following are the headings of three scenarios which were presented and discussed during the workshop;

1. Digital rural development in Chitwan
2. Changing patterns - farmers digitize and the government does not keep pace
3. The digital divide becomes or widens the rural – urban divide

Most of the participants have long experiences in their respective fields and so interactive approaches were used as a method of instruction. With these three scenarios the following components were focused during the discussion in the workshop.

1. Verifying the scenario with the participants: for example - how do they recognize in this scenario?
2. What issues, parts are recognized?
3. What other experiences and issues could participants add?
4. What scenario is most likely to happen and why?

The over all objective of the workshop was to discuss on the issues of three scenarios in recognizing with the most likely happen scenario regarding the ICT context of Chitwan. The specific objectives of the workshop were as follows;

1. To explore the role of ICT in people's day to day activities in rural communities in Chitwan.
2. To explore the scenarios that are recognized and practiced using ICT in agriculture and rural development sectors
3. To explore the most likely happen scenario in Chitwan context.

Considering the adult learning process for example- sufficient time for discussion and interaction, necessary space for group work and proper logistic supports - were taken into consideration in instructional techniques selection process. In most cases, workshop sessions were supported by group discussion, brainstorming, scenarios study, demonstration and plenary discussion. A variety of resources were selected and used to draw the participant's attention into the topics. The easily available resources were chosen as instructional materials but the over use of materials and other aids were avoided.

Finally, participants were able to recognize and practice the most likely ICT scenario and its impacts in rural society.

CHAPTER FOUR – RESULTS: TRENDS AND FACTORS

This chapter describes the trends and factors of ICT use in Chitwan. At the beginning it describes the ICT's status in Chitwan. In this case the findings are presented on the basis of information gathered from three spaces. Most of the findings are supported by literal quotes from different respondents or informants. The quotes are presented in italic format.

Then, the affecting trends and factors are identified on the basis of the information from different research activities. Those trends and factors lead to prepare the ground for scenarios writings. Three scenarios are constructed and presented in the later part of the chapters. The fictionalized scenarios are presented on the annexes of the report.

4.1. Status of ICT in Chitwan

The findings are presented on the basis of the three spaces. In this case the first space called private-space covers the farmer and their activities. The government offices and their activities come under the public-space. The third space i.e. institutional-space, in this case refers to the cybercafés and their activities. The followings are the findings which are related to private-space.

Due to the accessibility and use of ICT in the district, now it changes the people's day to day activities. Generally gathering in the teashops in the morning and evening is a very old tradition of Nepalese rural people. But now this tradition has been changed and very few people are only interested to go in the teashops for talking in the morning and evening. Regarding these issues Mr. Purnadatta Bhusal, an ex-teacher and a farmer, has his own experiences. He says –

“Now it is not necessary to go outside in the teashops to share our information or to get new information from other people as we have now different means of communication. Now, I am using my saving time in productive works.”

ICT seems to have its deeper impacts in social setting in the villages. Now the daily activities of the people have been changing gradually. Ms. Sraraswati Bhusal, a college student in Chitwan has realized that the work division in the household activities has been changed. She says -

“Due to the access of ICT in the houses the intensity of going outside for talking especially for male is reduced. Gradually they start helping in the household activities”.

Now women have more time to involve in some kind of income generating activities such as beekeeping, chicken farming or kitchen gardening. In addition, women have more time to look the children and to feed them properly.

Now the pattern system in Chitwan is also changing gradually. Gradually people are shifting from subsistence farming to commercial farming. The small scale enterprises have been raised during this five year period. Mr. Chudamani Bartaula, Cooperatives Chairman, says-

“Previously we have bit doubt that whether we can get the market or not. But now the situation has changed and we have every means of communication and we can contact instantly for market information. Thus these days people are interested for commercial farming or large scale production.”

Some of the cooperatives in the district check the prices in the local market before sending their agri products in the Capital or other markets. It is a kind of cross checking whether the middle persons in the villages has given proper price or not in the field. Mr. Bartaula again says –

“Phone and mobile phone are used to check the prices in the nearest market Narayangarh (local market) before sending the products in the capital city, Kathmandu. It is a kind of cross checking whether the middle person is cheating us or not”

In Chitwan, Agrovets (agricultural inputs seller) are gaining their credibility from the farmers. Basically Agrovets now not only selling their inputs but also providing the agricultural information to the farmers. It is possible that most of the Agrovets people are coming from agriculture background. Some of them have bachelor of even higher agriculture qualification and field experiences. Though their service is limited but gradually the Agrovets are gaining their momentum as an information centre in the district. Mr. Hari Bahadur Thapa from Mangalpur says-

“Agrovets are also our source of information. Sometimes we call them in our field when we have problems in our crop or animals. They make quick response and their services and information are effective”

Accesses of technology and awareness of the program both are important for introducing the new technologies in the villages. Most of the people in Chitwan even they don't know the importance of mobile phone, computer and internet facility and their use in income generating activities. Mr. Bhusal again says –

“Lack of awareness is a main reason that only very limited farmers are using internet. The service providing sectors such as District Agriculture Office (DADO), District Livestock Office (DLSO), and District Administration Office (DAO) should initiate the digital culture to provide their services in the internet”. They should organize awareness campaigns in the district”.

Many young people in the district do not want to be a future farm successor. Most of them perceived that agriculture business is not a profit making business. In addition the society has not given the due respect to this field. Ms. Sabina Kandel, a master level student says-

“Cost of production of agriculture sector is high and so this profession is less profitable and less respectable”

The following findings are related to the second space i.e. public- space. Public space is basically responsible for coordination work among other spaces and so some of the findings are mixed to each others.

Among 36 Village Development Committees (VDCs), now 34 VDCs have access to telephone facility. In total, 9 digital telephones centres have been installed in the district. The numbers of mobile phones used in Chitwan is 125,000. In addition, 35 thousands CDMA and 22 thousands land line phones are also used in Chitwan (2008). Mr. Durga Prasad Parajuli, Officer, Telecommunication branch in Bharatpur says -

“A Magar Kanchha (local name) from Kaule (remote part of Chitwan) now able to call in Mugling's (local market) vender about rates before digging-out yam from his filed”.

Telecommunication Chitwan has a package program to elder people and disabled people. Those peoples are getting subsidised sim-cards. In addition, subsidized sim-cards have been distributed to the students. In Chitwan, along with Telecom, other three internet service providers namely Techmind, G.Net and World link are working in the communication field.

The total number of cybercafé is 35 (2006) where as the no. of computer training centres established in the district is 20 (2006). In total 15 (2006) computer shops are doing their business in the district.

Out of 36 VDCs in Chitwan now only 2 of them are out of mobile services in the district. Mr. Parajuli adds-

"We are making plan for 10 year where 90 percent people will have mobile phone in their hands. Today the mobile phone is becoming a part of social life and in tomorrow it will be used for development"

In total around 40 million Nepalese rupees (NRs) equivalent Telecom recharge cards are sold every month in the district. Telecom office now tries to extend its service command areas. For example the service in the Madi areas especially focused on the farmers. Mr. Parajuli further adds-

"The mobile phone service in the Madi areas is especially focused for agriculture market information of farming community as there are 96% of the people are farmers."

District Development Committee (DDC) Chitwan now has its own information and documentation centre which is responsible for district level information management. This centre works with the government and non government institutions in the district in a coordinated way. Mr. Balaram Luitel, information officer, DDC says-

"Majority of the offices in the district now have the internet facility but very few have their own websites. Generally the internet is used for email and Google search"

DADO Chitwan has access to internet but limited members are trained to use the internet facility. Mostly the officer levels use the facility where the junior members are less interested to use the technologies. Mr. Laxman Paudel, Chief, DADO Chitwan, emphasizes the importance of mobile phones and says –

"These days the mobile phone is used as a means of communication for monitoring and evaluation of the programmes. It is also easy to get feed back from farmers and to monitor the staffs in the field"

Now, most of the extension workers in the field use mobile phone for individual or official purposes. In some cases the DADO office provides some compensation cost when a private mobile phone is used for official purposes. Extension workers, who have large and hilly command areas where the transportation facility is not common, are now extensively using the mobile phones for service delivery mechanism. Mr Deepak Raj Paudel, Ratnanagar Agri Service Centre says-

"I need to look after a huge command area including 5 hilly VDCs and it has been only possible now due to the access of communication facilities such as mobile phones."

Majority of the field extension worker says that they do not know how to operate the computes but their children at home or in the cybercafé now are using the computer and internet technology. These field workers are aware that some of the farmers in the field are now using computers and internet as a source of information.

Mr. Purna Prasad Gaudel, extension worker claims that in average he receives 15-20 phone calls from farmers and he needs to respond them everyday. He says-

“Farmers make a call before coming to Agriculture Service Centre (ASC) and take appointment. They ask for necessary documents to bring with them for group formation, application for small irrigation facility etc. It reduces their double walk from office to their home to bring the necessary documents again”

After the public-space findings, the followings are the results related to the institutional space.

Cybercafés are useful places especially for young generation. These Cafes provide internet, phone, fax, and photocopy services. So, people make their visit on cybercafés for their specific purposes. Besides younger generation, business community people also use internet facility in cybercafés. But only limited no. of farmers used to go for cybercafés. Basically the farmers are interested about the current prices of their products. The information in the English language makes the people reluctant to further use the internet facility because very few farmers can read or write the English languages.

The researcher made a week long regular visit to Versatile Cybercafé in Bharatpur. The café manager shares his problems and says –

“I wanted to closedown my business because of the huge power cuts in the past months. Every month I had to pay 16 thousands rupees for Internet service”.

The power-cut situation is improving now. The manager wants to replace desktop computers by laptops which can be used even in power-cut times with less power supply. One inverter (a rechargeable device) can operate 4 or 5 laptops during power-cut period. In General observation, it shows that the cybercafé are the visiting place of the young people in Chitwan. The café manager again adds –

“This city (Bharatpur) would be a cyber city in future, because the numbers of cybercafés are increasing gradually. In addition, now people are also interested in using ICTs in their day to day activities.”

The following findings are in general but these findings could be supportive in generating the affecting trends and factors regarding the use of ICT in agriculture and rural sectors in Chitwan, Nepal.

Information and communication are the basic component of the rural development and computer networking is important for information sharing. ICTs are those means of communication which provides information, awareness, entertainment aimed to motivate the people to involve in the process of development.

In central level, Agriculture Information and Communication Center (AICC) is the responsible organization to implement the communication activities in Nepal. AICC produces farm radio programs, television and video programs and publications related to agriculture. AICC has its own internet site and a block in Nepalese language which has been designed especially for farmers (www.aicc.gov.np). In this Nepalese block, farmers can get seasonal information especially for agriculture and livestock services. DADOs in the districts sometimes use the AICC's information resources for training or for radio broadcastings. DADO Chitwan has a joint agricultural program with local radio station which airs agriculture programmes around the year. Agriculture Extension Directorate has a website for “Agri Knowledge Bank” (www.agriextension.gov.np). This digital bank aims to collect and store all the technical information related to agriculture and rural development sectors in Nepal.

4.2. Affecting trends and factors of ICT scenarios in Chitwan

The above results indicate that most of the findings are interlinked to each others. In many cases one space findings is making compliment to the other spaces. On the basis of the above findings from different spaces the following trends and factors are identified regarding the ICT scenarios in Chitwan.

4.2.1 Trends

The numbers of mobile phone users are increasing in Chitwan. Basically the mobile phones are used by youths for social networking.

The numbers of farmers are increasing in using mobile phones. Generally farmers use it for regarding markets and prices.

The mobile phone is perceived that it reduces walk time by farmer and extension workers.

Farmers make appointments and prepare to visit extension service centre (ASC) using mobile phones

The youths have more interest and familiarity with mobile phones and internet.

Farmers are exposed to internet and mobile phones and learn from their children.

Potential of internet and mobile phones for rural development and agriculture is recognized.

The intensity of going outside for talking especially male is reduced as now the information is available in the internet and mobile phones at homes.

The staffs in the offices, field extension workers and the farmers are interested in using ICT in their respective fields.

The women are lacking behind the access of ICT in the case of getting training or visiting the cybercafés.

Some of the offices in the district haven't properly used the internet facilities as the office pays huge money for this connectivity.

4.2.2 Factors

Price of sim card, charge rate and cost of mobile phone sets are high.

In some cases subsidies sim-cards are provided for special group's people.

The coverage of mobile phone is insufficient in the districts.

People need skill to handle the new technology such as computer and internet.

Most of the information is available in English languages.

The Connectivity in the government offices is not adequate and sufficient.

Power cut (loads shedding) is a regular phenomenon around the year.

Still the cybercafés are not getting social dignity.

The government has no strong policy implementation mechanism.

Majority of the youths are out of nation for work abroad.

On the basis of the trends and factors the following three scenarios are proposed to 'forecast' and discuss the future of ICT regarding agriculture and rural development sectors in Chitwan.

4.3. ICT Scenarios

The scenarios are constructed on the basis of information collected from three spaces i.e. private-space, public-space and institutional space. The defining characteristics of the scenarios (Stylized narratives, Multiple and Tracing progression of present to future) are considered during the scenario construction process. Following are the three scenarios which represent different three future context of ICT use in Chitwan.

4.3.1 Scenario 1: Digital rural development in Chitwan

Farmers and Government and other service providers are both active, the Government actively supports policies both to develop influential technical factors positive, as well as simulating the social debate on socio-cultural aspects of increasing ICT use. Farmers recognize and use the ICT possibilities, and agriculture and rural communities becomes more attractive for youths as incomes increase and life in the rural communities becomes more attractive as they are 'connected' (see annexes for fictional stories).

4.3.2 Scenario 2: Changing Patterns – Farmers digitize and the government does not keep pace

Market driven influential factors develop positive, Government does not keep pace with ICT developments, yet farmers recognize the time saving aspects, are positively influenced by their children. Farmers quickly recognize and use production and market options. Due to the reluctant or slow response by the Government farmers 'connect' to other service providers and as a result the extension and other Government services loose their contacts and relevance for farmers and rural communities. Farmers discontent with Government increases leading to political instability. However, agriculture is boosting and farmers move forward on the digital highways (see annexes for fictional stories).

4.3.3 Scenario 3: The digital divide becomes or widens the rural-urban divide

(Farmers non active and Government and other service providers active)

Government and other service providers active but do recognize sufficiently problems and issues of rural communities. Farmers have no access to English based information, have insufficient understanding of new technologies and feel offended by the youth who catches up quickly. Farmers also experience pressure by govt and other service providers to change their ways of operation. All this results in a widening gap between farmers / rural communities and towns / govt and other service providers, this also increases rural – urban migration (see annex for fictional stories).

The above three scenarios are fictionalize on the basis of available information. The trends and factors are used to develop the different plots and sub-stories in the scenarios. The fictional stories are presented in annexes in the report.

CHAPTER FIVE - RESULTS: ASSESSMENT OF SCENARIOS

The previous chapter explores different trends and factors and introduces three scenarios. The first scenario explains about the digital rural development context of Chitwan. The second scenario explores the changing patterns where the farmers are digitized but the government does not keep the pace of ICT development. In the case of third scenario, it explains that the 'digital divide' context of Chitwan.

These scenarios are produced on the basis of information about affecting trend and factors found in different field activities. For assessment of those scenarios, a workshop was conducted to justify and to analyse the information presented in the scenarios. The workshop participants are represented by all three spaces.

The result of the workshop is presented on the basis of the components set during the workshop. The set basic components are in the questions forms and the answers are presented as outputs of the workshop. The workshop is a major activity of the research project and the workshop's outcomes are considered as the outcomes of the thesis project. While presenting the workshop's output, some quotes, feelings and emotions of the people are also included.

5.1. Workshop's outcomes

The people of Chitwan have practiced and recognized the scenarios on their own way. Most of them felt that scenarios reveal the problems and situation as they are facing now. The following are some of the questions and their answers produced by researcher for workshop's outcomes.

5.1.1 Verifying the scenario with the participants: How do the participants recognize in this scenario?

Participants found the scenarios as like their traditional folk stories. Some of the participants said that they are also masters of story-telling. At the beginning, they thought that the characters and the context in the scenario are real from their fields and so they tried to recognize the peoples and the context on the basis of the characters' ages and locations. Later the researcher informed them that the characters in the story are fictionalized on the basis trends and factors gathered from the real field.

Most of the participants said that the problems that are faced by characters are likely the real problems. During the discussion participants felt that they are also playing roles as characters in the scenarios. They found the scenarios as like of their individual experience during their day to day lives. At the beginning of the group discussion they became silent and later they said that they remembered their real experiences as like the problems faced by the characters in the scenarios which made them silent to think their past.

In some moment they feel so sorry for the characters during scenarios assessment. They put themselves in the places of the characters and tried to find out the ways to overcome the existing problems in the scenarios. Very often they tried to blame to the government to create these problems such as youths' unemployment, youth migration and digital divide between poor and rich and between literate and illiterate people in the nation.

5.1.2 What issues / parts are recognized?

Participants were aware that ICT plays an important role in overall development of the nation especially in the field of agriculture and rural development sectors. Still they can remember the 10 years back situation in Chitwan. During that time few telephones lines were there in the houses of the wealthy peoples and a long queue can be seen in telephone booth in the city areas. They said nearly more than 4 hrs was needed to get turn to call the people. They recalled their past experiences when they have to write letters to their sons, daughters, brothers and sisters who were studied in the capital city Kathmandu. But now they wanted to have a fresh look on it and said everyday they make call to their relatives as and when necessary either using mobile phone or general phones or in computer online conversation. They wanted to thank the ICT sector that it generates the different opportunities and options for accessibilities of information and communication.

During workshop, some of the participants were new in ICT related terminologies and sometimes they became confused while their colleagues discussing the use of computer and internet in day to day activities. In some cases they were so excited to learn more about the new technologies and its use for the benefit of human beings. Among them, some participants wanted to confess their fault as they missed many opportunities to learn computer. Still they don't know how to operate the computer as they have several chances to learn the computer skills in the past. During that time they thought that they don't need computer to learn as it is necessary for the people who have higher education and who have the big business. In addition, they thought that the equipment and the technologies are very much costly and it is not possible to afford by farmers. But, now they realized that neither it is so costly nor it is only for educated and wealthy people. It is concluded that still majority of the farmers are far from ICT use especially in computer and internet use.

Most of the participants in the workshop have same opinions that mobile phone is widely used in day to day activities of the people and it has its great impacts on culture, society and overall development of the nations. In their experiences, now it is not necessary to go for common places such as tea-shops or open ground to share and to get the new information. These days the information has been shared by people on phone calls, emails or SMS from mobile phones. Participants felt that such sharing process now saves time and prevents unwanted discussion among peoples in teashop or open areas. But they claim that excess using of mobile phones for every purposes gradually decreases the face to face communication process which ultimately reduces the frequency of meetings and interaction among people. Ironically they said that even in a same house now people start talking in mobile phones and in some cases the family members do not meet each other even a whole week. In fact this new culture is entering in Nepalese society.

During discussions, some of the participants asked the question to the researcher such as how computer can work and what is the internet etc. On the basis of the questions raised by participants, it reflects that some of the farmer's level of understanding and knowledge regarding ICT is very limited. It shows that the farmers in Chitwan have limited knowledge about computer and internet. Some of the farmers said that till date they are not touching the computer and they just heard the term internet but they don't know what it means. But some of the farmers they master the computer and every day they try to search new information in the internet. The above examples show that different levels of people live in Chitwan regarding the use of computer and internet. While discussing the scenario, the participants begin to reflect their own situations, conditions and experiences. Majority of the farmers do not know how the computer works and what the process of getting information from internet is.

During discussion, the participants expressed that they need to have some awareness programmes to understand the importance of ICT in rural communities. They put their demands for some awareness campaigns with some practical computers sessions. They thought such campaigns help them to understand the technologies and its working systems. Only theoretical lectures are not sufficient to understand the concepts regarding the use of computer and internet and its use in development sectors.

During scenario presentation, participants conclude that government offices need to take initiatives to trained front line extension workers (JT/JTAs) and farmers. First Agriculture Service Centers' (ASC) staffs should be trained and gradually they can teach to farmers. ASC would be the potential place to download information where the majority of the farmers can be benefited as it is not possible to have internet facility in every farmer's household at the moment. So, participants made demands for computers and internet facility in the service centre (ASC) level for the benefit of the farmers.

5.1.3 What other experiences and issues participants add?

While talking the use of computer, female participants felt that they are marginalized in using technologies in the district. They said that the mobile phone is also controlled by husbands if there is one mobile phone in the house hold. The husband takes out the mobile phone when he needs to go out as a result the working lady doesn't have phone accessibility as and when needed. Some of the educated and wealthy people have access to internet in the district in this case both male and female have access to the technologies. While talking to the general people the Cybercafés are the potential places for email, internet and phone call. Generally females from farm family hesitate to go to visit cybercafés in the rural areas as it is normally dominated by male. In addition, till date the Cybercafés are not getting social recognition in Nepalese society as previously the younger generation misused the cafes for visiting unwanted sites. This is also a main reason as parents do not want to send their daughters and sisters in the cafés for internet searching. But now the situation is changing and younger generation either male or female they are searching information related to study or career development.

In the discussion, participants put their views that the cybercafés are the places where the new generation passes their times with out productive work such as just chatting or just wasting money and times from hour to hours. In addition, just they gathered outsides the cafes and passes the potential study time without any productive and informative works. In some cases they fight each other even in a small matter such as looking perspectives and or perceptions of the different things. During workshop, some of the participants presented their group work and mentioned that the younger generation is cheating their parents as they said they went to the cybercafé. But generally they used to go in different places and gradually started to take drugs with their colleagues. Now the parents are worried about their children.

Participants argue that the information in the internet is not always reliable and informative. Some of the information in the internet are not sense making and out of sources. The information in the internet sometimes make confusion and even in some cases the information kept in the internet give the wrong perceptions towards the writers and the societies. Having non sense information in the internet, the right information also gradually has been loosing its credibility and authenticity. Participants who are the regular users of the internet show the concern about the reliability of the information. During discussion the participants who have little knowledge about internet seems to have more doubts while talking about the reliability of information and its use in development process.

Most of the Nepalese farmers have little competencies in English languages. Participants argue that the educated people are now gradually migrated to abroad for studies or works

and those who fail to go abroad are now engaged in agriculture in Nepal. Thus the information which is found in English languages in the internet is very difficult to understand them. Since some of the Nepalese language sites have been constructed but the information is limited. Such scenarios created the digital divide between educated and uneducated or semi educated people because of the competencies of English languages. Thus the language is also considered as one of the factors that govern the society in using internet among people in the district.

Female participants expressed their bitter experiences that the society (in some cases the project management) tried to marginalized them in acquiring the new knowledge and skills such as learning computer technologies. Ms. Basnet, a participant of the workshop shared her experiences that in the past the project management has decided to choose only male participants for computer training as she was one of the potential candidates of the training. She tried to get the response about choosing the participants from the senior officer of the project. In response she got the answer that a woman is for the kitchen and they don't need computer training for that purposes. This example shows that the patriarchal society is somehow responsible to lack behind the female from the use of new technologies.

During discussion the participants pointed out the problem as an inaccessibility of the technologies to the rural people in Chitwan. Mobile phones are now used by general people but computer and internet are still not in practiced yet by common people. Different institutions such as education, health and commerce sectors they have been using computer and internet since few years back. But other sectors such as agriculture and rural development sectors are lacking behind the use of technologies especially due to the low access of the facilities.

Even some of the accessible areas near by the cities in Chitwan, the cost are another factor that prevents farmers in using computers and internets. The average daily wage of people is NRs 200 per day in Nepal where NRs. 20 is to be paid per hour for cybercafés cost. The cost of computer is itself high and the problems are observed in equipment maintenance. Even if the technologies are accessible still the trainings of computer and internet is costly for common people. So in overall the computer and the internet facilities are not used by many common people in the district. Finally, the participants concluded that the cost of technologies is beyond the control of the common people. In case of mobile phones sim-card cost is around NRs 1100 but the mobile sets are again costly in the Nepalese markets. The low quality mobile phones are cheaper in the market but the problems would be seen in the connection and voices. The participants conclude their opinions that still the ICT programme in Nepal is mainly focused in urban, educated and wealthy place and people.

During workshop participants raised many questions about ICT policies and programmes in Nepal. They felt that the presented scenarios also little silent about national policies regarding the use of ICT especially for formers and their income generating activities. The National Agriculture Policy 2004 talks about the use of ICT for agricultural extension but the implementation part is weak and still only little works has been done in this field. Participants demanded clear cut policies on ICT use in agriculture and rural development sectors in Nepal.

During workshop participants shared their experiences that they have faced 20 hour power cut during winter this year. The load-shedding schedule is changing around the year and even in summer it is around 1 hour power cut everyday. So the life of people in Nepal during summer is very hard and even they failed to recharge their mobile phones during that time. During winter some of the rich people including some I/NGOs only can use computer and internet for their day to day works. General people can't afford the cost of inverter, heavy batteries or generator as an extra source of energies. The power cut situation not only hampered the ICT field but also marginalized the poor from the pace of development. In this

case the people who have money and technologies they used them. In contrast, the general people during winter have to spend their evenings and nights without light. Though power-cut problem is a national problems but it is necessary to have a policy that should have special consideration to the farmers as more than 65 % people are directly related to agriculture.

The other problem that participants raised during scenario presentation is the speed of the internet. The speed is related to the cost, time and quantity of information. Low speed of internet takes more times to download the information in the internet. Spending more times in cybercafés means more money to pay for this. Generally the farmers in Chitwan do not want to accept the costly and the time taking technologies in their day to day activities. In the case of farmers, the problems are still vague because in some parts of Chitwan they do not have cybercafés in their accessible areas. Farmers always have time scarce situation and they do not have sufficient time for searching information in the cafés.

In Chitwan only 71 % people are literate and among them 50 percent are just literate who can only read and write. In the case of technology handling special competencies and skills are needed and just literate farmers can feel hard to take up with these technologies. The training and campaigns programmes are useful for generating computer knowledge for farmers but still the training is costly. In some cases the awareness programmes were organized by CAN (Computer Association Nepal), I/NGO and other private or commercial sectors but it is not sufficient in number till date. So, still the farmers in Chitwan are not able to use and handle the computer and internet technologies properly.

The linkages between the stakeholders are poor in Chitwan as a result technology generating sectors and technology using sectors are not working together for the benefit of the people in Chitwan. ICT field is related to the Ministry of Science and Technology and the agriculture sectors come under the Ministry of Agriculture and Cooperatives. Every ministry have their annual plan and programmes. But due to the low linkage between ministries the problems could be seen in the implementation and monitoring phases. Finally the benefits for the targeted clients are limited and insufficient. During discussion in the workshop, participants focused the necessities of the joint programmes between different line agencies and local bodies. Finally the participants gave the impression that the government has given low priority for agriculture sectors in using ICT for overall development.

I/NGOs and private sectors are mostly ICT users in the district. They used different means of communication such as email, internet, phones and fax in the offices. Around fifty I/NGOs are working actively in the district. These organizations equipped with computer experts, technology and hardware equipments of ICT. If necessary, the existing manpower, technology and equipment can be used for awareness and training programmes related to ICT fields. The ICT awareness programmes can be interlinked to the regular programs of the organizations that have been carried out by the respective organizations. DDC's information and documentation section can work on it as all I/NGOs are reported on DDC every year.

The service providers such as Telecommunication, Techmind, G.Net and World link should be made responsible for providing quality and fast services in the district. The connection problem in mobile phones and slow speed of the internet services are considered as problems of use of ICT in agriculture and rural development sectors. Though all service providers have profit motives but the quality of services are important for regular profits in the businesses. Participants claimed that the service providers are focussing their activities mainly for the city areas and they are neglecting the rural areas of Chitwan. Still 2 VDC are out of touch from any type of mobile phones. In fact the profit would be less in the rural areas with compare to the city areas but the service provider organizations should be made some package programmes for the benefit of the rural people in Chitwan. The government should

provide some compensation amount to the service providers who are providing the services in the rural part of Nepal.

Participants realized that farmers are also responsible to take the opportunities to learn new things. Some of the participants realized that they have computers in their home but they never tried to learn it as their children are using the computer and internet everyday. In some cases, the employees of the government offices have also realized that they missed many opportunities which are provided by office to learn computer. Even in some cases just they enrolled in the computer training for the sake of the participation from office but they were not really willing to learn something during that time. Some of the participants put demands on computer training for farmers as they never got such opportunities yet. In conclusion the participants felt that their interest and involvement in the ICT field is important for overall development of the nation.

During workshop, participants commented on the behaviours of the politicians as they come house to house for vote but after election they forgot their voters. They are the policy makers and they can do better in formulating ICT policy but they are not shown their interest to formulate the new ICT policies. Politicians have got exposure in national and international community and they should have noticed the importance of communication but they forget to reflect their learning into the policy formation. Workshop concluded that if the political leaders shown their interest for new ICT policy formation with package programmes for farmers and youth in the nation, certainly the international community can support for training, equipment and infrastructure.

5.1.4 What scenario is most likely to happen and why?

During scenarios discussion participants tried to forecast the future scenario of ICT use in agriculture and rural sectors. They predict after 10 years most of the people will have mobile phones and about 60% of the farm family will have computer and internet facility in their farms. In addition, now the mobile phone is mostly using in day to day activities but in future the technologies will be used for the development of agriculture and rural sectors. Mostly the information technologies will be used for market information system and technologies will be inbuilt in the income generating programs. As a developing country like Nepal, every technology is needed to have linkages with income of the people for its sustainable use in the development process.

Among the scenarios, 'the digital divide becomes or widens the rural urban divide' is most likely to happen and most of the participants have shown their interest to discuss with the subject matters of the scenario. The reasons may be that the Chitwan district is clearly divided into two parts such as rural areas and urban areas. Most of the cybercafés, colleges and district offices are located in the urban areas. Still some of the rural parts of Chitwan are waiting for phone facilities in the villages. Urban areas where the people are wealthy and educated have most of the information and communication facilities. But in the rural areas still it is necessary to go for one hour walk for one call to their relatives. During presentation participants put their arguments that the government does not have any special programs to address the rural problems in Nepal regarding the use of ICT in the villages. Participants tried to blame the government that it only focuses the urban areas and all the programmes are centred towards the city and its periphery.

In Nepal most of the wealthy and high economic status people send their children to boarding-school. The general public send their children to the government school which is considered as a lower standard educational institution. In general most of the knowledge and skills related to computer and internet is taught in boarding school but in general school it is optional. Most of the information and skills related to ICT get students from boarding

schools. This is also another reason that most of the participants liked this scenario as they are experiencing the existing situations everyday.

Equipment and technologies are costly for general people and they can not afford the cost of technologies such as internet and email cost in cybercafés as it is high in Chitwan. Wealthy people can only afford for internet facilities at home but majority of the people prefer to use internet and phone services in cybercafés. But the speed of the internet in the cybercafé is very slow where Nepalese rupees (NRs) 20 cost per hour. The researcher has also same experience that even in some cases it takes one and half hour to check and simply reply single email and the cost increased up to 30 rupees. Thus people who have money can pay high cost for fast internet services at home. But in the cybercafés the speed of internet is slow and costly. In general it is beyond the capacity of the general people to use the services in cafés. This example also reflects the situation of rural urban divide between poor and rich people in Chitwan.

The use of mobile phone is rapidly increasing in Chitwan and both the people from urban and rural areas have mobile phones in their hands. But the connection in the rural areas is very poor and in some cases the network connection is out of order. In the case of city areas, the connection and the infrastructures are comparatively good. The communication service providers mostly concentrated on the city areas as they are profit making organizations. During presentation, the participants clearly pointed out the ICT problems as they faced in the rural areas. So even having accessibilities of mobile phones both in rural and urban areas but digital divide is there in using the quality services from the service providers.

All the participants in the workshop have their own mobile phones. This is the optimistic scenario in Chitwan which predicts the possibility of expansion of mobile phones and computer/internet in the district. Participants claim that after 10 years even in the rural areas with poor people they will have mobile phones. By 2019, around 95 percent people will have mobile phones and around 60 percent farmers will have computer and internet facility in their homes. Most of the works related to the different offices will be done in using online facilities. The educated people can operate computer and internet to get online services but in the case of illiterate people it will become harder than now as they can't get helping hands as it is now in the offices. This scenario predicts that even after a decade the digital divide will exist between rich and poor and educated and illiterate peoples.

The workshop participants recommended that the government should be more responsible to formulate the farmers' friendly policies regarding the use of ICT in agriculture and rural development sectors. The implementation bodies such as local government and the local organizations should be responsible to implement and monitor the programmes and activities in the field. Linkage is necessary in central level for policy formulation and at ground level for policy and programmes implementations. Participants argued that the CBOs and Cooperatives can also play positive roles in program implementation. In total 382 cooperatives have been registered in the district. But to mobilize CBOs, farmers' groups, NGOs and other traditional organizations, the government authority such as DDC, DADO and DLSO are needed to play as catalysts or the coordinators roles to implement the programs in the districts. A local networking among different stakeholders is needed to operationalize the programs in the district.

CHAPTER SIX- ANALYSIS, DISCUSSION AND CONCLUSION

After getting insights from the results presented in the previous two chapters, this chapter covers analysis, discussion and conclusion of the research project. These analyses are based on the results found in scenario assessment process during workshop. According to research strategy three spaces such as private, public and institutional space have been identified. Each of the space has its specific areas for example farmers are come under private space, government offices come under the public space and cybercafés are come under the institutional place. The affecting trends and factors have been drawn on the basis of gathered information from these three spaces. On the basis of these trends and factors found in the local (Chitwan) context three scenarios have been constructed which later assessed in the workshop. This chapter analyse and discuss the finding of the workshop which also summarizes the out put of the research projects.

6.1 Analysis and Discussion

The first scenario “Digital rural development in Chitwan” explores the issues that stakeholders from three spaces such as farmers, government agencies and institutions all are active. The government policies address the problems of farmers regarding the use of ICT in agriculture and rural development sectors. Farmers recognize and use the ICT possibilities and agriculture sector is one of the attractive sectors for youth. ICT programmes are inbuilt in the income generating programmes of the people. The lives of the rural people become interesting and productive as they are ‘connected’.

The second scenario “Changing patterns- farmers digitize and the government does not keep pace” portrays the issues that farmer recognized the effective use of IC for market information. Farmers develop their own information networking and they are less dependent to public services. Gradually the government extension system loses the credibility when farmers find effective and appropriate other sources of information. Farmers find their own places such as cooperatives where the system of participatory decision making is practiced. Though the government service is limited but an agriculture sector is flourishing and farmers and youths are moving into the digital highway.

Among the three scenarios discussed in the workshop, the third scenario “The digital divide” became most interested and influential to the participants. This scenario generally covers the issues related to private and public spaces. In the story the government and other service providing agencies seem active but do not recognize the problems and issues of the rural communities. In the other hand, the farmer and rural poor have no access communication technology and they have little knowledge about internet and computer.

In this story, farmer feel pressure by government and other service providers to change their ways of operation but the distinctly two types of people in the society such as poor vs. rich and educated vs. uneducated perceived the case differently. In the scenario there can be seen three types of people in the case of using technology. The first type is the rural poor who have no access to technology. The second type who have little access to technology at home or in cybercafé but they are not well informed and they don’t have operation skills. The third types of people are those who have full access to technology and sometimes they even misused the technology. The following is the total story (fictional) of most likely happen scenario.

The digital divide becomes or widens the rural – urban divide

Mrs. Karuna Gurung is angry with Mr. Bishnu in the office as she feels that he is not treating well with her. She wants a long conversation to him about papaya's jam/jelly making technologies but in response Mr. Bishnu handed over a small piece of paper having website addresses and a mobile phone number of Agriculture Information and Communication Centre (AICC), Lalitpur. He says "just try to visit these websites and you can get necessary information about your queries and in addition you can make online comments and questions in the internet". He adds "if you have special question you can make a call to AICC"

Mrs. Karuna is a resident of Bharatpur, a semi urban area of Chitwan and she has internet accessibility at home where her children use this facilities. But, she doesn't believe the information found in the internet. She wants face to face communication in practice. She doesn't want to learn computer and internet technologies as many times her children try to teach her about computer operation and internet searching techniques. She is an educative lady of around 50s but she doesn't have interest to learn the new information technologies any more.

Mrs. Jamuna Tiwari sometimes makes visit in Cybercafé to call his son in India as the phone call is little cheaper in cybercafés in Nepal. She doesn't have any means of communication at her home and even she needs to take help to press the phone numbers in call to her son because she is an illiterate woman.

She says "I know about mobile phone but I don't know anything about internet and its use". She lives in one of the remote areas of Chitwan and she needs to come to the market to call her son. She is a mother of 4 children as her husband lives in the other district with his second wife. Now she has 3 goats and the first goat was received from group, a part of goat transfer (revolving) program from international NGO.

Mr. Muktinath Shrestha, a commercial farmer in Chitwan has almost all kind of facilities in his home. He has a large scale feed-industry and his income is high with compare to his colleagues. Though he is a businessman but he wants to be a representative of farmers. As a farmer's representative, he has been participated many national and international meetings and seminars. He is very clever that he can maintain good relation to any ruling parties in the country. He is a father of 2 children and his son and daughter are studying in the abroad. Everyday this family chats with their children in abroad. He receives many phone calls and emails everyday and most of the replies are made by his clerk. This family has benefitted with the use of ICT in their day do day activities.

Though the above story is a fictional one but it portrays the reality of context of Chitwan. During workshop, many people recognized the story because it reveals the specific ICT scenarios of Nepalese society.

This story is able to answer the research questions set for this thesis research project. It shows a clear digital divide in the case of ICT accessibility or use between different socio-economic groups of people in Chitwan which is a prevailing scenario of farming community of Nepal.

The real participation of the workshop also indicates the clear digital divide between the different levels of people. During discussion the participants themselves realized that even in a small group, the digital divide is there. Among participants (see appendix), some of them have accessibility of ICT services at home or offices and they are the master of computer and internet and rest is the innocent who even does not have chance to touch the computer in their whole life.

During scenario assessment workshop, the groups discuss and present relevant issues regarding the use of ICT in agriculture and rural development sectors. The following analysis and discussion provides the information about the role of ICT in rural community in Chitwan.

Due to the access of ICT such as mobile phone, television and internet at home now people (male) stop to go outside in the teashops or other open places for talk. They start to remain at home with their family members. In addition, they start to share household activities during morning and evening time which previously they have spent outside from home. Female are overloaded earlier but now this sharing reduces their workloads. Hence, female have time to look their children and to involve in income generating activities such as kitchen gardening, bee keeping and poultry farming.

Majority of the extension workers in the field now use the mobile phone to communicate with the farmers and seniors in the offices. Farmers also use phones for taking appointment on the offices or asking problems to the extension workers. The movement of the farmers towards the service providing offices are gradually reducing. The technology is now saving time and money for farmers and extension workers. On the other hand, the daily activities of the extension workers as well as farmers are changing.

Due to the access of mobile phones in the villages of Chitwan, people are now gradually changing their behaviour in meeting with other people. Previously they used to go to meet anyone without prior notice. But these days they want to call or to inform before going to the other houses or in the offices. Taking appointment before meeting is a new for Nepalese people. But, now an appointment taking culture is introduced in Nepalese society. This new culture is helping to prevent the unwanted visits and talks between neighbours, relatives or employees.

Now the farming pattern in Chitwan is also changing gradually. The subsistence level of farming is changing into commercial level. Due to the access of ICT now people felt secure for their market and gradually they involved in Cooperatives. Among the total no of cooperatives in Chitwan, 75% of them are involved in agriculture sectors. There are in total 385 cooperatives registered in the district (DADO 2008). The cooperatives provide necessary information i.e. production technology, post harvest technology and market information to the farmers. Now the farming pattern is changing and most of the farmers want to produce in a commercial way. Cooperatives Chairman, Mr. Barlaula, also claimed that the farming pattern is changing since last five years. He pointed out that the accessibility ICT played major roles to make a shift from conventional to modern farming practices.

In the villages the previous call centres are now changing as cybercafés and the services such as phone, fax, desktop work and internet facilities are provided in the cafes. So all types of people make visit cybercafés for their specific works. Now these cafes invite people with different interest with multi-service facilities. This research gave the impression that many people in Nepal now understand the meaning of cybercafés in their own way. So, in Nepal most of the people make their visit to cybercafés for their specific purposes.

In addition, majority of the younger people spend their relevant part of their time in and around cybercafés. These cafes are not only for internet searching or internet chatting but also a place for social gathering. Cybercafés are now becoming meeting place for younger people. Now cybercafé-going-culture is becoming popular in Nepalese society.

In Nepal the increasing demands of mobile phones shows that after 10 years 90 percent people will have mobile phone in their hands. In addition, 60 percent farmer in Chitwan will have internet facilities in their farms during a coming decade.

ICT is considered as one of the income generating activities in the rural communities as calling centre are increasing in the rural parts of Chitwan. This scenario helps to provide job for people in the country. Majority of the younger generation are now interested to work in calling centres or in cybercafés. These scenarios can reduce the youth migration to the capital city Kathmandu or abroad.

Innovative and appropriate ICT helps boost agricultural production. New information and communication strategies, integrating conventional media, the Internet and other ICT applications can transform agricultural extension services. This process of change is already in full swing. Policy makers need to promote these winds of change; encourage practitioners to continue their imaginative and innovative uses of ICT in development approaches. The engagement of people in planning, implementation and monitoring processes is important for sustainable achievement in agriculture and rural development sectors. ICT is indeed shaping the future scenarios in agriculture and rural development sectors in Chitwan, Nepal.

6.2. Conclusion

The study was conducted in Chitwan district of Nepal during the mid 2009. The main objective of the study was to assess the prevailing scenarios regarding the use of ICT in agriculture and rural development sectors in Chitwan, Nepal. As a research strategy, scenario analysis is considered as one of the effective tools for research project. It engages the people in social change process. In addition, a workshop is considered as a one of the successful place for scenarios assessment. During discussion in the workshop, it is possible to get the people's feelings, emotions and realizations if the fictional scenarios are presented. It makes the discussion interesting and suddenly people start to put them in the places of the fictional characters.

The results of scenario assessment workshop indicate that "the digital divide" scenario is a prevailing scenario of ICT use in Chitwan. This is most likely happened scenario regarding the use of ICT in agriculture and rural development sectors. This scenario demands a new ICT policy that can minimize the digital divide between have and have not's and literate and illiterate people in Chitwan.

The findings from the study offer a contribution to the knowledge of ICT scenarios in agriculture and rural development sectors. Those ICT scenarios of Chitwan are unique body of information on ICT use in the Nepalese society. At the community level, the finding tells how the ICT trends and factors are affecting to create digital divide in the society. At the policy level the research findings furnishes precise information about general trends, factors, constraints and opportunities and a whole future scenario of ICT in Nepal. The findings can help to formulate the policies and programmes related to ICT in agriculture and rural development sectors in Nepal.

Since this study was conducted in the Chitwan district, similar studies can be conducted in the other parts of the country to test the result. This study assessed the scenarios of one terai (flat land) district. Similar study can be conducted in other districts covering the different geographical areas and socio-economic conditions of the people.

This study showed that there is big digital divide in ICT use in Nepalese society. A further in-depth study could describe the policy issues of digital divide and its consequences in the Nepalese society. In addition as a research strategy, scenario analysis worked effectively in this case. So, it is necessary to test this strategy in further studies to justify its effectiveness.

7. REFERENCES:

- AICC, (2004). National Agriculture Policy. Agriculture Information and Communication Centre. Harihar Bhawan, Nepal.
- Bhavnani, A., Wai-Chiu, R., Janakiram, S. & Silarszky, P., (2008). The role of mobile phone in sustainable rural poverty reduction: ICT policy division: Global Information and Communication Department, <http://siteresources.worldbank.org/> (accessed on 6 July 2009).
- Bowonder, Y., (2005). Developing an ICT platform for enhancing agricultural productivity: The case study of EID Parry. International Journal of Services, Technology and management. Vol. 6, Issue: 3-5, pp 322-341.
- Branston, G., & Stafford, R., (2007). *The Media Student's Book*. Routledge. New York.
- Bruijn, M., (2008). 'The Telephone Has Grown Legs': Mobile Communication and Social Change in the Margins of African Society, Universiteit Leiden. <http://www.ascleiden.nl/pdf/OratieDeBruijnEng.pdf> (accessed on 5 July 2009).
- Castells, M. & Midiaz, I., (2001). Diffusion and Uses of Internet in Catalonia and in Spain. PICWP/1201. 2001. Project Internet Catalonia Working Paper Series. <http://www.uoc.es/in3/wp/picwp1201> (accessed: 14/06/2009).
- CBS, (2008). Nepal in Figures. Central Bureau of Statistics, National planning secretarial, Kathmandu, Nepal.
- DDC, (2008). District information. District Development Committee, Chitwan.
- Dhakal, S., (2008). Nepalese women under the shadow of domestic violence. The Lancet, Vol. 371, Issue: 9612, pp 547-548.
- Ellis, F., (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford. University Press.
- Jarvis, P., Holford, J., Griffin, C., (2008). *The Theory and Practice of Learning*. 2nd ed. Routledge, Falmer, London.
- Joseph, M.K. & Andrew, T.N., (2007). Convergence opportunities and factors influencing the use of internet and telephony by rural women in south Africa and India towards empowerment. IFIP International Federation for Information Processing, Vol. 241, pp 1-20.
- Joseph, M.K. & Andrew, T.N., (2008). Participatory approaches for the development and use of information and communication technologies (ICTs) for rural farmers. Technology and society, IEEE International Symposium, pp 01.
- Khaliwada, L.K. & Tolentino, L.L., (2005). Social implication of information and communication technology in Sankhu, Nepal. Philippine Agricultural Scientist, Vol. 88, Issue: 2, pp 205-213.
- Laughey, D., (2007). Key Themes in media Theory. Bell and Brain Ltd, Glasgow, UK.
- Leeuwis, C. & Van den Ban, A., (2004). Communication for rural innovation: rethinking agricultural extension. 3rd ed. Blackwell Publishing, UK.
- Lie, R. & Balasubramaniam, D., (2006). An exercise in ICT, agriculture and society (http://www.ifpindia.org/ecire/upload/press_ifp_website/i4d_july_oscar_%20article_29-30.pdf) (accessed on 5 Jul 2009).
- Meera, S.N., Jhamtani, A. & Rao, D.U.M., (2004). Information and Communication Technology in Agricultural Development: A Comparative Analysis of Three Projects from India. AgREN Network, Paper 135.

- Mefalopulos, P., (2008), Development Communication Source Book. The World Bank, 1818 H Street NW, Washington.
- Muddy, P. & Phuyal, U., (2001). Developing Agricultural Communications in Nepal, Consultancy Report, Agricultural Research and Extension Project, Lalitpur, Nepal.
- Prasad, A., (2009). Understanding Successful Use of Technology in Organisations in Developing Countries: A Structural Perspective, the Electronic Journal of Information Systems in Developing Countries, Vol. 37, pp 07.
- Rao, N.H., (2007). A framework for implementing information and communication technologies in agricultural development in India. Technological Forecasting and Social Change. Vol. 74, issue 4, pp 491-518.
- Ritchey, T., (2009). Developing Scenario Laboratories with Computer- Aided Morphological Analysis. In 14th International Command and Control Research and Technology Symposium. Washington DC.
- Rollinson, D., (2005). Organizational Behaviour and Analysis: An Integrated Approach. 4th ed. Pearson Education Limited.
- Sasidhar, P.V.K. & Sharma V.P., (2006). Cyber livestock outreach services in India: A model framework. Livestock Research for rural development. Vol. 18, Issue: 1, pp 1-5.
- Schnaars, S. & Ziamou, P., (2001). The Essentials of Scenario Writing. Business Horizon: July-August, pp 25.
- Servaes, J., (2002). By way of introduction. In: Servaes, J. (ed), Approaches to Development Communication, Paris: UNESCO.
- Sohoo, S., (2008). ICT initiative of SAARC Agriculture Centre in the SAARC Region: Proceedings of the International Conference on Computer Science and Information Technology. Article number 4625002, pp 923.
- Subba, R. (2009). ICT for socio-economic growth. <http://www.nepalit.com/> (accessed on 6 July 2009).
- Talwar, V., Mastakar, N. & Bowonder, B., (2005). ICT platforms for enhancing agricultural productivity: The case study of Tata Kisan Kendra. International Journal of Services, Technology and Management. Issue 3-5, Vol. 6, pp 437-448.
- Tiwari, S.P., (2008). Information and Communication Technology Initiatives for Knowledge Sharing in Agriculture. Indian Journal of Agricultural Sciences. Vol. 78, issue: 9, pp 737 – 747.
- Vanek, J., Jorolimek, J. & Simek, P., (2007). eFarmer- Project “Building the datawarehouse for agriculture into practice”. Plant, Soil and Environment. Vol. 53, Issue: 11, pp 506-510.
- www.aicc.gov.np , an official website of Agriculture Information and Communication Centre (AICC), Nepal (accessed on 3 July 2009).

8. ANNEXES

Annex 1: Fictionalized Scenarios (stories)

Scenario 1: Digital rural development in Chitwan.

Upon arriving in his office Mr. Govinda Khanal switches on his computer and mobile phone; while reviewing the list of incoming emails he hears his ringtone; Mr. Deepak Pariyar from Bhandara asks him if he has already read his email. They have an outbreak of caterpillars in the village and he wants to come to town in the afternoon, he has sent a description of the caterpillar by mail and he will phone later to discuss what other information he needs to bring to the office so that they can decide on the way forward. Before opening the email, Mr. Govinda goes for a tea and informs his colleague from the information section about Mr. Deepak's phone. Fortunately his colleague Mr. Rajesh Thapa is around so they can later discuss together this request and discuss the best answer. When he is reading his email his colleague Ms. Sunita K.C. passes by requesting if there are emails from farmers regarding the prices of bananas. She is a young colleague, she studied information technology and marketing abroad and returned to Nepal because "it is necessary to follow the pace of changing time; communication technology has great impact in agriculture and rural development". She feels supported by the new policies of the Government and initiated a project on marketing issues on prices and intermediaries of fruits.

Scenario 2: Changing patterns - farmers digitize and the government does not keep pace

Since two days Mr. Bishnu Acharya is worried about Ms. Gita's absence in the office as he wants to reply email for banana farmers. He got a phone ring from Gita and she says she is not coming that day as she has to go to her relative's marriage ceremony in the village. Ms. Gita is a computer-operator and in the office she only knows how to check and reply emails and search information in the internet. Mr. Gopal Sharma, a chairman of a Banana Cooperative Khurkhure, is waiting for his email's reply about market information as it is necessary to decide to send banana either in capital city Kathmandu or in tourist city Pokhara. Mr. Bishnu tries to call Kalimati Fruits and Vegetable Market, Kathmandu but the office phone is not working for long distance call. When Mr. Gopal approaches in the office Mr. Bishnu says still he is trying to find out the related market information from different sources. A banana loaded truck is ready to move since two days and it is necessary to send it in the market immediately. Mr. Gopal makes call to Kathmandu and Pokhara for market information and the cooperative decides to send banana truck to Kathmandu.

Next day a letter from MOAC is received in the office from the post mentioned that ministry is collecting the information for paddy plantation areas in the district. Due to the late monsoon many farmers do not able to plant their rice this year. MOAC is preparing the immediate package for farmers of drought prone areas but the letter is received one day late. In the letter, it is said that a form is attached in the email and reply it as soon as possible.

Ms. Gita is coming office after 4 days and that day she is busy in checking emails and letters. During her absence in the office, many important emails have been unanswered and a foreign mission which has a plan to visit in the Chitwan has been already cancelled because of no response from DADO office.

Mr. Gopal and his colleagues from other cooperatives have experiencing quick services from Agrovets in Narayangarh and Tandi bazaar. Agrovets sell inputs and try to provide agricultural information to the farmers. The Agrovets also provide different brochures and posters to the farmers about agricultural technologies and inputs from private sectors. The Agrovets'

people use internet and mobile phones as sources of information and try to give the relevant messages to the farmers. Such information dissemination mechanism helps them to increase their sells gradually and they can keep the people in contact.

Mr. Pradeep Pradhan, an Agroveter owner who has graduated in agriculture, today made a visit in Madi areas as many people has called him in their place to teach them to operate the newly purchased coffee Pulper-machine. He provides his service free of cost but it is a kind of business promotion as the machine was purchased from his shop. He handed over a paper mentioning some important websites addresses to the learners about the use and advantages of this newly produced technologies. Mr. Pradeep exchanges his mobile phone number to those who are using Pulper-machine and says “please call me if you have any problems in the machine operation or about coffee production and processing technologies”

Scenario 3: The digital divide becomes or widens the rural – urban divide

Mrs. Karuna Gurung is angry with Mr. Bishnu in the office as she feels that he is not treating well with her. She wants a long conversation to him about papaya's jam/jelly making technologies but in response Mr. Bishnu handed over a small piece of paper having website address and a mobile phone number of Agriculture Information and Communication Centre, Lalitpur. He says “just try to visit these websites and you can get necessary information about your queries and in addition you can make online comments and questions in the internet”. He adds “if you have special question you can make a call to AICC”.

Mrs. Karuna is a resident of Bharatpur, a semi urban area of Chitwan and she has internet accessibility at home where her children use this facilities. But, she doesn't believe the information found in the internet and as an old tradition of the old generation she wants face to face communication in practice. She doesn't want to learn computer and internet technologies as many times her children try to teach her about computer operation and internet searching techniques. She is an educative lady of around 50s but she doesn't have interest to learn the new information technologies any more.

Mrs. Jamuna Tiwari sometimes makes visit in Cybercafé to call his son in India as the phone call is little cheaper in cybercafés in Nepal. She doesn't have any means of communication at her home and even she needs to take help to press the phone numbers in call to her son because she is an illiterate woman.

She says “I know about mobile phone but I don't know anything about internet and its use”. She lives in one of the remote areas of Chitwan and she needs to come to the market to call her son. She is a mother of 4 children as her husband lives in the other district with his second wife. Now she has 3 goats and the first goat was received from group, a part of goat transfer (revolving) program from international NGO.

Mr. Muktinath Shrestha, a commercial farmer in Chitwan has almost all kind of facilities in his home. He has a large scale feed industry and his income is high with compare to his colleagues. Though he is a businessman but he wants to represent farmers in the district. As a farmer's representative, he has been participated many national and international meetings and seminars. He is very clever that he can maintain good relation to any ruling parties in the country. He is a father of 2 children and his son and daughters are studying in the abroad. Everyday this family chats with their children in abroad. He receives many phone calls and emails everyday and most of the replies are made by his clerk. This family has benefitted with the use of ICT in their day do day activities.

The above presented scenarios' stories including characters are fictional. But these are the representative scenarios of ICT in Nepalese context. These scenarios have been presented during workshop.

Annex 2. Facts and figures

1. National facts and figures (Nepal)

1. Total area – 147181 square kilometres
2. Average household size- 4-5
3. First telecom project in 1970 with 5350 lines
4. In 1975 the number of telephones were increased to 7100, in 1985 with 20,691, in 1995 with 82,774 and in 1999 with 234668
5. Internet users (sectors)- education 10%, commercial 30%, NGO/Non profit organization -15%, government - 5%, international organizations (UN, WB etc)- 20% and home users - 20%
6. Internet users (number) – 1,000 in 1995, 2,000 in 1996, 5,000 in 1997, 15,000 in 1998 and 30,000 in 1999
7. Websites constructions (no of .np hosts)- 19 in 1995, 60 in 1996, 139 in 1997,153 in 1998 and 290 in 1999

Source: The internet from the top of the world: Nepal case study, ITU (2000)

Chitwan district

1. Total area of the district- 2238 square kilometres
2. Total Village Development Committees (VDC) in the district- 36
3. Accessibility of telephone services – 34 (VDCs)
4. Digital telephone exchange centres- 9
5. Total number of mobile phone used – 1,60,000
6. Number of computer training centres - 20 (2006)
7. Number of computer shops – 15 (2006)
8. Number of cybercafés- 35 (2006)
9. Number of internet service providers – 4 (Techmind, G.Net , World link, Nepal Telecom)
10. Number of government offices using internet facilities- 8 (2006)
11. Number of NGOs/CBOs using internet – 30 (2006)

Source: District information (2008), DDC Chitwan

Annex 3. Workshop schedule and instructional plan

Date : 9 August 2009 (Sharawan 25, 2066 BS)
Time : 10:00 hrs
Venue : DADO, Bharatput, Chitwan
No of participants : 20 (Farmers, Youths, Extension workers, DADO SMSs and I/NGO representatives)

Sn.	Topics	Methods	Time	Remarks
1	Registration/Introduction	Interaction	10:00 – 10:30	
2	Introduction to the research	PP presentation	10:30 – 11:00	
3	Group discussion on scenarios	Group discussion	11:00 – 11:30	
4	Group presentation	2 groups	11:30 – 12:00	
5	Tea break		12:00 – 12:30	
6	Plenary discussion	PP presentation	12:30 – 13:00	
7	Policy and responsibilities	Discussion/feedback	13:00 – 13:15	
8	Closing remarks		13:15 – 13:30	
9	Lunch		13:30 – 14:30	

Note:

1. Participants are jointly selected by DADO and researcher.
2. Venue, computer and multimedia projector are provided by DADO, Chitwan.
3. Tea/coffee, Lunch, travel fares and stationeries to the participants are provided by researcher.
4. Tea/coffee and lunch for DADO's supporting staffs are provided by researcher.

Annex 4. List of workshop Participants

SN	Name	Address	Age (years)	qualifications
1	Mr. Purnadatta Bhusal	Chainpur- 1	55	Bachelors degree
2	Ms. Sarita Thapa	Mangalpur 4	28	School Leaving certificates (SLC)
3	Mr. Bssudev Kafle	DADO Chitwan	30	Master degree
4	Ms. Rabaneshari Chaudhari	Bachhauli -5	27	Under SLC
5	Mr. Somnath Ghimire	DADO Chitwan	45	Master degree
6	Ms. Deepkala Bhattarai	Agri Service Center (ASC), Khairahani	42	SLC
7	Mr. Hari Bahadur Thapa	Mangalpur 4	53	SLC
8	Mr. Shreeram Bhujal	Jagatpur 8	33	Bachelors degree
9	Ms. Laxmi Basnet	Piple- 4	26	Under SLC
10	Mr. Hralal Bhusal	DADO Chitwan	48	Bachelors degree
11	Ms. Kamala Acharya	ASC, Gunjanagar	25	SLC
12	Mr. Laxman Prasad Paudel	DADO, Chitwan	46	Master degree
13	Ms. Deebaki Naupane	Chainpur -3	30	Under SLC
14	Mr. Deepak Raj Paudel	ASC, Ratnanagar	46	SLS
15	Ms. Kamala Neupane	DADO, Chitwan	42	Intermediate

Annex 5. Photos



Photo 1: Interview with farmer



Photo 2: Scenarios assessment workshop



Photo 3: Group work on scenarios assessment



Photo 4: Preparation of presentation for group work