

Integrated ICT Approach for Farmers of Uttarakhand State

Gaurav Papnai¹, Anup Prakash Upadhyay^{2*} and Shweta Sunetha³

¹Subject Matter Specialist, ICAR-Krishi Vigyan Kendra, Chinyalisaur, Uttarkashi- 249196; ²Assistant Professor, Communication and Extension Management, Indian Institute of Forest Management, Bhopal, M.P.; ³Ph.D Scholar, Department of Agricultural Communication, GBPUA&T, Pantnagar, U.S. Nagar, Uttarakhand, 263145
gauravpapnai@gmail.com, anup.prakash57@gmail.com*, shweta.sunetha@gmail.com; +91 9479895773

Abstract

The greatest challenge today is improvement in the quality of human life particularly of rural people through eradication of poverty and hunger and achieving over all rural urban balance. Agriculture being the pivotal sector of rural economy in India, the empowerment of farmers in taking initiatives and decisions will help in shaping the future of the farmers' economy. Farmers' as producer of food must have an enabling environment for access to know how and do how for realizing the full potential of modern agricultural technology. The pluralistic system needs to envision with many players for promoting effective use of Information Communication Technologies (ICT) for the benefit of the farmers including Government, corporate, private, NGOs and other farmers' organization in various forms. "ICTs" encompass a full range of information and communication technologies, which include radio, television, the press, physical notice boards, computers, mobile phones and the internet. It recognizes that any emerging technologies emerge in an already existing communicative ecology that itself changes over time and that any "new" connections and networks (social and technical) that develop as a result of ICT interventions and the introduction of individual media technologies will be far more effective if they are interconnected with existing, locally appropriate systems and structures. The economy of the state is largely dependent upon agriculture, therefore there is need to strengthen this sector by developing ways and means which can empower the farmers of this region. Information for farmers is vital resource which can enhance their abilities to compete with farmers not only at national level but globally as well. Farmers of each region have distinct information needs and moreover access and availability of communication sources also varies. The findings of the review showed that majority of the farmers of hill region mentioned other farmers and relatives as primary source of information followed by radio and Rural Knowledge Centers. Thus, there is a need to follow an integrated ICT approach to expedite the development of agriculture sector which will result in better and progressive economy of the state.

Keywords: Information communication technologies, farmers, agriculture extension, Uttarakhand.

Introduction

Rural development means overall development of rural areas in social, economic, political and cultural aspects so that the people may lead satisfying life. Any development, which does not touch the vast masses, cannot be justified. Therefore, the development strategy should lead to a total development scenario where masses get better control and rhythm over their environment with their own initiatives. In the rural perspective, the development initiatives should strive to improve the quality of life of the poor. Information and communication technology (ICT), including radio, television, telephone, personal computer and the Internet, lowers barriers to the flow of information. It can contribute notably to income, education and welfare in rural areas by expanding opportunities and bridging distances. Information and Communication technologies have a potential for economic growth and social empowerment (Nandi, 2002).

Direct or indirect application of ICT, in rural development sector has also been referred to as "Rural Informatics". Rural economies can be benefited from ICT by focusing on social production, social consumption and social services in the rural areas (Malhotra, 2001). ICTs are a vital tool in rural development. The strategic use of ICTs for poverty reduction will depend on the suitable economic enterprises, for social and human development to take place. The rural underprivileged depends mainly on agriculture and related activities for their livelihood. Agriculture does not only provide the source of nutrition but the bulk of their income. Improved systems for the management and communication of agricultural information can help deprived farmers make informed choices about the opportunities and constraints related with agricultural development strategies. Chuma (2004) in his study suggested that the presence of ICTs in rural areas can assist farmers to access, store and share

information with other people using multiple devices and multiple media for purpose of:

- Accessing information on potential buyers for their farm produce: ICTs could link farmer groups or agricultural cooperatives to larger markets and it would assist the rural youth in agriculture to standardize their prices. Therefore the potential of using ICTs to promote rural development through agriculture lies largely in increasing market efficiency through addressing information gaps and blockages. Access to markets and market information will help to improve choices for the sale goods both on local and international markets according to enhanced information on prices, comparative supply and demand for products. In the longer-term new markets, techniques and processes for production, processing and marketing of products, both farm and non-farm can be explored.
- Accessing information on economic trends in terms of prices and demand for a particular farm produce.
- Accessing information on weather projections–this will assist the farmers plan well for the season, taking in consideration external factors such as weather conditions.
- Accessing information on farm implements.
- Accessing information on how to grow certain crops and post germination management. This will compliment the current agricultural extension systems. How there is need for easy to use and more interactive programmes.
- Accessing information on animal husbandry and diseases highly prevalent in livestock. The ICTs will link the farmers to service providers such as veterinary, drug suppliers and NGOs.
- Accessing information on best farming practices and training in agriculture and entrepreneurship (complimenting the current extension system). ICTs will also enable young people study online without interfering their farming and business activities).
- ICTs will improve and enhance social networking at community, regional and national levels, bringing about reduction in the cost and time taken traveling pursuing markets and potential buyers for their farm produce. The ultimate beneficiaries (end-users) of ICT initiatives in rural areas are rural communities; consequently ICT initiatives for rural areas ought to be people-centric. The design of ICT initiatives should reflect community needs, aspirations, prevalent resources and knowledge.

ICT in India

In India, the initiation of ICT has been viewed with enormous optimism. ICT is being prescribed as the panacea for a plethora of problems faced by India such as unemployment, lack of growth, technological backwardness etc. Agriculture being the crucial sector of rural economy in India, the empowerment of farmers in taking initiatives and decisions will help in shaping the future of the farmers' economy.

Farmers' as grower of food must have facilitating environment for access to know how and do how for realizing the full potential of modern agricultural technology. The pluralistic system needs to visualize with many players for encouraging effective use of information communication technologies (ICTs) for the benefit of the farmers including Government, corporate, private, NGOs and other farmers' organization in various forms.

In India different ICT projects were launched in recent past by government as well as by the private counterparts. Some of the successful projects are:

- Akshaya–Malappuram, Kerala,
- Anand Milk Collection Centres–Anand, Gujarat,
- Bhoomi–Bangalore, Karnataka,
- Computer-Aided Administration of Registration Department (CARD) –Hyderabad, Andhra Pradesh,
- Community Information Centres–Gangtok, Sikkim,
- ITC e-Choupal–Ujjain, Madhya Pradesh,
- e-Seva–Hyderabad, Andhra Pradesh,
- Fast, Reliable, Instant and Effective Network for Disbursement of Service (FRIENDS)– Thiruvananthapuram,
- Kerala, Gramdoot–Jaipur, Rajasthan,
- Gyandoot–Dhar, Madhya Pradesh,
- Agriland–Nellikuppam, Tamil Nadu,
- Janmitra–Jhalawar, Rajasthan,
- Mahitishakti–Panchmahal, Gujarat,
- N-Logue Telecentres–Madurai, Tamil Nadu,
- Self Employed Women's Association (SEWA)– Ahmedabad, Gujarat,
- TARahaat–Jhansi, Uttar Pradesh,
- Vidyal Information Service Provider (VISP)– Thiruchirapalli, Tamil Nadu,
- Warana Wired Village–Kolhapur, Maharashtra

A critical need is content development to ensure the suitability of knowledge and information for the local client needs in rural communities and agriculture societies. A crucial agent of change developed through this purpose should be the mobilization and harnessing of previously inaccessible knowledge and information in digital form, derived from or adapted to the local context. A set of key determinants for the successful application of information and communication have been derived at local level information dissemination:

- **Locally-adapted content and context**–how to ensure that useful information is repackaged and mobilized in the right format, so that it meets the different information needs and preferences of a variety of groups, so that it can be stored, retrieved, and exchanged with ease, and taking into account issues of ownership and copyright.
- **Building on existing systems**–how to capitalize on, rather than replace and lose the value of existing indigenous and therefore highly trusted, information and communication systems.

- **Addressing diversity**—how to respond to the different information and communication requirements of men and women, the youth and other marginalized groups.
- **Building capacity**—how to strengthen capacity of institutions and people involved in information provision to ensure the right information in the right formats, as well as building the capacities of the information users to access and appropriate a wider range of information and ICT.
- **Access, empowerment and democratization**—how to ensure that relevant information actually reaches and empowers poor people, especially women, and is not captured by wealthier or more powerful sections of the community.
- **Strengthening partnerships**—how to build the new horizontal and vertical inter-organizational, inter-departmental and inter-sectoral partnerships that are necessary to ensure information is available to all stakeholders.
- **Realistic approaches to technologies to support information and communication**—how to build sustainable systems that enhance existing systems, are expandable and extendable, and exploit multiple and diverse communication tools and the full range of existing media.
- **Information costs, value and financial sustainability**—how to value and finance the establishment of appropriate information infrastructure and the provision of appropriate information content, particularly in remote rural areas.

Subsistence agriculture in Uttarakhand

In context of the Uttarakhand state; Hill, Tarai and Bhabar are three major agro-climatic zones with significant differences in cropping pattern, agro-ecological variations and diversity in culture, tradition, taboos, developmental concerns and constraints. The main characteristic of the state is its rich bio-diversity, besides soil and environmental diversity, of this region. The state because of its diversities produces not only cereal crops but variety of fruits, vegetables and varieties of flowers. Subsistence agriculture, practiced on small terraced fields in Uttarakhand, forms the primary source of livelihood for a majority of the state's population. About 80% of the working population in remote hill villages is engaged in agriculture and animal husbandry (Sati and Sati, 2000). Due to harsh topography and climate and the subsequent inaccessibility of the area, traditional hill farming systems in Uttarakhand were self-sufficient, self-contained, closed systems, which did not require any outside input. Instead, traditional management and ecological knowledge have been the fundamental means by which farming communities have evolved diversity rich, food production and livelihood systems. Owing to limitations—in the form of lack of irrigation, small and scattered landholdings, low soil-depth, high altitude, heavy rainfall and cold climatic conditions—agriculture in the mountains exhibits a lot of variations in crop diversity,

crop composition and crop rotation (Maikhuri *et al.*, 2001). Forest biomass fertilizes the fields in the form of organic manure via livestock and through humus coming directly from rainwater run-off from the forests (Jain and Webster, 2001). Women play a key role in hill agriculture, particularly in the context of the men workers migrating to the plains for employment. Interestingly, almost all hill women are engaged in agriculture as compared to approximately 59% men. Agricultural land is scarce and comprises of small terraced plots carved out of the hillside or cleared forestland. Majority of land is unirrigated and hence the communities are heavily dependent upon rain and snowfall. Although vast majority of the state's population is dependent upon agriculture, the land area available for cultivation is very limited. In terms of net sown area agriculture occupies only 14.8% of the total geographical area of the state and this includes the figures for the districts of Haridwar and Udham Singh Nagar, which have a very high ratio of cultivated area to total land area. Excluding the figures for these two districts, only 10.7% of the remaining land area of Uttarakhand is under cultivation. The average size of landholdings in the state is also very small. There are an estimated number of 10 lakh landholdings in Uttaranchal. About 70% of them are less than one hectare in size and the per capita area comes to only 0.8 ha (Rawat, 2001). However, in the Garhwal region alone the amount of cultivated land per-capita comes to 0.2 ha (Maikhuri *et al.*, 2001). According to Semwal *et al.* (2001) marginal farmers (landholdings between 0.02-1.0 ha) comprise more than 68%, small farmers (landholdings between 1.0-4.0 ha) about 29% and big farmers (landholdings between 4.0 and 10.0 ha) only 3% of the farmers. District-wise, the average size of landholdings, in 1990, varied from 0.54 ha in Pithoragarh to 1.67 ha in Nainital. However, farmers in plain districts of Udham Singh Nagar and Haridwar have much larger landholdings (Jain and Nagarwalla, nd). The crops and cropping patterns in the hills vary greatly with altitude due to varied climatic conditions, the nature of agricultural land and irrigation. There are two main cropping seasons i.e. Kharif and Rabi. Kharif season crops occupy about 63% while Rabi season crops about 59% of the gross cropped area of the region, with the cropping intensity of 159.29% (Swarup, 1993). Upland cropping is highly diversified having various combinations of cereals, pulses, millets, oilseeds, pseudo-cereals, beans, vegetables, fruits and spices (Jain and Webster, 2001). The main Kharif season crops comprise: paddy, finger millet, barnyard millet, foxtail millet, maize and pulses. Wheat, barley, lentils, peas and mustard are the main Rabi season crops (Semwal *et al.*, 2001).

Development strategy for Hill Districts of Uttarakhand

Mittal *et al.* (2008) suggested development strategy for hilly districts of Uttarakhand because of its varied agro-ecological diversity.

They revealed that infrastructure development is a common development agenda to facilitate development in the hill districts. In addition, specific issues pertaining to each hill district are identified and listed below.

Hill Districts' development plan

1. Almora

- Diversify agricultural products to include fruits (apples), spices (ginger), and herbal/medicinal plants
- Develop minor irrigation projects to facilitate agricultural diversification.
- SSIs based on wool.
- Impart training in design in the handloom sector.
- Develop leisure and nature tourism. For example, areas such as Ranikhet and Kausani have not been explored.

2. Bageshwar

- Diversify agricultural products to include off-season vegetables and fruits (peas, cabbage, beans, tomato and potato). The traditional crop, bhatt, is important. Promote plantation of tea, chillies, turmeric and other herbal plants.
- Fodder and grazing land is an asset that can be used to meet demand from neighboring districts.
- SSIs and agro-based industries for jams and pickles. Khadia in cosmetic products.
- Promote leisure and nature tourism.

3. Chamoli

- Religious tourism to the Valley of the Flowers, Hemkunt Sahib, Badrinath, and Kedarnath. Other types of tourism to Nanda Devi National Park, river rafting, and rock climbing.
- Poultry and wool-based industry.
- Agriculture diversification towards herbal and medicinal plants, pulses and off-season vegetables.
- Develop forest resources: Jatropha plantation for bio-fuel, bimal trees for the cosmetics industry, and forest-based handicrafts.

4. Champawat

- Diversify agricultural products to include medicinal and aromatic plants, ginger and other spices and organic fruits and vegetables.
- Forest products: Ringal-based products by local artists.

5. Pauri Garhwal

- Poultry and wool-based development: Sheep.
- Diversify agricultural products to include herbal and medicinal plants, pulses, bee-keeping and mushroom cultivation.
- SSIs and agro-based industries: Bamboo and fiber development, and jatropha-based bio-diesel.
- Start a medicinal plant-based pharmaceutical industry
- Bimal and rambans fiber for handicrafts and furniture.

6. Pithoragarh

- Poultry and wool-based development: Goat-rearing.
- Diversify agricultural products to include litchi, herbal and medicinal plants, garlic and spices.
- SSIs and agro-based industries- Bamboo, ringal and fiber development, and furniture production from forest products.

7. Rudraprayag

- Religious tourism to Kedarnath; adventure tourism like river rafting, rock climbing.
- Diversify agricultural products to include herbal and medicinal plants, haldi and coriander.
- SSIs and agro-based industries: Bio-fuel, bamboo plantation, and traditionally-grown mandua for bakery products.
- Forest-based industry.

8. Tehri Garhwal

- This district is rich in irrigation facilities; thus, agricultural diversification towards fruits and vegetables, spices, pulses, herbal and aromatic plants using a cluster approach combined with proper market development can be very successful.
- SSIs and agro-based industries: Food processing industry, forest-based industry, fruit and vegetable-processing industry.
- Training and innovation to add value to small enterprises.
- Nature tourism and adventure tourism in Devprayag.

9. Uttarkashi

- Religious tourism to Gangotri, Yumunotri, etc.
- Diversify agricultural products to include fruits and vegetables, apple orchards, tea plantations, and aromatic plants.
- Development of sheep and goat-rearing and wool-based industry.
- Nature and leisure tourism.

Integrated ICT approach for Uttarakhand State

Being the hill state, Uttarakhand has diverse bio-diversity and agro-climatic conditions. In Uttarakhand, ICT interventions that can improve the general livelihoods of poor rural families have the potential to enable those families for:

- (i) **Developing a region-based ICT hub for agriculture and rural development:** The Uttarakhand state have two regions Kumaon and Gharwal, which is again divided into Hill, Bhabar and Tarai areas. Those areas have different agro-climatic and agro-ecological differences with wide variety of cropping pattern which demands for different agricultural information hubs for each of the areas. Information for crops of one area cannot cater the need of other area. For that purpose different ICT resource centres at panchayat level can be established to provide local-specific information regarding agriculture and allied fields.

- (ii) **Providing information to rural banks and microfinance institutions to increase and sustain participation in rural microfinance:** The rural areas have great potential to come up in the main stream but due to lack of information they lagged behind. The rural area people are mainly dependent on the micro-savings and their investments are also very less. In this regards rural banks can and microfinance institutions can upload their present information to those ICT hubs and they specially can visit to those ICT hubs to provide information to rural people about the micro-finance and can increase the participation of the rural people. ICT can expand access to financial services, not only through information but also through low-cost, automatic teller machine-based accounts. Evidence indicates that poor people are willing to spend significant financial resources on telecommunications.
- (iii) **Involving rural households in information gathering, particularly on market opportunities, and business monitoring:** Now a day the concept of participatory approaches have emerged. For developing the ICT information hubs the participation of local people is very much needed because the local people know their needs, problems, strengths, weakness, opportunities and threats. The outsider cannot judge the local problems up to the extent so the involvement of local people is essential for information gathering regarding agricultural and marketing problems. Through the Internet, for example, small enterprises can market and distribute their goods worldwide at greatly reduced cost.
- (iv) **Facilitating access to public information and communication facilities:** Radio can be used to educate, and is still the major electronic medium in distance learning programs in developing countries, although Internet-based teaching devices have started to take hold. The impact of improved ICT on poverty, however, depends on the status of other infrastructure (such as roads and electricity) and services (like education and health), given the complementary and catalyzing role of ICT and its strong linkages with other sectors. ICT is vital in building rural linkages. However, the communications strategy must ensure that communication mechanisms are two-way.
- (v) **encouraging private sector investment for affordable ICT services:** Government ICT programs include implementing an integrated e-government concept in local areas with private sector support to manage regional resources in support of regional autonomy. Such programs aside, an effective broad-based framework for developing ICT must be developed and implemented. ICT policies should encourage private sector investment, promote infrastructure conducive to the free flow of information, and make ICT more widely affordable.

Conclusion

Indirectly, ICT promotes economic growth by increasing the market for exports (especially in services), the number of participants in the market, and the speed and efficiency of the market (including the provision and quality of government services). Improved access to credit, educational activities, health care services, or improved non- agricultural rural business activities can also yield significant improvements in the agricultural sector when families are able to enhance their overall livelihood strategies. The end goal of these ICT interventions is not improved agricultural production or post-harvest activities. The end goal is poverty reduction in the context of improved livelihoods, recognizing the clear importance of the rural family as the hub of agricultural production in hilly areas which are lagging behind due to lack of updated area-specific information.

Acknowledgements

Author is highly grateful to the Director, Indian Institute of Forest Management Dr. G.A. Kinhal, (IFS) for his encouragement, guidance and continuous support. Special thanks for Mittal *et. al.* for suggesting development strategy as well as the ICT approach for hilly districts of Uttarakhand.

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