

# Effectiveness of Information and Communication Technology in Hill Agriculture: A Case Study

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## Abstract

For all round development of agriculture, the communication process deserves its significant role as in case of social, economic, religious, political and educational development. Farming is an ancient occupation. If the farming may be recognized only as a factory of producing the food grains there is no difference between the ancient time and modern time farming. According to the economics, for other productions there are needed factors as land, labour, money and management which are still in the present and were in the past also. Now, what is the modern farming? The modern farming is that in which the person adopts the latest new methods of farming based on science for the agricultural production. Thus for the modern agriculture there is need of one more factor and this factor is the latest knowledge. Thus, in the modern agriculture for the agricultural production along with the four factors one more factor of the latest knowledge (fifth) has been added. The question arises from where this new knowledge may be achieved? The first need is that to create the new knowledge and the second need is to send this latest knowledge to the farmers.

More than three-fourths of total population of Uttarakhand depends on agriculture for their livelihood. The economy is predominantly dependent on mountain agriculture, however, the land holdings are small and fragmented, and irrigation facilities limited. Soil and water conservation is another issue for inclusive development. As a result, the majority of the rural population in the hills either survives on subsistence agriculture or migrates to other parts of the country for employment. The state faces the challenge of promoting livelihoods to retain people through local employment and income generation and to enhance their quality of life. The success of agricultural development programmes in developing countries largely depends on the nature and extent of use of communication media in mobilization of people for development. The planners in developing countries realize that the development of agriculture could be hastened with the effective use of communication media. A wide variety of communication technologies are available for diffusion of innovations / information to Indian farmers. For effective communication / information the basic ingredients are purpose of communication, information / innovations to be communicated, methods to be employed, end users and response or

reaction of the users. ICTs are emerging as a powerful tool for gender empowerment in a developing country like India. The new tools and techniques are evolving and the implications are clearly visible in a global scale but the level of dissemination of ICT in hills is very low. No doubt, communication media created a greater awareness among farmers thus contributing a lot to our “food self-sufficiency status” of nowadays.

In the present investigation the status and usage of communication media by hill farmers and the kind of communication media to enhance their agricultural knowledge were incorporated. Communication media methods in agricultural information dissemination generally, are useful in reaching a wide listeners at a very fast rate. To a large extent, communication media serve as a authentic instrument for information dissemination in agriculture.

**Keywords:** Hill ecosystem, hill farmers, ICT, Sustainable agriculture

## INTRODUCTION

### *Uttarakhand at a Glance*

Uttarakhand is located between 28° 43' – 31° 27' N latitudes and 77° 34' – 81° 02' E longitudes. The population of the state primarily depends on agriculture for livelihood. About 70% of hills population is engaged in agriculture. There is hardly any other major source of livelihood deriving from the secondary or tertiary sectors. These sectors are very poorly developed primarily because of inaccessibility and vulnerability of mountain regions. Although almost 70% of the population is dependent of the primary sectors, the contribution of this sector of the GDP/NDDP is only 37.5. As a result, it does not provide sufficient income levels to the people. This subsistence nature, which leads to low incomes and unstable incomes, which in turn lead to a sizeable out-migration of male members that leads to only women headed families behind, and the role of women in the household economy becomes more important. The hill region districts are less developed in terms of infrastructure, *i.e.*, electricity, roads and irrigation. The inter-district inequality in infrastructure leads to increasing disparity in terms of income and livelihood between the hills and the plains. Low levels of income not only result in low levels of consumption and material deprivation, but also constrain human potential by restricting access to education and health facilities, thereby creating a vicious cycle of poverty.

The state of Uttarakhand encompasses a geographical area of 53,483 sq. km which accounts for only 1.63 per cent of India’s area. The state contains about 4.53 per cent of India’s forest area and about 3.1 per cent of India’s agricultural area (Table 1).

**Table 1 : Geographical indicators, 2006**

Indicators	India	Uttarakhand
Total Geographical area (sq. km.)	32,87,240	53,483 (1.63%)
Area under forest (sq. km.)	7,65,210	34,651 (4.53%)
Area under agriculture (ha)	18,30,16,000	56,71,704 (3.10%)
Area under irrigation (%)	40.3	43.6
Average annual rainfall (mm)	1,432	1,547

**Sources:** *Indiastat* ([www.indiastat.com](http://www.indiastat.com)) and *Uttarakhand at a Glance, 2006-07* (Govt. of Uttarakhand)

**Note:** *Figures in parentheses are the per cent share of India.*

Approximately 43.6 per cent of the agricultural area is under irrigation as against the national average of 40.3 per cent and average rainfall is also above the national average. The ratio of irrigated area in the hills and plains is 10.2: 88.8 in Uttarakhand.

Agriculture and rural economic activities are essential for growth, poverty reduction and food security especially for the poorer farm families in Uttarakhand hill region. Table 2 shows the demographic profile of respondents which is described as follows:

The number of family members ranged from 1 to >6 in the selected villages. Approximately 65 percent of respondents having 4-6 family members in the hill area followed by >6 members in 25% families. Age was measured in terms of numbers of full years the respondents completed at the time of interview. The age of the respondents ranged from 25 to above 45 years. About 70 per cent of the respondents fall under the age group of >45 years followed by 25 per cent in the age group of 36-45 years. A handsome proportion of workers i.e. 5 per cent were in the category of 25-35 years. The mean age of respondents was 45.2 with  $\pm 6.26$  standard deviation.

**Table 2: Demographic profile of respondents N=20**

Parameters	Categories	Number of Respondents	Percentages
Family Members	1-3	2	10
	4-6	13	65
	>6	5	25
Age profile (Years)	25-35	1	5
	36-45	5	25
	>45	14	70
	Mean age	45.20 $\pm$ 6.26	
Education level	Illiterate	8	40
	Primary School	5	25
	Middle School	2	10
	High School	4	20
	Intermediate	1	5
Primary Employment	Agriculture	11	55
	business	4	20
	Service	5	25
Secondary Employment	Agriculture	9	45
	business	4	20
	Labour	5	25
Out migration of family members	yes	16	80
	No	4	20
Reason for migration	Government job	7	35
	Private job	3	15
	Military	6	30

Education is an important variable which may influence the division of labour. The educational level of respondents in the present study varied from illiterate to intermediate. Literacy level among the

farmers was very low and majority of them i.e. 40 per cent were illiterate. About 25, 10 and 20 per cent of agricultural workers were educated up-to primary, middle school and high school respectively. It was further revealed from the investigation that very few proportions of respondents were studied upto intermediate (5 per cent). Employment of respondents was also important variable in the study. If the economic condition of the workers is better, they can enjoy the good physical and mental health. For the present investigation employment is categorized into primary and secondary employment. Under the primary employment section majority of respondents i.e. 55 percent were doing agriculture and 20, 25 percent were doing business and service respectively. Further it was found that under secondary employment section 45 percent were doing agriculture and rest were employing either under small business opportunities or labour.

As far as migration of family members were concerned it was found that 80 percent of families were facing the problem of out migration of members of family due to lack of employment opportunities in hill region. Land holding is depicted in shows that approximately 29.56 Nali total agricultural lands is available in hill area out of which 25.3 Nali were Un-irrigated and rest 4.26 Nali were irrigated land available for farming practices.

The area under the NWH, comprising of Himachal Pradesh (HP), Jammu and Kashmir (J&K) and Uttarakhand is 33.1 million ha. Agriculture continues to be the mainstay of the people of the hills (about 78% of the population in Indian Himalayan region is rural) despite the fact that the hills experience adverse agro-climatic conditions. The contribution of agriculture and allied sectors in the region to the state GDP ranges between 13.78 to 25.80%. The area, production and productivity of various crops grown in N-W Hill Region is given in Table 3.

**Table 3: Area, Production and Productivity of the three Mandated States for 2017-18 [A – Area (000 ha), P- Production (000 tonnes), Y- Productivity (kg/ha)]**

State	Area	Production	Productivity
<b>Cereal</b>			
Himachal Pradesh	696.5	1430.8	2054
Jammu & Kashmir	900.1	1560.4	1734
Uttarakhand	789.0	1849.0	2343
<b>NWH</b>	<b>2385.6</b>	<b>4840.2</b>	<b>2028.9</b>
<b>Foodgrains</b>			
Himachal Pradesh	724.9	1488.3	2053
Jammu & Kashmir	919.3	1571.1	1709
Uttarakhand	851.0	1903.2	2236
<b>NWH</b>	<b>2495.2</b>	<b>4962.6</b>	<b>1988.9</b>
<b>Small Millet</b>			
Himachal Pradesh	4.1	3.3	807
Jammu & Kashmir	6.2	3.1	497
Uttarakhand	59.0	76.0	1288
<b>NWH</b>	<b>69.3</b>	<b>82.4</b>	<b>1189</b>

<b>Rice</b>			
Himachal Pradesh	71.6	114.8	1603
Jammu & Kashmir	273.6	513.1	1876
Uttarakhand	252.0	646.7	2566
<b>NWH</b>	<b>597.2</b>	<b>1274.6</b>	<b>2134.3</b>
<b>Wheat</b>			
Himachal Pradesh	318.9	565.7	1774
Jammu & Kashmir	299.4	487.4	1628
Uttarakhand	333.0	915.4	2749
<b>NWH</b>	<b>951.3</b>	<b>1968.5</b>	<b>2069.3</b>
<b>Maize</b>			
Himachal Pradesh	280.8	711.1	2532
Jammu & Kashmir	302.5	546.0	1805
Uttarakhand	22.0	43.3	1970
<b>NWH</b>	<b>605.3</b>	<b>1300.4</b>	<b>2148.4</b>
<b>Pulses</b>			
Himachal Pradesh	28.5	57.5	2019
Jammu & Kashmir	19.2	10.6	553
Uttarakhand	62.0	54.2	874
<b>NWH</b>	<b>109.7</b>	<b>122.3</b>	<b>1114.9</b>
<b>Oilseeds</b>			
Himachal Pradesh	9.8	5.8	590
Jammu & Kashmir	51.8	39.4	760
Uttarakhand	29.0	26.6	916
<b>NWH</b>	<b>90.6</b>	<b>71.8</b>	<b>792.5</b>
<b>Vegetables</b>			
Himachal Pradesh	89.3	1811.8	20289
Jammu & Kashmir	56.3	1226.0	21776
Uttarakhand	100.1	989.4	9884
<b>NWH</b>	<b>245.7</b>	<b>4027.2</b>	<b>16391</b>

Source: Fertilizer Statistics 2018-19

### ICT and Agriculture

Extension activities in Uttarakhand are also carried out by state agriculture departments, private agri-business companies and NGOs. The information needs of the farming community have been addressed by the public extension system through a two pronged strategy. Mass mediated broadcasts supported by trained agricultural extension system in India. All India Radio (AIR) – the state controlled radio network – started broadcasts for farmers in the late 1950s. These programs cater to the day to day seasonal needs of the farming community and provide information on the latest agricultural technologies. They are broadcast for 60 to 100 minutes every day. Since 2004, AIR has also started broadcasting daily market rates and weather reports for farmers through 94 FM stations of AIR. In addition, non-formal educational programs known as “Farm School on Air” are also broadcast by AIR.

Doordarshan (the state controlled television network) started telecasting agricultural programs (*Krishi Darshan*) for farmers on an experimental basis in 1966. At present, these programs are broadcast for half an hour on week days.

Mass mediated message are, however, too general to be of much use and they usually serve only as a reminder for regular field operations. On the other hand, individual contact field level staff is limited by logistics, resources, skills and sheer numbers. It has been estimated that there are roughly 110,000 extension workers to cater to the needs of farm families spread across 600,000 villages. Furthermore, the government run public extension system has a poor track record of reaching small and marginal farmers (Parikh, 2007).

All these factors combine to result in an information deficit situation where about 60% of the farmers – usually the small and marginal – do not have access to a reliable source of agricultural information.

The National Commission on Farmers has noted that knowledge deficits constrain agricultural productivity in India. It added that the use of information and Communication Technologies (ICTs) for agricultural extension is one way of addressing the information needs of farmers. In keeping with this view, the Working Group on Agricultural Extension constituted by the Planning Commission (Eleventh Five Year Plan), Government of India has recommended that there is a need to respond to emerging challenges to the sector by strengthening information dissemination to farmers through use of ICTs. With the help of ICTs, agricultural extension is expected to become more diversified, knowledge-intensive, and demand-driven, and thus more effective in meeting farmers' information needs. (Zijp, 1994).

The ICT tools used in these initiatives present an impressive list and include video conferencing, voice activated call centre facility, internet enabled PC based networking, voice and text messaging via mobile phones, internet based crop specific digital video, and interactive community radio (Kokil, undated, Rajendran et al., 2004; Lal; 2007 Mittal, 2010).

### ***Review Analysis of ICT***

In recent decades, the widespread use of the mass media has resulted in heightening the level of public knowledge in different fields (**Buren, 2000**). Among the diverse mass media, radio and television, due to their wide and vast range of viewers, have had an outstanding position particularly with regard to informal teaching, and are considered as the best cultural and educational media (**Tancard and Verner, 2005**). **Khushk and Memon (2004)** stated that production and distribution of printed material helps farmers in the transfer of new information and technologies. Printing helps in preserving the technologies in the shape of books/booklets, magazines, newspapers and brochures. According to a study conducted in the central Punjab, majority of the farmers consulted pamphlets, magazines, and newspapers for getting the information regarding sugarcane production technologies. These were regarded as the most suitable forms of print media for adoption of sugarcane production technologies (**Abbas et al., 2003a**). Farm publications have proved to be effective means for dissemination of information, especially to introduce new technologies. Farm publications are also useful for disseminating information among literate farmers (**Singh, 2001**). Radio is a tool for the delivery of quick information. Television is a powerful medium of information exchange in these days. The common electronic media viz; radio and TV are regarded as very effective in communicating the latest knowledge to the farmers. Radio and television are the most effective tools in communication for

the support of development (**Hussain, 1997**). An investigation conducted in the central Punjab showed that more than 56% farmers listened/watched agricultural programmes on radio and television (**Abbas et al., 2003b**).

### Objectives

In line with above stated facts this study was undertaken to assess the utilization of selected communication media by farmers as sources of Agricultural information in N-W Himalayan Region of Uttarakhand state. The specific objectives of the study were:

- To identify the socio-economic characteristics of the farmers
- To examine the different mass media utilized by the farmers;
- To determine the relationship between utilization of mass media and socio-economic characteristics of the farmers

### Material and Methods

The study was conducted in the Almora District of N-W Himalayan Region of Uttarakhand. This study used purposive sampling in selecting 20 respondents from Bhagartola and Dunagiri Almora district of Uttarakhand. The choice of these two Local areas was because they were the areas that had regular programmers /services of the electronic mass media stations in the state.

### Result and Discussion

#### *Radio- a powerful media of Communication in Uttarakhand*

The radio is a powerful communication tool. It has proved to be the most effective media in promoting agriculture and development in rural areas, particularly as a tool for the delivery of quick information specially in hills where, in the absence of regular and stable electric supply in rural and far flung areas. The communication and sustainable development in agriculture may be accounted as one of the very important issue of rural India. In modern technological age, the communication media is playing a very important role in spreading the new agricultural techniques and diffusion of innovation. It may serve as unique contribution in a region having diverse terrain conditions where farmers of the remote villages are handicapped with the poor mobility. Thus the identification of communication media and their appropriate utilization in distribution and planning of communication systems along with various agricultural extension services may prove very fruitful.

People have to depend on radio to meet their needs of information, education and entertainment. It was further found that various programmes on radio were listened occasionally as *Kheti Ki Baten* (45 %), *Kisan Vani* (25 %), *Gram Jagat* (40 %) and *Krishi Samriddhi* (35 %). Approximately 20% of respondents are not listening agricultural radio broadcasts.

Nowadays, access to education, information, knowledge, and communication plays a vital role in the individual and social life as well as human development and inclination towards growth. As a pre-requisite of knowledge, information, recognition and awareness are among the most efficient factors in reaching human development (**WSIS, 2005**).

**Ekoja (2003)** has mentioned that the information sources in different aspects of agriculture for the farmers are radio and television, propaganda publication, daily farm newspapers, agriculture exhibitions, practical education, and consultation services, respectively. **Jenkins and his colleagues (2003)** have conducted a study about the information technology used by the farmers of North

California. Based on this research, newsletters were found to be the most important way of collecting information about major issues in agriculture.

In Nigeria, the studies conducted by **Arokoyo (2003)** showed that although video, radio, and television are the major sources of information for the farmers of this country, in the case of establishing the foundations, it is also possible to use other developed equipment. Canada as an advanced country, considers radio as a noticeable medium in parallel with its technological improvements in the field of agriculture. The production of radio programmes on agriculture has been the prime concern of Canadian radio and television organization (CBS) for about half a century (**Khatoonabadi, 1995**). Radio is a powerful communication tool (**Chapman et al., 2003**) that has also proved to be the most effective media in promoting agriculture and development in rural areas (**Nakabugu, 2001**). Radio and television are the most effective tools in communication for the support of development (**Hussain, 1997**). Radio is acknowledged as the most important medium for communicating with the rural populations of developing countries (**FAO, 2001**).

### ***Television - a viable media of Communication in Hills***

As far as television as a agriculture information sources is concerned it was found that 60 percent of farmers are watching Krishi Darshan and 35 percent are occasionally watching the programme followed by 15 percent regularly.

In rural development, information and knowledge are two significant factors. Local knowledge provides different ideas for agricultural as well as other changes. The information brought to the area contains fresh ideas, and introduces new opportunities. Knowledge obtained from a specific research can motivate thinking and practices. All the five external and one internal catalyst of social change, which were identified by **Figuroa et al. (2002)** have the stimulus of new information or knowledge at their core. Neither knowledge is being “transferred” to potential users, nor are the outputs of specific research being “taken up” by farmers and other land managers (**Garforth and Usher, 1997; Garforth et al., 2003**). Among the mass media, informal education, radio and television have a specific value. Due to their vast use, the media are among the best educational and cultural instruments. Based on their educational requirements different countries can take advantage of radio and television in terms of informal education.

### ***Print Media & Extension Service – an evergreen Information Source in Agriculture***

Print media is also used as good information source in villages as utilization were found 50 percent (newspapers), 55 percent (posters), 30 percent (Book/Booklets), 45 percent (Leaflets), 40 percent (Magazines) and 65 percent Krishi Calendar. But use of print media in most cases was found occasional and in case of Technical Bulletin the use is found negligible.

Further 50 percent of respondents were consulting extension filed staff for agriculture related information and frequency of use were found to be 20% rarely, 15% occasionally and 5% regularly. Approximately 25% of respondents were consulting Fellow farmers for agricultural information. The major source of information was found Farmers fair/Exhibition/Field day (85%) followed by *Kisan Gosthi* (75%) as verification and discussion platform of information (Table 4).



**Table 4: Distribution of respondents as per agricultural information sources**

Information Source	Yes	No	Frequency of Use		
			Regularly	Occasionally	Rarely
<b>Radio Programmes</b>					
1. Kheti Ki Baten	80	20	30	45	5
2. Kisan Vani	65	35	25	25	15
3. Gram Jagat	65	35	15	40	10
4. Krishi Samridhhi	75	25	25	35	15
<b>Television Programmes</b>					
Krishi Darshan from Dehradun	60	40	15	35	10
Live Phone Calls During Prog.	10	90	-	-	10
<b>Print Media</b>					
1. News Paper	50	50	35	15	-
2. Posters	55	45	-	35	20
3. Book/Booklets	30	70	-	5	25
4. Leaflets	45	55	-	40	5
5. Magazines	40	60	5	15	20
6. Technical Bulletin	-	-	-	-	-
7. Krishi Calendar	65	35	35	25	5
<b>Farm Advisory Service</b>	40	60	5	15	20
<b>Extension field staff</b>	50	50	15	30	5
<b>Fellow farmers</b>	25	75	15	10	-
<b>NGO</b>	30	70	5	15	10
<b>Farmers Fair/ Exhibition/ Field Days/ FLDs</b>	85	15	60	25	-
<b>Kisan Gosthi</b>	75	25	40	20	15

The communication media is crucial in helping farmers access the information that they need and transmitting their concerns.

**Table 5: Preference given to Communication media**

MEDIA	I <sup>st</sup> Preference	II <sup>nd</sup> Preference	III <sup>rd</sup> Preference
<b>Radio</b>	5	10	20
<b>Television</b>	0	5	10
<b>Print media</b>	10	10	15
<b>Farm Advisory</b>	10	10	5

Service			
<b>Extension field staff</b>	30	30	10
<b>Fellow farmers</b>	5	0	5
<b>NGO</b>	0	5	10
<b>Farmers Fair/ Exhibition/ Field Days/ FLDs</b>	40	25	15
<b>Kisan Gosthi</b>	0	5	10

The data given in Table 5 reflects that majority of respondents (40 %) have given first preference to Farmers fair/Exhibition/Field days as the information is retained more and correctness of information is more in this communication media. Further 5.0, 10.0 and 15.0% of the respondents gave 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> preference respectively to radio as source of agricultural information respectively. Approximately 10% of the respondents gave 1<sup>st</sup> and 2<sup>nd</sup> preference to television print media and farm advisory service each as source of agricultural information.

No one gave 1<sup>st</sup> preference to Television, NGO and Kisan Gosthi as a source of agriculture information is really a matter of concern.

The respondents were further asked to rate various communication media on the basis of their effectiveness. Based on the data, the relative ranking of the communication media as a good agricultural information source has been done as given in Table 6. It is evident from the data given in Table 4 that in line with the fact that a large majority of the respondents was getting information through farmers fair/ exhibition/ field day, it was ranked 1<sup>st</sup> with regard to its effectiveness in the dissemination of agricultural technologies by 70% of the respondents followed by extension field staff. Farm advisory service, Radio, Television, Print media, NGO, Kisan Gosthi and Fellow farmers were ranked 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> respectively on the basis of effectiveness, respectively.

**Table 6: Ranking of communication media on the basis of their effectiveness**

MEDIA	Ranking	Percentages of respondents
Radio	4	18 (90)
Television	5	9 (45)
Print media	6	15 (75)
Farm Advisory Service	3	17 (85)
Extension field staff	2	12 (60)

Fellow farmers	9	9 (45)
NGO	7	6 (30)
Farmers Fair/ Exhibition/ Field Days/ FLDs	1	14 (70)
Kisan Gosthi	8	7 (35)

*Figure in parenthesis indicate per cent values.*

Data regarding preferred subject of agricultural information were presented in Table 7 indicating that approximately, 45 percent of respondents were preferred crop production and taking information regarding crop production aspect which includes development of new varieties, vegetable cultivation, crop rotation, fodder cultivation, protected cultivation, fruit plantation and floriculture and medicinal & aromatic plants. However agricultural information and Frequently Asked Questions (FAQs) under other major domain were preferred and asked by farmers were based on crop protection and management (80 %), crop improvement (55%), diversification (65%) and value addition (25 %) etc.

**Table 7: Preferred Subject covered in Communication media**

Subject covered	Yes
Crop Production	9 (45)
Crop Protection	16 (80)
Crop Improvement	11 (55)
Diversification	13 (65)
Value Addition	5 (25)

*Figures in parenthesis indicate per cent value.*

An empirical qualitative research method along with observation technique were taken into consideration for impact assessment of introduction of agricultural information sources into locale and it was found during investigation that 50 percent of respondents agree (indicated in table 6) that they have changed knowledge about new scientific method and application in the agriculture and further 55 %, 60 % ,30 % and 10 % of respondents were agreed that due to intensification of agricultural information and communication sources they have positive outcome as yield level increase, diversification, increase in income and improved living standard, respectively (Table 8).

**Table 8: Impact Assessment**

Parameters	Yes
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Knowledge Change	10 (50)
Yield level increase	7 (35)
Diversification	12 (60)
Increase in Income	6 (30)
Living Standard Improved	4 (20)

*Figures in paranthesis indicate per cent value.*

Data regarding major constraints were found to be in accessing communication media were found to be as less availability, signal resource constraint (If the media have to go to the rural areas to cover agriculture, it is very costly, and most of the media in hill lack resources).

### Conclusion

Communication media offers effective channels for communicating agricultural messages, which can increase knowledge and influence the behaviour of the intended audience. Broadcast media have the ability to disseminate information to large audiences efficiently; the radio can be a particularly important channel. Since the radio plays a more important role in public education, producers should be familiar with the latest and newest programme structures to be able to meet the needs of people by employing appealing method Based on the research findings, the farmer's literacy level plays an influential role in the extent of his/her use of available media. The relevant institutes and organisations should provide appropriate opportunities for the development of formal and informal education in a move to decrease illiteracy levels in rural communities. In the present investigation it was found that radio, TV, various print media sources, farm advisory service, extension staff, Fellow farmers, Non Governmental Organizations, Farmers fair/Exhibition/Field days and Kisan Gosthi is the major source of agriculture for farm families.

### Suggestive Measures

- The national governments should give the necessary equipment and financial rewards to the media, to go and report on agricultural subjects *i.e.* the Govt. should promote the activities beneficial in dissemination of new technologies.
- ICT encourages villagers to take an active part in the development process or even better to take their own initiative to improve their living conditions.
- Radio enables communities to articulate their experiences and to critically examine issues and policies affecting their lives for example a community can use the radio to highlight new agricultural policies. These policies can be debated upon and discussed using the radio and immediate feedback can be given for relevant authorities to take action.
- Vital information like, better farming methods, improved seeds, timely planting, agro-forestry, better harvesting methods, soil conservation, marketing, post harvest handling and diversification can be passed on through communication media.

- Communication media gives farmers an opportunity to interact with each other and other relevant authorities.
- Communication media demystifies the scientific jargon. It is able to explain the research in simpler and ordinary language that people understand.
- The air time especially for the agriculture television programs should be changed to a more appropriate slot. Majority of the farmers interviewed were not able to watch the program due to unsuitable air time.
- Only a few farmers interviewed listen to the agriculture radio program thus the promotion on radio agriculture program should be intensified.
- Printed materials are also the important choice of farmers in Uttarakhand in getting the agriculture information

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