

Chapter 1

INTRODUCTION

India is predominantly an agriculture economy based country. Agriculture is still playing an important role in total economy of India. So, agricultural communication while dealing with other production factors such as land, labour, capital and managerial ability can be improved by relevant and reliable information and knowledge so that the farmers can make better decisions to avail of market opportunities and to manage continuous changes in production systems. Effective agricultural information delivery requires recognition of the needs of the farmers and the determination of how best to provide them with the information they need. Information is a critical resource in the operation and management of the agricultural enterprise. Access to the right information determines the success and failure of farmers and therefore agriculture, the mainstay of rural life, needs proper communication of new ideas and technological innovations for improvement of rural life as a whole. The communication patterns of farmers are shaped by socio-structural factors like class, caste, gender, age etc. Lack of proper communication and distribution of information is one of the constraints to achieve sustainable agricultural development in many least developed countries. This chapter deals with the research problem formulated the research methodology adopted and the way research organised in the study.

THE RESEARCH PROBLEM

Development is a process of acquiring control over environment by a society to bring in social, economic, political and cultural advancement of people. It consists of such goals as promoting literacy, health, limiting family size, increasing productivity and material advancement, along with greater equality, freedom and other valued qualities, varying from place to place and time to time. Over the years, the social scientists have propounded a number of models such as capitalist, socialist/communist, democratic, psychological, social, economic and diffusion models of development, grouped as growth models (Adam Smith, Ricardo and Malthus); Marxian model; modernization models (Lerner, Inkles, Hoselitz, Rostow,

Eisenstadt, and Parsons), dependency models (A.G Frank, Cardoso, Baran) and post-communism model. Some models have been given by Indians also such as P. C Mahalanobis's econometric model used in formulating the framework of India's second five-year plan, essentially an allocation model based on techniques of operational research as applied to development planning and useful for making effective use of scarce resources to meet ends; Mahatma Gandhi's model for uplift of the rural people, stressing on increase in production and employment and Sarvodaya model constructed by some Indian reformists like Vinoba Bhave, J. P. Narayan, K. C Kummarappa etc., emphasizing on 'uplift of all', without generating class antagonism. The Government of India has given emphasis on multidimensional and integrated rural development for improvement of Indian people's lot. However, most of the western and eastern models of development have emphasis on modernizing agriculture by using modern technology for improving lot of rural masses in the developing societies like India. All the models have stressed on communication to achieve new vistas of improved quality of life as communication network is an integral part of modern society and one of the latent functions of communication is to initiate as well as to maintain the process of development; to distribute effects of development in all segments of society; to generate creativity among the people and to increase efficiency and productivity (Borthakur 1994).

A major characteristic feature of the developing societies is their predominantly rural character and subsistence oriented agrarian economy. All models of development have a major emphasis on transformation of these societies by structural changes of total society. The classical economists felt that the proper path of growth for a country is to develop its agriculture first, manufacturing industries second and commerce last (Adam Smith quoted in Bhatia: 1977: 23). Schramm (1964: 116) is also of the opinion that economic and social development often begins with agriculture. Role of communication is much more important to improvement of agriculture, health, political activities and dissemination of information in the developing societies like India. In India about 75 percent of the people live in rural areas and majority of the rural population is illiterate (Census 2011). The radio became cheap only in 1950s and later the other communication technologies like television and print media became popular in India, So, impact of mass media on socio-economic development has not received as much attention among social

scientists as other means of development (J. Joni 1983). However, it has been noticed that development efforts have proved to be unsuccessful due to lack of proper communication strategies and a majority of villagers had no access to information or had problems in understanding or implementing any new schemes in the villages. The villagers are often not supplied with adequate, simple and accurate information to use innovation properly. Due to the lack of proper communication the villagers are often not able to articulate *real needs for productivity in agriculture or other needs related to health, education, political awareness etc.* The World Development Research (1999) focuses on knowledge about technology (technical knowledge) and knowledge gaps that relate to the unequal distribution of technical knowledge. Knowledge about the qualitative aspects of economic production and the unequal distribution of qualitative information results in information problems that also contribute to underdevelopment. The actual role of communication is to communicate and facilitate acceptance of innovations helping in mobilization of people through transformation of attitudes and values. Agriculture as the mainstay of rural life needs proper communication of new ideas and technological innovations for improvement of the life as a whole. For long, even after Independence, villagers in Assam had no access to modern mass media of communication and they persisted with interpersonal mode of communication. Of late, many of villagers in Assam have had access even to new media of communication; namely, Cable TV, Internet and mobile phone, besides Radio and newspapers, and, from these, they are getting new ideas to implement, many-a-time, in agricultural development. However, interpersonal mode of communication is also widely used in diffusing new ideas in agriculture and, sometimes, both the modes of communication are seen to be working hand in hand, though at different levels. Further, modes of communication are somehow related to certain structural factors such as age, sex, caste/community, education, income, size of land etc. Here, a question arises: **What patterns of communication are perceived to be emerging out of the agricultural development taking place in Assam, especially in the villages of Sivasagar district?** Since the early part of the last century there have been conducted a good number of studies showing impact of communication on social life and vice versa. These have been reviewed here to attain theoretical and methodological understanding for the study.

REVIEW OF THE LITERATURE

During the years covering the 1930s and 1940s and much of the 1950s McQuail (1969) has identified three major areas of inquiry in the field of mass communication research: (i) researches concerned with behaviour, interest and structure of audience, (ii) researches on the effectiveness and persuasive power of the media and (iii) researches concerned with general social effects of the mass media. Besides, there are plenty of researches on diffusion of innovations, conducted in the second half onwards of the last century. These researches are discussed under the following classes:

(i) Researches on Social Impact of Communication and Communication Impact of Society

The communication as an area of scientific investigation has attracted the sociologists in the early part of twentieth century under the influence of Chicago School in sociology. The Chicago school developed a general approach to social theory that emphasized the role of communication in social life (Cooley 1902; 1909; Dewey 1927; Mead 1934). For the first decade of the century the University of Chicago was the American Centre of the researches for meaning of democracy in urban life (Duncan 1962). The Chicago sociologists influenced the development of communication studies in several important ways. Collectively they were a major force in establishment of scientific sociology and thus indirectly of communication science. The contributions of Robert Park can be seen in his emphasis that his students get out into city itself. Thus, he fostered the development of methods of systematic observations and of participant observation. When collecting data by survey he demanded collection of detailed life histories through a series of questions, allowing the respondents to express their feelings and attitudes. In fact, he was instrumental in developing a new branch of sociology at Chicago in which communication research was at the centre of investigation. Through its promotion of theory based applied sociological research it had a great influence on the later communication research.

The influence of Chicago style studies outside the Chicago sphere can be seen in Lynd and Lynd's (1927, 1937) classic studies of 'Middle Town' and in Malor studies on journalism and films (Desmond 1937; Lee 1937; Rosten 1937, 1941).

These studies showed the important impact of communication on patterns of everyday life and the creation of national culture as well as the importance of understanding media institutions as part of the larger social process. Although most researches focused on communication institutions and their effects on society, the influence of society on the communication institutions and their effects on communication institutions, the influence of society on the communication media was also recognized (Harris 1933). Most of the researches on the social impact of communication grew out of concern with the effect of mass communication, particularly on children and youths (Healey 1915; Phelan 1919; Jowett 1976; Young 1922). These were also a good deal of efforts to establish historical understanding of the developing media of communication (Young 1922; Mott 1938; 1941; Hampton 1931; Jacobs 1939). After World War II the centre of sociological communication research shifted from the Chicago School to Columbia. Lazarsfeld had more substantial impact on the sociology of communication and establishment of a unit for applied social research of Columbia, which later became a model for other university structures (Lazarsfeld 1940; Cantril et al. 1940; Lazarsfeld and Stanton 1941; Lazarsfeld, Berelson Gaudet 1944; Merton 1946; Berelson, Lazarsfeld and Mc Phee 1954; Katz and Lazarsfeld 1955 and Klapper 1960).

V. A. Okwoche and C. P. O. Obinne also (1998) conducted a study to examine the influence of socio-economic characteristics on communication of agricultural innovations amongst women cooperators and women non-cooperators in Benue state. The objectives of this study were to (1) describe the socio-economic characteristics of women cooperators and non-cooperators in Zone C, Agricultural and Geopolitical Area of Benue State; (2) examine the socio-economic factors that distinguished communication levels of rural women cooperators and non-cooperators in the area. The areas of the study are within the Zone -C Area of Benue State Agricultural and Rural Development Authority (BNARDA). Three women cooperatives from three villages and non-co-operators were selected. Purposive simple random sampling technique was used in the selection of 25 respondents from each of the three cooperatives, $25 \times 3 = 75$ women cooperators. On the other hand, from each of the three villages, $25 \times 3 = 75$ women non co-operators were interviewed. A total of $75 \times 2 = 150$ respondents were selected for the research. The major occupation of the people is farming of crops (yam, water yam, cassava, guinea corn, maize, millet, rice etc).

However, some inhabitants are engaged in other jobs like trading, public service including teaching. Inferential statistics such as t-test, Pearson Product Moment Correlation (PPMC) and Step-wise regression were used to test the objectives of the study. The results showed that apart from age, there were significant differences in the socio-economic characteristics of co-operators and non-cooperators. Nine variables were positively related to communication of agricultural innovations for cooperators, while three variables were significantly related to communication of agricultural innovations by non-cooperators. On the part of women cooperators, socio-economic characteristics all together affected communication by about 46%. Out of these, contact with extension, membership of cooperatives, level of formal education, farm size and agricultural credit accounted for 40% of the variance. Contact with extension agents ranked highest with 15% of the variance. For non-cooperators, the selected variables accounted for about 20% of the variance in communication. Out of this, household size, level of formal education, age and non-farm income accounted for 18% of the variance in communication. Contact with extension agents is surprisingly not making significant contribution. This may be explained by the availability of information sources like friends, neighbours, relatives etc and the fact that non-cooperators could not arrange for extension agents for visits. They recommended that for extensive information dissemination of agricultural innovations, extension service which is public goods be extended equally to both organizational members and non-members. In view of the fact that not many people who handle agricultural and cooperative matters are aware of what cooperatives stand for, cooperative education should be carried out at all levels of the society. This will help to broaden the financial base and increase their number and size distribution to impress the crucial importance of cooperatives in the process of socio-economic development upon the generality of the people.

(ii) Audience Research Studies

The audience research studies which have been mainly descriptive have looked at the audience in its social setting and attempted to map out the salient features of audience behaviour, interests etc (Allport and Cantril 1935). The findings of the audience research by Allport and Cantril (1935) showed that there had been an average daily radio listening around 2-3 hours. Another group of researchers like (Bogart 1956; Steiner 1963; Belson 1967) studied television in U.S.A. and Britain.

Finally, many researches have been conducted to understand the structure of the audience, and the setting of interpersonal relations in which mass communication is received. Merton (1957) studied the patterns of influence in a small community where the flow of communication has been considered in relation to the existing structure of personal relationship.

O. J. Okwu, A. A. Kukuand & J. I. Aba (2005) investigated the use of radio as a medium of agricultural information delivery to farmers in Benue State, Nigeria. Absence of a functional agricultural information delivery system is a major constraint to agricultural development in Nigeria and lack of access to relevant agricultural information by farmers in developing countries cuts across all subsectors of agriculture and different stages of agricultural production process. Farmers need to be informed and educated about improved agricultural practices to enable them to increase their productivity and income. Several channels such as extension agents, individuals, farmer-to-farmer contact, print media (newspapers, magazines, newsletters, leaflets, pamphlets, and posters) and electronic media (radio, television, film, slides and film strips) have been widely used to disseminate information to farmers. The required amount of information and learning is, however, so vast that only effective use of the information multipliers, the mass media, can provide information at the rates driven by pressure of time, population, geographical constraints, and shortage of trained extension personnel in developing countries. Radio is one broadcast medium which almost all experts identify to be the most appropriate for rural emancipation programme. It beats distances, and thus has immediate effect. The study examined to (i) identify agricultural programmes aired on Radio Benue; (ii) find out the level of patronage of the programmes; (iii) ascertain the convenience of the time of presentation to the target audience; (iv) determine relevance of the programmes to information needs of the target audience (v) and ascertain agricultural knowledge gained by the listeners. The area of study was Makurdi Local Government Area of Benue State, Nigeria. Benue State lies within the middle belt of Nigeria where farming is the main occupation. About 75% of the people primarily engage in agriculture. Field survey was carried out with the aid of questionnaire, complemented by personal observation and interview during data collection. The questionnaire was made up of two parts (A and B). Part A sought information on demographic/socio-economic characteristics of the respondents. Part B consisted of questions on radio ownership, listenership pattern, agricultural

programmes and its effectiveness. Random sampling technique was used in selecting four wards from the study area (Makurdi LGA); namely, North Bank, Apir, Fiidi and Agan. A total of one hundred (100) respondents with 25 from each ward were then selected through simple random sampling technique and administered with the questionnaire with the help of well-trained enumerators. Frequency distribution and percentages were used for analysis of data. Ownership of radio sets by respondents is an important factor that indicates the physical availability of the medium and exposure of audience/farmers to radio agricultural programmes. The result revealed that 69% of respondents had radio sets in their houses, while 31% did not. Majority of the respondents (66%) listened to Radio Benue agricultural programmes. This implies that a good proportion of the farmers had access to agricultural information disseminated by Radio Benue. The reasons given for non-patronage of agricultural programmes by those who did not listen to them were: non-awareness of the programme presentation (35%), non-access to radio set (40%) and unsuitable time of presentation (25%). The results show that 23, 22 and 21% respectively listened to agricultural programmes once, twice and more than twice while 34% of the respondents never listened to agricultural programmes on Radio Benue and 42.4% of the respondents indicated that the programmes were very relevant to their information needs; 56.1% indicated that the programmes were partially relevant, while 1.5% did not find the programmes relevant at all. Generally, 98.5% of the respondents found the programmes relevant to some extent. Most of the respondents (81.8%) gained some new knowledge on timely crop planting. Majority of the listeners also gained some knowledge on correct application of fertilizer (68.2%), appropriate type of fertilizers to apply (78.8%), proper management of growing crops (66.7%) and disease, insect and pest control (56.1%). Relatively few listeners gained knowledge through the programmes about improved crop/livestock varieties (42.4%) and proper methods of processing farm produce (39.4%). Only very few respondents (18.2%) indicated some knowledge-gain about access to agricultural credit.

(iii) Researches on the Power/Effects/ Social Consequences/Impacts of Mass Media

A large number of communication researchers studied the power of press, cinema and radio to change options and influence behaviour, attempts to measure the effects of mass communications (Berelson 1953; Horland 1953, 1954; Klapper 1960;

Cox 1961). Their findings showed that (i) the effects of media, where they occur, most frequently take the form of a reinforcement of existing attitudes and opinions (Klapper 1960) and (ii), clearly, the effects vary according to the prestige or evaluations attached to the communication source (Hovland 1954).

Stead (1954) and Himmelweit (1958) studied the social consequences of mass communication, i.e., crimes, violence etc.; the effects on attitudes (Peterson 1933) or emotional response to crime portrayals, showing that crime films were popular amongst young criminals (Blummer 1933; Belson 1967). Hamilton and Lasswell (1956) revealed the 'passivity', 'escapism', unsociability and loss of creativity of the television viewers in Britain and in an American community.

Media are helpful in bringing about attitudinal changes. Lazarsfeld and Merton (1948) have also suggested that news reports can expose a discrepancy between private attitude behaviour and public morality, thereby forcing the public to a decision. Thurstone and Peterson (1933) tested the attitude of a group before and after exposing a film. The results indicate that children acted according to the direction indicated by the film; these effects persisted significantly for five months. Rosen (1934) also demonstrated that pictures, with certain types of contents, produced measurable effects on the socio-economic attitudes.

According to Waples, Berelson and Bradshaw (1940) and Davidson (1956), the mass media publicity, besides having an effect on the audience, can foster a sense of prestige and importance among the members of a group singled out by media. Davison (1956) also believes that in an action situation the knowledge that others are watching can fortify a group's determination to struggle for achieving goals or for resisting an enemy.

Lerner (1958) saw the problem as one of 'modernizing' the traditional societies. He saw the spread of literacy, resulting from urbanization as a necessary precondition to more complete modernization that would include participatory political institutions. Development was largely a matter of increasing productivity, and 'the problem of stimulating productivity' was basically "psychological."

(iv) Researches on Diffusion of Innovations

In 1962, Rogers discussed about the tradition of research on the 'diffusion of innovations'. He saw the diffusion of new ideas and practices as a crucial component of the modernization process. In his early studies he highlighted a large number of factors in both the 'message' and the recipient that might facilitate effective persuasion. The important realization that mass communication seldom sufficient to produce direct changes of attitudes or behaviour on their own: the influence of persons and groups with whom the individual is in direct contact could be crucial. It was found that individuals were not equally receptive to their messages. Mass communication influence appears to operate by a "two-step flow" process: the more aware members of groups tended to be most readily reached by the media and these 'influential' or 'opinion leaders', in turn, were instrumental in spreading the message to others (Katz 1957).

Hundreds of diffusion studies based on Rogers' model have now been carried out in many parts of the world and have resulted in a refinement of the communication techniques involved. The idea of a 'two-step flow,' for instance, has been extended to the notion of 'communication networks' operating in the local situation and some recent work has been developed to analyze these (Rogers 1976). Wilbur Schramm (1964) for the UNESCO Mass Media Development Programme founded the theory of 'magic multipliers'. He pointed out that information flows not only to people but also from people so that their needs can be known and so that the many participate in the acts and decisions of nation-building, and information must also flow vertically through which decision may be made, work organized and skills learned at all levels of society. Schramm (1963: 6-7) states: "Communication raises people's aspirations, teaches new skills, and socializes citizen to a new and different society that is still only in the process of becoming. In a modern society, a certain degree of change is expected in modernizing society; on the other hand, change is an overriding value, and the planned and purposeful use of communication therefore looms large. That is why, in the last few years, a number of schools and national planners have decided that the use of communication in support of the modernizing process is worth their active attention." He discussed the nature of communication system in three different types of society; namely, the tribal village, the South Asian

village and the industrial society and concluded with a comment that South Asian village has more open communication in nature.

(v) ICTs and Agricultural Studies

Agwu et al. (2008) has studied to ascertain the used level and constraints of information communication technologies (ICTs) among major stakeholders in the agricultural development process in Abia and Enugu States of Nigeria. The specific objectives were to: ascertain the knowledge, awareness and access to information communication technologies among researchers, extension workers and farmers; identify the available ICT facilities and their frequency of use; and determine the constraints to the use of ICTs in agricultural development process as perceived by the researchers, extension workers and farmers. The target population for this study included researchers (from the National Root Crops Research Institute (NRCRI), Umudike and University of Nigeria, Nsukka) as well as the public extension workers and farmers in Enugu and Abia states. Simple random sampling procedure was used to select 20 researchers, each, from the National Root Crops Research Institute, Umudike and Faculty of Agriculture, University of Nigeria. Also, 20 extension workers were randomly selected from each of the public extension organization (Agricultural Development Programme (ADP)) in each of the state. Again, 20 randomly selected farmers from each of the state also participated in the study. In all, a total of 120 respondents participated in the study.

Data were collected through the use of questionnaire. Objective one was achieved by asking respondents questions relating to their knowledge and awareness level on the role of ICTs in agricultural development. Ten questions were asked and a maximum of 1 point was awarded for a correct answer to each question and 0 point for a wrong answer. The respondents were categorized into 3 groups based on their knowledge level; namely, a. Low knowledge (for those with 1-3 points) b. Moderate knowledge (for those with 4 – 7 points) and c. High knowledge (for those with 8-10 points) Objective 2 was achieved by asking respondents to indicate their frequency of usage of available ICTs, e.g., computer, internet and cell phone. A three-point Likert type scale with responses ranging from “never used” to “very often used” and scaled 1 to 3 respectively, was utilized. Objective 3 was achieved by listing 20 possible constraints to the use of ICTs in agricultural development and asking respondents to rate the level of seriousness of these constraints. A 3-point Likert type scale of “very

serious”, “serious” and “not serious at all” were used to measure their responses. Responses of the three-point scales were later categorized according to their mean scores. In terms of frequency of usage of available ICTs, mean scores of 2.00 or above were classified as frequently used, while in terms of constraints to the use of ICTs in agriculture, variables with mean scores of 2 and above were regarded as serious constraints to the use of ICTs in agriculture, and variables with mean scores below 2 were regarded as minor constraints. Mean scores and percentages were used to analyze all the data.

A majority (52.5%) of the researchers had high knowledge level while only 7.5% had low knowledge level of ICTs. In the case of the extension workers, majority 57.5% had moderate knowledge level while only 10.0% had low knowledge level. On the part of farmers, majority (56.7%) had low knowledge level of ICTs. This shows that apart from the researchers, the extension workers and farmers need to be trained on the use of ICTs. Table 2 also shows that majority (72%) of the researchers and extension workers (63%) had high level of awareness of the major ICT tools, while only 41% of the farmers interviewed were highly aware of these tools. It is important to recognize that awareness among policy makers on the potentials of ICTs is a critical element for its development. It showed that 65% of the researchers, 56% of the extension workers and 33% of the farmers asserted that they had access to ICT facilities. The fact that majority (67%) of the farmers do not have access shows that most of the rural areas in Enugu and Abia states don't have access to major ICT facilities and so are not likely to be aware of major agricultural findings. According to UNDP (2001) the problem of underdevelopment is attributable to the inability of a large portion of the world's population to access and effectively use ICTs.

Bidit Lal Dey, Renee Prendergast & David Newman (2008) have investigated the use and appropriation of ICTs by rural Bangladeshi farmers. It examines farmers' information needs and how and to what extent those needs can be addressed through the use of different ICT tools and applications and their appropriation in the settings of rural Bangladesh. They examined these issues from the point of view of the target beneficiaries – the rural farmers using an action research approach by dividing into two phase of the fieldwork, first the information needs of rural farmers were investigated and the second phase enabled groups of farmers to have access to the services offered by two telecentres using mobile phone technology. The centres in question were D-Net1's Community-based Technology Centre (CTC) and

Grameenphone and Katalyst2's GPCIC (Grameenphone Community Information Centre). D-Net, a Bangladeshi NGO, runs the Microsoft Unlimited Potential Project in the form of Pallytathya Kendra (a type of CTC). Both of the projects provide the rural communities with access to different ICT tools, including computers and Internet. The fieldwork project examined the current and potential interaction between farmers and these telecentres. The intervention of the action research also enabled small groups of farmers to use mobile phones to retrieve information from telecentres and other sources. The initial planning and preparation started from 1st week of January, 2008. The first month was spent mingling with the farmers and learning about their problems. In-depth interviews and focus group discussions (FGD) were conducted to learn about their lifestyles, how they collect agricultural information (i.e., prices and sources about fertilizers), what sort of problems they face while getting such information, how they overcome those problems. Farmers' opinions regarding the use and availability of fertilizers, use of technology in farming and non-farming activities were gathered. Their perceptions about the telecentres and mobile telephony were also investigated during this period. The findings showed that the telecentre projects had limited impacts in terms of meeting some crucial agricultural information needs. Mobile telephony, computers and internet connectivity have the potential to deliver the information. However, the information content and the applications need to be developed through a bottom up approach in order to achieve the objectives of meeting the information needs of farmers.

Agnes Godfrey Mwakaje (2009) studied with an empirical evidence of the impact of ICT on market information access and its effect on incomes, trade volumes and the adoption of new farming technologies by rural farmers in Tanzania. To achieve this, the following activities were undertaken: to document the existing ICT networks in the study area; to identify people who use ICT to access markets; to assess the impact of market access through ICT on agricultural producer prices, trade volumes and the introduction of new crops and to investigate factors that are influencing and/or constraining the access to ICT by rural farmers. The study was conducted in Rungwe District, Mbeya Region, Southwest Tanzania. The choice of the district was purposive based on the high potential for agricultural production and its remoteness. Secondary data were collected from the literature review and documents that were obtained from different sources including the Ministry of Livestock Development, Ministry of Agriculture and Food Security, Ministry of Industry and

Commerce, Academic institutions, Mbeya Region, Rungwe district and cooperative unions in the District and villages within the area of study. Also information on ICT services was collected from service providers, traders, organizations and NGOs. Primary data were collected from six wards, constituting fourteen villages altogether. The selection of the wards and villages was based on the ownership of at least one ICT facility. From the 14 villages, 200 farmers (each having at least one type of ICT) were selected randomly for interviews. The number of respondents per ward ranged from 14 to 71. In addition, there was an extensive consultative meeting with regional and district officials, policy makers, ICT service providers, NGOs, key informants and other relevant stakeholders. Data collected included the type of ICT owned by the farmer, production levels, prices, sources of market information, distance to the market, cost of getting market information, wealth of the households (asset ownership and incomes), family size, type of crop marketed, new crops adopted, and cost related to ICT use. Interviews were conducted using structured questionnaires (for households), semi-structured questionnaires and checklists (for focus group discussions and key informant interviews). Data were analyzed using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel. The findings shows that the majority of respondents with access to ICT were male, where 25% had mobile phones and 60% had radio sets, compared with 11% and 40% for female respondents. Most of the respondents aged between 21 and 60 owned at least two types of ICT (radio and mobile phone) compared with those of other ages who had mainly one and normally it was a radio set. Farmers received marketing information mainly from fellow farmers (88.8%), relatives (56%) and traders (37.5%) and a considerable number of respondents, that is, of 25% and 23%, used mobile phones and radios, respectively to get market information. Farmers who received market information through newspapers and primary cooperative societies comprised 9% and 2.5% respectively.

Farmers with high incomes had more than one ICT (normally radio and mobile phone) and therefore they were in a better position to access market information through these items than those with less income who had only one type of ICT. This suggests that low-cost access to ICT such as information centres is a necessary prerequisite for the successful use of ICT by the poor. Statistics were also significant concerning the type of farm crop sold. However, there was no significant difference in the use of ICT for market access across education levels, adoption of new technologies and years in the agricultural marketing business. The significant

lack of impact of education could be explained by the fact that a high proportion of the respondents had about the same level of education, i.e, Standard Seven. On the other hand, the reason why the number of years in business had no significant impact is not clear. One explanation could be that in this science and technology era people are using ICT continuously to search for market information and new opportunities, including new markets that are emerging daily. The adoption of new technologies was also not significant because of the short time in which ICT has been available in the district.

The development of ICT use for market access in Rungwe district is still in its infancy but the future is promising. The few farmers who used ICT to access markets were mainly those who produce large quantities of crops or have crops that are in great demand. The results also show that people who used ICT to access market information sold a lot more and received relatively better prices, which has a positive impact on poverty alleviation. A number of factors are constraining the spread of ICT technology which include cost, availability, knowledge and reliability. Also the lack of electric power in many rural areas is a dictating factor in relation to the spreading of ICT.

Masuki, K. F. G. et al. (2010) examined that agricultural production for local consumption and export in East Africa plays a critical role in national economies. The sector employs nearly 80% of the people who are mostly small-scale farmers and depend on agriculture for their livelihoods. Agricultural information is a key component in improving small-scale agricultural production and linking increased production to remunerative markets, thus leading to improved rural livelihoods, food security and national economies. They discussed the dynamics of using portable phones among smallholder farmers to link them with market outlet and other service providers who contribute in one way or the other agricultural productivity. The study was conducted in Rubaya sub-county in Kabale district. Rubaya is one of 19 sub-counties in Kabale district. It has 6 Parishes; namely, Kitooma, Rwanyena, Mugando, Buramba, Kibuga and Karujanga. It was conducted in all 6 Parishes where village information centres were established. The Sub-county telecentre is in Mugandu Parish where the Sub-county headquarters is located. A systematic action research and process documentation was used in this study to monitor the use of various information and communication technologies to facilitate communication and information flow between farmer institutions at different levels (farmer groups,

parish, sub-county and district levels), between farmer institutions and the telecentres and between information sources and the telecentres or information hubs. Information needs assessment protocols was used to identify farmers' information needs and tested with farmer groups in Rubaya sub-county.

Research findings showed that use of phone was appreciated by rural communities as easy, fast and convenient way to communicate and get prompt answers of respective problems. Farmers were more excited about the use of phone than other information and communication technologies. Use of mobile phones to access information differed from one Parish to another. Information on marketing is on higher demand (100%). There is generally more use of phones by male than female farmers, yet more female farmers requested information on NRM and agriculture as compared to male farmers. Despite some obvious challenges the use of phone in the study area was accompanied by positive outcomes and opened opportunities such as emerging of strong collective action among social groups. Farmers are coming together to market their produce. Based on these results the increased mobile penetration rate in the country provides opportunities for actors along commodity chain to look into possibilities of using mobile applications to boost agricultural development that accounts for 30.2 % of the county's GDP.

(vi) Role of Mass Media in Agricultural Communication

Muhammad Irfan et al. (2006) have studied the gap between average and potential yields of various agricultural crops in Pakistan. It clearly indicates that the available technologies, if adopted by farmers according to the recommendations, can enhance agricultural production considerably. Therefore, there is a dire need to apply science and technology in the field of agriculture. In order to achieve this objective, the extension agencies are disseminating new technologies through different means including mass media (radio, TV & print media). Lahore district was selected for the study. A random sampling technique was used for selecting sample. The total sample size was 120 respondents. Data were collected through a pretested interview schedule. The results revealed that all the respondents regarded fellow farmers and pesticide agencies as their major sources of agricultural information followed by TV (64.2%) and extension field staff (51.7%). Among the mass media, the respondents (54.1%) ranked TV, 25.0% radio and (16.7%) print media 1st, 2nd and 3rd, respectively with regard to effectiveness. A vast majority of the respondents did not listen/ watch

agricultural radio/TV broadcasts regularly or occasionally. Either they never listened/watched agricultural radio/TV broadcasts or they did so rarely. It may imply that a large majority of the respondents was getting very less information through radio and TV.

(vii) Information Source and Communication

Sher Muhammad and Chris Garforth (1999) studied farmers' information source and its relative effectiveness to develop an appropriate strategy for effective dissemination of agricultural information among farmers. They have studied one of the Tehsils of Faisalabad district to identify farmers' information source and their relative effectiveness as perceived by them. 60 contact farmers and 128 non-contact farmers were randomly selected from 16 villages selected at random through multistage sampling technique. Sugarcane, being one of the major crops of the area, selected as reference crop to assess the information levels of the farmers. The data were collected through interviewing farmers and analysed by using 'Minitab' statistical package. The findings of the study showed that majority (73.8%) of the respondents got information through neighbour, friends or relatives and 2.6% of the contact farmers played role as source of agricultural information for non-contact farmers in that area. 46% of the contact farmers reported that they got information from field assistant and only 18.3% of non-contact farmers found as they got sources of information from field assistant. Only 3.1% and 1.1% of the farmers contact Ayub Agricultural Research Institution, Faisalabad and University of Agriculture, Faisalabad for getting information. Mass media were also popular among the farming community. It is found that although only 11% of the respondents had access to print media, maximum information they got from it followed by radio, TV, sugar mills, contact farmers, pesticide dealers, extension office, field assistant.

O. Pipy Fawole (2008) investigated the sources and use of information among pineapple farmers in Nigeria. (i.) determine the personal characteristics of pineapple farmers, (ii.) determine pineapple farmers' awareness of available information on pineapple production, (iii.) Ascertain pineapple farmers' sources of agricultural information (iv.) determine pineapple farmers' frequency of use of available information, (v.) Investigate pineapple farmers' frequency of contact with extension agents and (vi.) delineate farming challenges encountered by pineapple farmers. He selected purposively the Ovia local government area in Edo State for the study based

on two criteria: high concentration of pineapple growers in the area and representativeness of a typical pineapple growing community. From a list of pineapple growers compiled by the staff of the agricultural unit of the local government area, 120 farmers were randomly selected. An interview schedule with items based on the objectives of the study was used to collect data from the selected farmers. The interview schedule contained 17 questions measuring: demographic characteristics, information awareness, information sources, information uses, contact with extension agents and, constraints encountered in pineapple production activities. Besides, information awareness, information sources, information uses were analysed by using descriptive and inferential statistics. Demographic characteristics of farmers were analyzed using percentages and frequencies. Significant relationships between selected variables were established using chi-square statistics. Results show that pineapple farmers receive information at varying intervals from various sources. Radio (71%), television (46%) and neighbours (46%) constitute major daily information sources. Major weekly and monthly information sources are newspapers (53%) and extension (42%). Generally, therefore, this study indicates that the mass media and interpersonal channels are the major information sources of pineapple farmers. Results show that the farmers use available information on various cultivation techniques on a varying degree. They 'always use' information on the miniset techniques of cutting suckers (83%) and crowns (80%) into bits. Similarly, they "always use" information on sectioning technique of stem defoliation (54.6%) and trenching technique of harvesting plantlets as they emerge (63%). Farmers' contact with extension agents was assessed using a 3-point scale. Findings show different modes of farmers' contact with extension agents which were mostly "occasional" (68%). This low frequency of contacts by extension mirrors the limited number of extension agents (1:4000 farmers) in Nigeria which makes it impossible to reach all farmers by interpersonal means. Mass media alternatives of reaching large number of farmers are therefore essential supplementary imperatives. Frequency of interaction with contact farmers which is high (65.8%) is consistent with the training and visit extension system adopted by the ADPs in the state. Farmers were asked also to react to multiple choice statements designed to assess farming activities challenges. The challenges identified included lack of income, pest and diseases, weather vagaries, market trend and transportation. They are aware of most pineapple production information except for processing technique information. Pineapple

farmers obtain information daily from radio, television and neighbors and less often (weekly/ monthly) from newspapers and extension agents. Consequently, extension agencies and related organizations should ensure that more information is disseminated through these channels to pineapple farmers. Use of available information among respondent is frequent, except for treatment of planting material with benomyl fungicide. Contact farmers are the main intermediaries between pineapple farmers and extension agents.

The study has shown that four demographic characteristics (age, gender, marital status and education) influence pineapple farmers' sources of information. While gender is significantly related to agricultural information use, education and farming experience are associated with pineapple farmers' contact with extension agents.

Umunna N Opara (2008) studied about the sources of agricultural information available to farmers Nigeria and farmers' preferred sources for agricultural information provision in Imo State, Nigeria, Using the ex-post facto research design. Thus, he studied the sources of agricultural information available to the farmers who participated in the study as well as their preferences. The target population for the study comprised all farmers in the three Agricultural Development Project (ADP) zones of Imo State, Nigeria. The three zones consisted of 34 farm blocks and 63 farm cells. The available records at the ADP headquarters show that there were 6,930 farmers in the three zones. Stratified proportionate sampling was used to select 20 percent of the farmers. The sample consisted of 1,386 farmers distributed across the 34 farm blocks and 63 farm cells. A sample size of 1,386 out of 6,930 farmers is considered high enough for generalization based on the Krejcie and Morgan (1970) formula, which states that for a population of 7,000, one needs a minimum sample size of 364, etc. A self-developed and validated questionnaire was used for data collection. A reliability co-efficient of 0.83 was obtained for the instrument using the Crombachalpha. A total of 1,386 copies of the questionnaire were directly administered to 1,386 farmers across the 34 farm blocks and 63 farm cells in the three ADP zones of the state. The distribution of the questionnaire and the number returned and considered useable for data analysis was 1,362 copies representing a 98 percent response. The data collection lasted for 6 weeks and involved the researcher and the extension staff in each block/cell, who served as research assistants. The questionnaire was handled as an interview schedule or non-self-administered questionnaire in situations where the farmers could not read and write in English.

Data analysis involved the use of descriptive statistics involving frequency counts and percentages. A total of 88.1% of the farmers surveyed ranked the extension agent highest as their source of agricultural information; 71.2% indicated fellow farmers, 63.2 percent indicated radio, 43.3 percent indicated television, etc. The results further showed that majority (70.0 percent) preferred the extension agent to the other media (radio 28.4 percent, friends and relatives 27.2 percent, television 19.1 percent, etc.) The results emphasize the need for the extension agency to regularly identify those sources of information that farmers prefer, or use most, as this will enable them deliver agricultural information effectively to the farmers.

(viii) Utilization of Relevant Agricultural Information

Daniel Tadesse (2008) has studied the settler farmers' access to and utilization of relevant agricultural information, and to identify the demographic, socio-economic, psychological and institutional factors that affect access and utilization of agricultural information by settler farmers in Metema woreda in Amhara region of Ethiopia. He examined the following questions: 1. What is the level of access to agricultural information of new and previous settler farmers? 2. What is the level of utilization of agricultural information of new and previous settler farmers? 3. How the extension service quickly responds and addressing farmers need. 4. What are the factors that influence access and utilization of agricultural information for both categories of settler farmers? A two stage random sampling technique was employed and in the first stage of sampling, three PA (peasant association) were selected purposively and the respondents were stratified into new and previous settler categories. In the second stage, probability proportional to size sampling technique was applied to each stratum. Finally, 160 respondents were selected using simple random sampling technique and interviewed using then pre-tested structured interview schedule. Fifteen percent of respondents were female headed households. Both primary and secondary data were collected and analyzed to understand various aspects of access and utilization of agricultural information of farmers. Qualitative data were used to supplement quantitative data. Data were analyzed using descriptive analysis and Tobit model. Except from seasonal extension orientation and mass media, in all cases there was significant difference between new and previous settlers' access to and utilization of agricultural information. In all extension methods, there were highly significant differences between male and female headed households in obtaining agricultural

information, in the favour of males. The female headed respondents utilized the obtained information with comparable to male headed households. The agricultural information and support for utilization provided by the extension service were biased towards the previous settlers and males, and consequently the new settler farmers' and female headed household agricultural information access and utilization was very limited. The survey finding reveals that the current extension service has limited responsiveness, gender sensitivity and poor potential of addressing farmers' need. In the absence of responsive extension service that understands and addresses interests of various groups of farmers, the purpose of resettlement program would not be fulfilled. Result of the econometric model indicated that, settlement category, education level, settlement orientation, innovation proneness, production motivation, age of household head, frequency of market visiting and credit access had influence on the access to and utilization of agricultural information. The overall finding of the study underlined the importance of well organized agricultural information provision and supporting utilization of information through the delivery of credit and technologies based on the farmers' problem and need. Institutionalized and genuine resettlement program information provision in the highland also required. Therefore, policy and development interventions should give emphasis to improvement of such institutional support system so as to enhance the production and productivity of agriculture and to achieve the desired poverty reduction strategy in the resettlement program.

. Rafia Aktara et al. (2010) conducted a study to examine the crop seed information and communication network pattern of men and women in a north-western village in Bangladesh. A sociometric survey was conducted using a representative enact system of sampling encompassing each household. Out of 128 households of which farming being the main source of livelihoods 75 were selected randomly. Two individuals (usually husband and wife), who are the decision-making units in the household, were interviewed. Data were analyzed using descriptive and chi-square statistics. The findings indicate that women farmers have comparatively lower communication exposure than men. Women have intensive contact with sources only within their neighborhoods. Formal sources of information (extension agent and NGO worker) have fewer ties with both men and women and their ties are negligible with the women farmers. Albeit, all possible patterns of network exist (e.g.,

male-male; male-female; female-male; female-female) female-male and female-female networks have more connectedness compared to male-male and male-female networks. Women are more likely to play important role as nodal farmers in a community since crop seed information may flow from women to men as well as to other women effectively and in a speedy manner. They argued that locally made videos could be an important communication tool, when used either in the mass media or in the group learning sessions, to complement formal sources and to reach out women farmers in wider geographical area. The outcome will also depend on the types of intermediaries and their competencies to target men and women clients considering clique in the network and gender patterns of communication.

Communication Research in India

Communication research in the field of sociology is relatively new in India and most of the communication researches have followed diffusion approach. These are discussed under the following two classes:

(a) Researches on the Role of Media in Diffusion of Innovations

Y.B. Damle's article (1956-57) in the *Public Opinion Quarterly* under the title "Communication of Modern Ideas: Knowledge in Indian Villages" focused on the diffusion of modern ideas and knowledge in seven villages near Pune in Maharashtra and showed that it was not merely the distance from the city that facilitated or hindered communication of ideas and knowledge but it was equally affected by the social structure of the community which determined the qualitative and quantitative contents of the communication.

Y.V Lakshmana Rao (1966) conducted a study in the villages of Andhra Pradesh to analyse the role of communication in national development and reported that the development of communication and, as a result, flow of information is followed by, or goes hand in hand with development in other areas. Information of certain kinds, once released, awakens appetite for new things or for new ways of doing things.

In a paper presented at the UNESCO conference on Family Planning and Mass Communication, B.P. Patel (1969) discussed mass education strategies for family planning in India, problems of media arrangement and media selection at central, state

and district levels. The findings have pointed out the effectiveness of local visual media and leadership groups in diffusion of family planning messages.

Yogesh Atal (1973) studied the role of communication in nation-building in his article on “Dynamics of Nation-Building: Insulators and Apertures’. He argues that within nation various kinds of units should have a free flow of men, messages and materials in order that integration is achieved at the national level. All those mechanisms that facilitate this are designated by him as social apertures, hinges and links and those that tend to restrict the flow and, thereby, obstruct integration are termed insulators.

S.P. Verma and Iqbal Narain (1973) divided the media of communication into two categories; namely, mass media and interpersonal media. Under interpersonal media were included relations, friends, neighbours, party activists and campaigners, trade union workers, local social and political leaders, and the candidates. Mass Media included radio, films, public meetings, posters, handbills and the like. They found that newspapers were commonly used medium among men whereas voters used the mass media of communication in urban constituencies. Among interpersonal media of communication, relations and friends played a key role.

Briefly, both, interpersonal and mass communication have played role in diffusion of new ideas, however, communication is significantly mediated by various social structures in a society.

(b) Researches on the Role of Communication in Agricultural Development

A large number of studies have been conducted by social scientists regarding the agricultural development and interpersonal communication. Prodipto Roy (1969) studied radio forums, literacy-cum-reading forums and animation leadership training. His studies showed the powerful impact of radio in adoption of agricultural and health programmes for forum participants and non-participants. Literacy classes did better in bringing about increased agricultural knowledge for forum participants and increased health knowledge for non-participants.

K. B Kothari and A. G. K Murthy (1969: 73) studied the role of opinion leaders in the promotion of fertilizer use and viewed that the transmission of symbols,

messages or ideas has to be so developed that it reaches intermediaries and, through them, the wider rural audiences.

B.N Borthakur (1970) conducted a study at Dinjan in Dibrugarh district of Assam about influence of communication in the rural population with special reference to radio and news papers. He found that for the younger generation radio and newspapers followed by cinema were the main media of communication. He also discussed the changes in social institutions and social relations and adoption of improved agricultural methods and health practices.

Om Singh Verma (1970) has found that interpersonal communication is influenced by various socio-psychological characteristics like socio-economic status, farm size, innovations and mass media exposure. He concludes that information firstly flows among individuals of similar characteristics such as age, caste, kinship and, then, it is obtained from those who are superior or those who possess expertise rather than from the information seekers.

Rupak Goswami and Ashutosh (2001) studied Payaradanga Gram Panchayat of Nadia, West Bengal on pattern of interpersonal communication in agriculture through friendship patterns, neighbourhood pattern (it has been operationalised as exchange of information, ideas, opinions etc. occurring among the relatives and fellow individuals having either homogeneous or heterogeneous socio-personal attributes within the local social system/boundary on concerned issues and problems) and discussion group pattern. Multi-stage random sampling technique was employed for the selection of District, Block and Gram Panchayat. Electoral booth was selected purposively which included a village completely and was predominantly inhabited by the farming community. A total of 100 farmers were selected as a sample for the study. The respondents were asked to indicate their choices (necessarily within the social village) from whom they received information regarding gram panchayat activities. Respondents were allowed to make unlimited choices without any specification of ordering. The data collected were, hence, binary in nature (individuals receiving choice – 1 and not receiving choice – 0). The choices were also directed in nature, i.e., seeking information and providing information were distinguished. The number of received choices by the respondents was then ranked. The respondents of the upper quartile were considered as the key communicator for the study. The data

collected for the sociometric study were analysed by the software Ucinet 6 for Windows. The Netdraw Visualization Program was used for the identification of communication networks. Care was taken to minimise the number of crossed lines in the diagram for easy comprehension. The egonet option was used for the representation of the diagram with subsequent adjustment for representation.

There are six key communicators in the village as far as the friendship pattern of communication is concerned. Among these six key communicators respondent no. 86, 34 and 7 has been common for both neighbourhood pattern and friendship pattern of interaction. This indicates that there are more than only spatial factors, contributing towards the sociometric status of these key communicators. Moreover, there has been interactions – that too reciprocal – among key communicators to some extent. Also a higher proportion of respondents have been found to be featuring in the interaction process. Several respondents have chosen more than one key communicators for securing information. In doing so, they have acted as the connection (the liaison) between the sub-groups existing within the community. This provides the basis for the study of weak ties existing within the community regarding the flow of information on panchayat activities. From the analysis it is found that three patterns of interaction were found and it can be generalised that

1. Neighbourhood pattern of interaction shows least dense key communicator network and least dependence of them for seeking information.
2. Friendship group pattern of interaction features higher number of respondents seeking information from more than one key communicator.
3. Discussion group pattern of interaction shows least number of key communicators and highest inter-key communicator interaction.

Indra Singh (1973) studied person-to- person communication in making farmers aware of new technology as well as in bringing about attitudinal changes in Tarai region in U. P. He found that the radio was regarded by his informants an efficient medium of information. However, people were critical about the length and timing of the programmes. The farmers were of the view that film strips would be much better than films as their questions could be answered immediately. Because of the low level of literacy, printed material such as posters, pamphlets, brochures etc. were not favourably considered by the farmers.

D. K Gogoi (1984) conducted a village level study in the district of Ludhiana (developed) and Sangrur (underdeveloped) in Punjab by using a multi-stage

purposive-cum-stratified random sampling on the basis of 'value productivity per hectare' and number of percentage of area irrigated, cropping intensity, tube wells and number of tractors per thousand hectares. His study shows that in progressive villages farmers are more educated than non-progressive village and information flows from opinion leaders, extension officers etc. Mass media were found less important than interpersonal communication regarding flow of agricultural information.

V. R. Gaikwad et al. (1972) studied the role of interpersonal communication in agricultural development and showed that it was the village-level-workers from whom most of the cultivators received information on fertilizer and seeds and new media were not a primary source of information; and second category of information came from the friends, neighbours and relatives. He also found that interpersonal relations between leaders and followers were unidirectional as unless asked leaders did not share knowledge. They also (S.L Shah, G. S Bhatnagar 1973) found that among mass media the radio and documentary films were significant to some extent.

Dube (1974) studied various aspects of agricultural extension and role of communication in Haldipur. Communication was examined in terms of methods employed by the agents of change in approaching the villagers and introducing innovations. The methods covered were: individual contact, group contact, mass contact, audio-visual aids and combination of methods.

(c) Sources of Communication at Different Stages of Innovation Adoption

After reviewing different studies on sources of communication, Singh and Pareek (1967) made reported the following major findings of the studies:

1. The village level change agent is important at the need stage.
2. The village level change agent and other farmers together are the most important sources at the awareness and interest stages.
3. At the deliberation stage, informal interpersonal communications, including family members are most important.
4. At the trial stage, no communication is needed for simple practices. For complex or entirely new practices, expert or formal local sources are important.
5. At the evaluation stage, fellow farmers are the main communication sources.

Besides, a large number of studies in agricultural communication focused their attention on sources and channels of communication in farm information. The Indian Institute of Mass Communication (1968) studied on the flow of agro-information at the village level and reported that village literacy workers and 'word of mouth' accounted for 80 percent of farmers' awareness about high yielding varieties. A large number of studies except Assam, Haryana and Gujarat also have reported that the village literacy workers were the initial source of agricultural information. In terms of frequencies reported by more than 60 studies, the village literacy workers lead, followed by 'work of word of mouth' (neighbours, friends, relatives and other farmers).

L. Shanta Meitei et al. (2009) conducted a study to examine the information needs and sources of information dependence used by the farmers in rural Manipur. The data were collected from 165 farmers from rural hilly and rural valley districts through pre-tested semi-structured questionnaire and using multistage sampling method. Sixty villages, 15 from each valley districts, from the first stratum have been selected, while 50 villages, 10 from each hill district, from the second stratum. Simple random sampling again used as the second stage sampling by which 165 individuals were selected from the selected villages for both valley and hill. In the third stage the sample has been again classified into two parts with 90 individuals from valley 75 from hill for data collection. The findings show that farmers need: (a.) field acquisition (b.) agricultural inputs (c) agricultural technology (d.) agricultural credit (e) agricultural marketing and (f) food technology. The study also revealed that the farmers (80.61%) need agricultural information, 73.33% health and 63.03% training and educational information etc. The study concludes that farmers need ICTs- based agricultural information system in that state.

(d) Studies on Communication Channels

A.K. Thakur and J.K. Doshi (1984) also studied about the aspects of rural life which have bearing on development and communication process in the village of Kashipur block of Nainital districts on 625 respondents. The study dealt with different channels of communication operating in the village to examine the aspects like life and economy, social organisation, social structure and infrastructural development. Besides this, awareness and adoption of innovations in different developmental

aspects were examined. The selected village was dominated by Hindu followed by Sikhs and Muslims. Most houses were concentrated near the village link road. The main occupation of respondents was agriculture and few were engaged in subsidiary occupations. Interpersonal channels were used most frequently followed by radio, government officials, news papers, cinema, magazines and extension literature. They frequently listen to the Rampur station and preferred programmes for listening were agricultural news, film songs and folk songs. The majority listened to Krishi Jagat, but only 6.7% listened to Suno Kisano.

Awareness of most agricultural implements, as well as improved breeds of cows and buffaloes was high among farmers. Awareness and adoption of improved HVY of wheat, rice, sugar cane and fruit crops were low among farmers. Cooperative Society and agricultural credits were mentioned as the main source of agricultural credit. Farmers mentioned the rising prices of agricultural inputs, irregular supply of irrigation water from the canal, non availability of certified seeds of improved varieties, and non-availability of green fodder in summer as major problems. Awareness of different vaccines for children such as B.C.G, polio drops and triple antigen was low. Respondents were aware of sterilisation as a method of family planning, but awareness of other methods was negligible. Most respondents showed negative attitude towards education for girls, employment of women and inter-caste marriages, but a sizeable number had a positive attitude toward widow remarriage.

C. Conroylet al. conducted a research project funded by the Department for International Development (DFID) through the Livestock Production Programme (LPP) has been investigating the production problems facing backyard poultry keepers in two locations in rural India, Udaipur district in Rajasthan and Trichy district in Tamil Nadu, and seeking to work with poultry keepers to address some of them. The survey collected three types of information concerning: (i.) farmers' individual use and assessment of information sources and channels; (ii.) structures, institutions, organisations and processes for obtaining, transferring and exchanging agricultural information; (iii.) a history of agricultural change in the project area. They used a combination of informal semi-structured group methods and a structured interview schedule for individual interviews to identifies their main sources of information and the most useful media for reaching them. The project has been done in one district (Udaipur) in the state of Rajasthan, and one district (Trichy) in the state

of Tamil Nadu. The survey covered two villages in each project district: one of these was a relatively remote village and the other, a well-linked one. Another selection criterion was that both villages should be having poultry keepers. In Udaipur, Saradit (remote) and Baghpura (well-linked) were selected. Both have a non-governmental organisation (NGO), BAIF working for several years, with a good rapport with the villagers. Both villages are in Baghpura block, Jhadol tehsil. In Trichy district the two villages selected were Ayyanar Kovil Salaikadu and Peruganur, which are the poorly and the well-connected respectively. The survey covered men and women, in equal numbers, as both are involved in poultry keeping activities. For two of the three methods (*information diagrams and individual interviews*) men and women were covered separately, as their information sources might differ in some way. For individual interviews respondents were selected on the basis of stratified random sampling. For group exercises there was some stratification, but individual members of the groups were not selected randomly.

For Udaipur it was agreed that the survey should focus on resource-poor tribal farmers (BAIF wealth categories 1 and 2), and that these do not have to be poultry keepers. To maximise the value of their contributions, all men selected were at least 25 years old (and all women at least 30 years old). In BAIF's experience, people younger than this may not be very knowledgeable about agricultural activities and information sources. It was agreed that in each of the group discussions there should be 10-15 resource-poor tribal people. In each village 10 men and 10 women were selected for individual interviews, giving a total of 40 respondents.

The situation in the Trichy villages was more complicated than encountered in Udaipur, as three categories of poultry keepers (code-named C1, C2 and C3) had previously been identified by the project in this district. The three categories of poultry keepers were: (i.) small and marginal farmers whose home and poultry are adjacent to their agricultural land, (ii.) small and marginal farmers whose home and poultry are separate from their agricultural land, i.e. in a nucleated settlement, (iii.) landless people who live in a colony (hamlet), with poultry kept in and around the house.

The survey found that there were substantial gender differences in information sources and preferred media for receiving agricultural information. In Trichy there were also differences between farmers and landless poultry keepers. One factor contributing to this was differences in literacy rates. In the Udaipur villages, 85 per

cent of men were literate (defined as able to sign their own name), but only 40 per cent of women. In the Trichy villages, 10 out of 12 men and women from farming households were literate, but literacy rates were lower for landless people, especially women. Men have access to more information sources than women belonging to the same group (i.e; farmers, landless); farmers have access to more agricultural information sources than landless people, most information sources are at the village level for all four groups, generally speaking, the higher the level, the less the number of information sources accessed at that level. Regarding new technologies and technical knowledge it shows that these have been obtained by farmers in the survey villages from a variety of sources, which can be broadly categorised as informal, government and commercial. For some enterprises the government agricultural extension system has been the main source, while for others it has been informal or commercial sources. When products (e.g; pesticides, inorganic fertilisers, tractors, animal breeds) become available (from whatever source) only one or two farmers decide to experiment with them, but they are more widely adopted if they are perceived to be an improvement on conventional practices, technologies or enterprises.

Rajeswari Ramachandran et al. (2004) studied scarcity of information on communication channels in rural areas where just less than 50% people were illiterate to identify the channels of communication available in rural areas by interviewing key informants. This study was conducted in 51 villages of Ellapuram block, Tiruvallur district, Tamil Nadu. Key informants from each village were selected. One key informant from each village who was able to give the information about available communication channels selected by the villagers formed the study population. She was either panchayat leader or village teacher or post master or any other community leader identified by the villagers. Key informants selected from the villages were interviewed by a Medical Social Worker. They collected: major occupation of the villagers, availability of transport, education, health facilities, electricity and other services like mills, societies, markets, ration shops, social groups and places of worship. In addition, we also collected detailed information on the communication facilities available in the villages, such as announcements by Dandora (beat of drums/mike, communication facilities such as television, radio, newspaper, etc. All the informants were specifically asked which communication channel was utilized

maximum by them for collecting new information. Data were entered, checked for errors and analysed using the SPSS (8.0 version SPSS Inc, Chicago, IL) package.

The studied block included 9893 households covering a population of 39255. Their main occupation was agriculture (86%). Electricity was available in all the villages. More than 80% of the villagers had community TV/cable connections, 50% of the villages had cinema star fan associations, mahila mandals, youth clubs, self-help groups, anganwadi centres and ration shops. The main source of communication as per interview was television (100%), wallposters (55%), publicity through panchayat office meetings (53%) and dandora or beat of drums (43%). They found that main communication channels commonly used to disseminate information were TV and wall posters. More than 50% of villages had local associations which can be used for effective communication. This information is vital for disseminating important information on public health programmes and educating the rural community.

(e) Audience Characteristics and Communication Source

A.K. Negi and M.P. Saxena (1983) studied the audience profile of the 'Farm-school-on-the-Air' programme and listeners' options about the programme through descriptive and diagnostic study in Nainital and Bareilly of U.P. Farm school is an instructional programme for farmers, broadcast from all India Radio. Audience profile of rural and urban participants of the 'Farm-School-on-the-Air' programme on 'Poultry Production' was studied and compared. Listening characteristics and opinions on different aspects of the selected programme and suggestion for improvement also were covered. Out of twenty two districts of U.P., two districts were selected purposively because they contained the maximum number of participants constituting the total population. Eighty participants were selected through a stratified random sampling technique from rural and urban categories. Both groups were composed of an equal number of lower and upper frequency listening groups. An interview schedule was used for data collection. Scoring, percentage and t-test were used for data analysis.

Most respondents from both categories were young and middle aged belonged from the middle socio-economic status and had education up to middle high school. Only a few were illiterate. The majority of urban and a few rural respondents were 'landless'. The urban, upper listening group had higher socioeconomic status and

higher mass media exposure than lower listening group. Most rural participants were more regular and frequent listeners of the agricultural programme 'Krishi Jagat' than were urban participants. The rural, upper listening group had a higher educational level and belonged to a higher caste than the lower listening group. Most participants were satisfied with different aspects of the programmes such as language, time, voice, days, and frequency of broadcast, subject matter, speed and comprehension of the broadcast. Simplicity of language, pre-payment of the postal charges by AIR, prompt declaration of results and provision to send answer to all the questions were suggested by participants for improvement of the programme. Source channel utilization varies according to farmer's socio-economic status and other characteristics- age, education level and farm size were found to be positively associated with the use of institutional sources. Rahudkar (1962) found that farmers with a progressive outlook toward improved technology used more impersonal and official sources, while others relied more on personal acquaintances as sources of information. It also reveals the differences in the communication behaviour of small and big farmers.

(f) Researches on New Mass Media and Agricultural Communication

a. Television Studies

An experimental telecast was started in Delhi by All India Radio in the collaboration with UNESCO in 1959. The Krishi Darshan Programme was one of the important agricultural programme telecast through this media from 1967 in the villages around Delhi. As soon as, under initiative of NCERT they started an evaluation of this programme to examine the impact and contribution on agriculture in India. Later they report that the organization and management of TV reception had not received adequate attention and they emphasized the need for a field oriented programme management. They also brought out weaknesses e.g. language incompatibility, programme timing.

The Audience Research Unit of the Delhi TV Centre also conducted several studies on the programme of the Krishi Darshan regarding TV as an effective medium of agricultural communication. The Indian Agricultural Research Institute which was associated with this programme from very beginning have done various studies covering the area of relative effectiveness of TV in imparting knowledge about new agricultural technology, creating favourable attitudes towards recommended farm

practices, influencing adoption of new agricultural technology, as well as factors affecting the gain and retention of new knowledge and influencing the viewing behaviour about Krishi Darshan. Studies have also been conducted on the credibility of TV as a source of agricultural information, the functioning of TV Clubs, farmers' understanding of and liking for the Krishi Darshan Programme, reason for low attendance, etc. The major findings of the studies could be summarized as follows:

1. There has been a significant increase in the knowledge of farmers who were exposed to agricultural telecasts.
2. A large part of the knowledge was retained by them even after a lapse of 30 days.
3. TV created a favourable attitude towards new agricultural technology.
4. Krishi Darshan programmes helped substantially in the actual adoption of new practices.
5. Almost all the studies established the potential and universality of TV in imparting information to all categories of farmers-small and big, literate, and illiterate, etc.
6. Farmers wanted entertainment along with instructional programmes.
7. Reason for low attendance at the screening of the Krishi Darshan programme: too tired to view TV after day's hard work, have to attend to cattle, strained relations with TV custodian children make noise, high cost technology shown on TV is beyond the reach of small farmer, no proper seating arrangement, uncertainty of the programme and non-functioning of TV sets, unsuitable TV telecast time, language incompatibility, difficulties in comprehending TV programme etc.
8. The telecast instructions moved in the community from primary to secondary to tertiary audiences, involving three steps in the process.
9. There was need for integrating TV with other media rather than allowing it to function in isolation.

Kivlin, Roy, Fliegel and Sen (1968) have done remarkable studies on radio as a effective medium of information regarding farm technology, leading to the technology's gradual spread and adoption. In another experimental study done by Knights (1973) in Tamil Nadu highlights radio as an effective source of agricultural information. After experimenting with three modes of presentation for communicating agricultural information to famers, he concluded that 'interview with farmers' was more effective than 'straight talk' or 'discussion'. He did not find any significant difference between the latter two.

In July, 1975 to 1976 research on SITE (Satellite Instructional Television Experiment) has also probed the development experiment programmes in 2,400 villages in six states in India. A group of social scientists studied the role of mass media in the agricultural programmes including other areas like health, family planning, education and national integration in rural areas. The general objectives of the study were to find out the extent to which the climate for development could be created by TV. It was done by measurement of awareness, knowledge, adoption and use of new scientific findings leading to long term attitudinal behavioural changes. The study was multidisciplinary. The major findings of these studies are:

1. Awareness, knowledge and adoption of new agricultural practices was higher for experimental villages and TV viewers than for non-experimental villages and non-viewers.
2. Television reached to about 95 percent of the farmers in one year.
3. For the first time in the TV villages, adoption of new innovation was increased 44 to 54 percent within one year. The villagers also used high yielding seeds, pesticides, soil and water testing after viewing TV on SITE villages.
4. A study of the villages in Bihar shows that they gained knowledge, agricultural information and other practices with modern values after viewing television. The Bihar study also shows that TV reduced the distance among various caste and changed their attitude and developmental behaviour.

P. M Singhi and Mody (1974) studied the role of television in agricultural development where the finding shows that farmers watching agricultural programmes were less ignorant than non-viewers. The content analysis of two programmes

revealed that about half of the information items were not new to the farmers. The gain of information in absolute terms was greater to the least knowledgeable farmers who had no access to other sources of information. Television was found the most effective medium of communication for the people of the weaker section.

Meena Kapoor and J.K. Doshi (1985) conducted a study to analyse the contents of the *Krishi Darshan* television programme, to determine time periods and frequencies of broadcasts, modes of presentation of agricultural programmes, technical quality and to analyse the information on national half-hour broadcasts from Delhi after 7:30 p.m. four days per week in Pantnagar. They categorised the contents as purely instructional programmes on agricultural subjects vs. socio-cultural content, such as informal talks, folk songs, dances, etc.; format of presentation; audio quality, visual quality; topicality; suitability etc.

In all, programmes were coded, including agricultural advertisements telecast before, during after or before *Krishi Darshan*. Nearly half of the programmes thus coded (47.3 percent) consisted of advertisements, but only 3.52 percent of the total time consisted of advertisements. Almost 80 percent of the programmes were classified as purely instructional. Horticulture, agronomy and plant pathology were the most common topics (23.3, 20 and 17.8 percent). Programmes devoted 53.7 percent of their time to the interview format, although talks were more frequent. Visual quality, as received in Pantnagar, was judged 'good' most of the time. Criticisms of the programmes dwelled on the presentation of too many ideas at one time, rapid movement of pictures, and fast speech delivery.

Janat M. Miazy and M.P. Saxena (1986) studied and documented the historical development of television in India, India's TV infrastructure, and problems and prospects of TV with reference to *Krishi Darshan* programme. The study was based on secondary source of data (historical), audience survey research, visits and personal interviews with communicators and researches at television related institutions. The institutional visits were made to the Indian Institute of Mass communication, the Audience Research Institute (New Delhi) and the Film and and Television Institute of India (Pune); the survey research was conducted with farmers visiting G. B. Pant University of Agriculture and Technology, Pantnagar, at the time of Kisan Mela (2-6 March), for the Kharif Farmers Fair. The data were collected through personal visits

to libraries, government offices, and television-oriented institutions of research. Farmers were sampled accidentally on the basis of availability at various locations in Pantnagar over the six-day period of Kisan Mela. Ninety-two farmers were interviewed and data concerning demographics, mass media habits and availability, and suggestions concerning improvement of *Krishi Darshan* were recorded onto an interview survey sheet.

Indian TV began functioning 15th September 1959. The satellite Instructional Television Experiment of 1975-76, the introduction of commercials (1976), the 1976 separation of TV from All India Radio, the launching of Indian National Satellites (INSAT) (1982, 83), the 1982 inauguration of national programmes and colour broadcasts, the coverage of the 1982 IX Asian Games, the 1983 non-aligned meet and the 1983 Commonwealth Heads of Government Meet, the programme for Higher Education through Television (HTV), the introduction of new programme format beginning in 1984, the inauguration of second channels in Delhi(1984) and in Bombay (1985), and the 1985 introduction of teletext service to the television network are all chronicled. Present barriers and problems facing Indian television are enumerated, with particular reference to *Krishi Darshan*. A long list of farmers' suggestions for improvement of their agricultural programme is provided. A major hurdle is the population's inability to use TV. In conclusion, they suggest that India will have to deal with the problems in hardware and software development, manufacture and distribution.

b. Radio & Cassette Listening Profile Studies

B. Chandra and Doshi (1984) studied the Radio listening patterns of the farmers of four villages in Haldwani Tehsil in Nainital district using survey method. They studied the radio listening patterns, programme preferences and use of information sources of the radio-owning farmers of Haldwani Tehsil. In addition, opinions and suggestions on various aspects of farm programmes were collected. Four villages selected randomly and 25 respondents having radio sets were selected from each of the villages through interview schedule.

The findings showed that most commonly used source of information was radio, followed by newspapers, friends, neighbours, and magazines. Most of them listen to radio for one to two hours and peak listening hours was six to seven in the

morning and seven to eight in the evening. News was the most preferred listing item followed by film songs, musical farm programmes, folk songs and 'Geet Sangeet'.

Age was negatively correlated with preference for film songs and folk songs, whereas education and size of landholdings were positively correlated. Crop production, diseases, insects, pests, and weed control, livestock production, agricultural problems and vegetable production were preferred topics in farm programmes. Poultry production was least preferred.

Two thirds of the respondents were satisfied with the programme finding it as useful. Majorities found coverage of locally relevant items in the farm programme inadequate, and indicated that talks by scientists were the most preferred mode of presentation, followed by discussion, interview and talk. Time of broadcast of both the programmes was found suitable to most listeners. Farmers' suggestions for improving farm programmes were to cover subjects of interest to people and to drop folk songs from the farm programmes. Farmers indicated that a farmer's interview, weather forecasts, farming news and farming tips should be included in the farm programme.

J.P. Sharma and J.D. Tripathy (1984) studied experimentally to evaluate the impact of different formats of presentation of cassette special communication system in terms of gain in knowledge in three villages of C.D. Block Rudrapur in Nainital district. The three villages were selected purposively and fifteen respondents from each category of small and medium farmers were selected through stratified random sampling from each village. Eleven innovations of paddy cultivation were selected and cassettes were prepared using three formats of presentation. They also examined the independent variables such as age, education, size of landholding, communication behaviour etc by using pretest-post-test experimental research designed. Data were analysed through mean gain scores, percentages, paired t-test and correlation.

The findings showed that neighbours, friends and relatives were contacted most frequently followed by extension specialists and university personnel. Age, education, socio-economic status and communication behaviour had positive relationships with knowledge gain. He concluded that cassette special communication system can play a vital role in the transfer of agricultural technology.

B.M. Mohan and J.D. Tripathy (1985) studied to test five different distribution systems for providing audio cassettes containing agricultural information to farmers in Uttar Pradesh. The study was done in four villages of Rudrapur Community Development Block. The study examined the information on HYV of paddy recorded on audio cassette tapes (ACT) and distributed through five systems. A cluster of five villages was selected purposively to test the five distribution systems. Twenty respondents were selected randomly for each treatment. In each case, one tape recorder was provided to the farmers by following way: (1) After hearing one day he passed on to the second farmer and next day to the third one. (2) a farmer was provided with the tape and machine and played the tape in a group setting with three additional farmers. (3) The village Pradhan was given a tape and machine and specific farmers are informed of their availability on a particular schedule for their use. (4) Same as No. 3 but using an informal farm leader as the distribution point. (5) Same as No. 3 using the village development officers. The tape was about 20-minute length including information and entertainment. The dependent variables were 'knowledge gained' and 'opinion about the distribution system' and independent variable was the distribution system. The distribution pattern produced significant knowledge gain but there was a slight advantage in the distribution pattern (interpersonal passing of tape). The research also showed that any type of distribution system can attain desired results by providing opportunities to listen to the cassettes.

c. Films and Communication

Srikant Gupta and M.P. Saxena (1984) worked to identify the functional relevance of agricultural documentary films and its effectiveness in terms of knowledge gained in two villages in Rudrapur Community Development Block in Nainital. The study was set by selecting four films randomly and examines the effectiveness on both villages. On the basis of landholding, respondents were categorised into three categories. From each category 15 respondents were selected randomly. The survey method was used for identifying functional relevance. Variables such as understanding, completeness, applicability, usefulness and willingness were operationalised for studying functional relevance. Different socio-personal variables and their effect on knowledge gain were studied. Mean gain scores, percentages, t-test, and paired t-tests were used for data analysis.

Major findings of the study revealed that status of agricultural documentary films was poor and had fifth place behind other sources. Most respondents were of middle age, with education below high school and had low communication exposure. Audibility and visibility of the selected films were reported to be good. Age had no impact on knowledge gain whereas education, size of landholding, social participation and communication exposure had a positive impact on knowledge gain. All films except one were reported to be understandable and complete with respect to information. All films were found useful by the respondents and willing to use the information.

d. Mobile Phone as Mass Media Communication

Surabhi Mittal et al. (2009) made a study to look at the impact of mobile phones on the crop sector in India with a focus on small farmers. They drew primarily on a series of field investigations conducted from August 2008 to November 2008 in the states of Uttar Pradesh, Maharashtra, Rajasthan and New Delhi and the union territory of Pondicherry. These visits comprised a series of focus group discussions and individual interviews with farmers, fishermen, labourers, traders, commission agents, non-profit organisations and businesses involved in the agricultural sector. The team conducted 14 focus group discussions and 46 individual interviews in 11 districts and 20 villages. Around 187 farmers were interviewed, in all, of whom 152 were small farmers with less than 6 acres of lands. They found that mobile phone is a basic need of life especially in agricultural development. They also found that most farmers had access to a variety of non-mobile enabled information sources that they consult for regular agricultural information. This included TV, radio, newspapers, other farmers, government agricultural extension services, traders, input dealers, seed companies and relatives. However, the perceived quality and relevance of the information provided by these sources was highly variable. Most of the farmers lacked access to consistent, reliable information for many of their needs and often relied on a combination of traditional knowledge, experience and guesswork to make decisions.

(g) ICTs and Agricultural Communication

Shaik N. Meera et al. (2004) studied the performance of three ICT projects in India concerned with improving the delivery of information to farmers and other rural

dwellers. One project is managed by the Government of Madhya Pradesh as part of an exploration of e-governance. A second project is run by sugar cooperatives (with some government support) in Maharashtra and attempts to expand services to growers. The third project is an experiment by a large private agricultural input supplier to provide information to farmers in Andhra Pradesh. The study describes the organisation of each project; discusses the types of farmers involved and assesses their utilisation of the services and looks at the backgrounds and performance of the functionaries who manage the projects. The projects studied varied with respect to the type of services provided, but these included marketing information, extension advice, information about rural development programmes, and other information from government and private sources. The studies reveal that the ICT projects provided external and on-the-job training for personnel, although there were variations with respect to sufficient orientation towards ICT for agricultural extension. All projects reviewed had younger, better educated, male farmers as their primary users, but a government project in a marginal area was fairly effective at reaching poorer and illiterate clientele. In the state government project, users mostly valued access to market information, land records and information on rural development programmes. In the cooperative project, question-and-answer services, accounting, and farm management information were valued most. In the private company experiment, participating farmers valued various types of information on practices, management of pests and diseases, and rural development programmes.

Indu Grover (2005) made a study with the objective to ascertain the extent of adoption of ICTs by farm families in Haryana state, India, on a sample of 250 rural families drawn on a land owing basis from the two agro-climatic zones, four districts and eight villages of the state it was found that majority of the respondents had medium mass-media exposure, risk orientation, change proneness and scientific temper. The modern ICTs that have made fairly adequate inroads in rural households and are being used to derive agricultural and household information include radio and TV while the readership for newspapers and magazines in local language is showing a rising trend. At the same time the number of mobiles is fast increasing while computers are a new entrant, possessed and used by few, the rich and elite. The extent of adoption of technologies increased with landholding size and adoption was low in families of landless, small and marginal farmers. Factors of age, caste, landholding size, education and occupation were found to have a significant effect on adoption. In

another study conducted on a sample of 120 households drawn from three different farming systems; viz. wheat-cotton, vegetables and dairy farming it was found that mobiles were the latest ICT craze, these were being purchased and used for maintaining communication networks with family and friends and extensively used for marketing of agricultural produce after knowing the prevalent prices in different markets. In another study it was found that the toll free helpline service offered by the CCS Haryana Agriculture University was being used mainly by farmers to resolve their day-to-day problems in agriculture, horticulture, vegetables and dairy production. The accelerators for adoption of ICTs were comfort, time and energy saving, reasonable cost, easy to operate and ready availability in local market. The government along with Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries are making use of computers in a big way for maintaining land records and putting latest information for the benefit of the farmers. The various ICTs are playing a key role in rural and agriculture sustainability and farm business.

(h) Communication Gap

S.K. Kandpal and K. Singh (1984) have studied to measure the communication gap and the constraints responsible for the gap of wheat production technology among the farmers by survey method in two villages of Chaukhutiya Block of District Almora. The study was conducted on 40,968 populations in two villages. The communication infrastructure of the block was very poor with fourteen community radios, four small public libraries and a circulation of over 1000 copies of both English and Hindi newspapers. A sample of 83 respondents was selected randomly from a progressive and a non-progressive village. Data were collected through interview schedule. Scoring, coefficients of correlation and percentages were used for analysis. Socioeconomic status, mass media exposure, extension agency contact, information sources used, knowledge gained were selected as constraints for the study. The findings showed that communication gap between wheat production technology recommended and actually possessed by farmers and extension workers were significantly high in both villages. Major constraints responsible for communication gap were poor socioeconomic status, low exposure to mass media, poor extension agency contact and low media credibility. Wheat production technology was perceived as complex, costly and profitable in both villages. It was

found to be non-compatible with the physical environment in the non-progressive village and compatible with the physical environment in the progressive village.

B. M. Bhatia (1988) also studied about the growth, problems of Indian agriculture and suggests use of alternative technology for agricultural development. His analysis on different parts of Indian agriculture growth and problems showed that they are under developing due to lack of using technology in agricultural products. The use of new technology like bio-fertilizer, scientific farm management, high-yielding varieties will lead to development in India.

(i) Readership of Kisan Bharti

Ashok Kumar and J.K Doshi in the year 1982-1983, in Survey on Readership of Kisan Bharti have studied to find out the readership profile of Kisan Bharti in U.P. The readership profile of Kisan Bharti was studied by examining the socio-economic characteristics of subscribers. The relationship between these characteristics with opinions of its subscribers was worked out. Preferences of subscribers regarding the type of material to be published and recommendations for improvements were part of the study.

Kisan Bharti is being published from Pantnagar. The magazine had 2,630 subscribers in the month of August. The subscribers were ordinary and life members, both from U.P. and outside U.P. A stratified random sample of 300 subscribers was drawn from each category of life members/ordinary members, within the state/outside the state. The mailed questionnaire was used for data collection and data were analysed through simple percentages. The main findings were based on analysis of 102 questionnaires. Subscribers were mostly of middle age, belonged to higher castes and had larger landholdings. Their main occupation was farming, followed by subsidiary occupations related to farming. All were literate and fifty percent had education up to high school and intermediate. One third were graduate. They found that more than half of the respondents found the material published to be generally topical, followed by small groups who found it sometimes topical or not at all topical. A large number of subscribers preferred to have information on agriculture, followed by smaller groups opting for animal husbandry, and vegetable/fruit crops. Information on mother and child care and family planning was least preferred.

(j) Communication Profiles of Farmers

H.P. Yadav and J.K. Doshi have done a study on Communication Profile of 583 farmers in three villages of Haldwani Blok (Nainital) in the year of 1983 through observation, interviews and case studies. The study pertains to farmers' social organisational patterns, the different sources of information used and the different developmental aspects related to communications. They selected three villages which were described as a cluster as sample from 'Mota Haidwani' of Haldwani block. Eighty households were chosen for the study as sample. The main findings showed that the village was dominated by Brahmin caste followed by Thakur, Jogi and Schedule Caste. Agriculture was the main occupation with high literacy rate. Very few were employed in service and business occupations. Moreover, the organisational membership in the cluster was high and farmers were aware of Kisan Mela. Respondents showed favourable attitudes towards higher education of girls, employment for women and widow remarriages, but were conservative concerning inter-caste marriages and inter-dining among different castes.

Village tradition and cultural communication channels operating at different levels (such as family, caste and occupation) were described as consisting of inter-village communication channels, such as gathering on the occasions of marriage, death and birth. Regarding use of information sources, friends and neighbours were the major source of information followed by radio, newspaper, urban contact and government officials who visited the selected villages. The most listened to programmes were news, agricultural programmes, 'Bhajan Kirtan', folk songs, film songs and plays. Levels of awareness and adoption of high-yielding varieties of major crops of fruits and vegetables recommended by scientists and of improved agricultural implements were low but awareness of certain improved breeds of cows and buffaloes and vaccination for children was high, but their adoption was low. Major problems reported by the farmers were non-availability of certified seeds and sprayers, high prices of inputs, and an irregular supply of water.

(k) Studies on Communication Behaviour of Women Farmers

Shagufta and K. Singh (1984) studied the suitability of selected nutrition and home management practices and communication behaviour among farm women in Shantipuri village in Nainital. The purpose of the study was to compare and examine

the socioeconomic status, communication behaviour, personal characteristics perceived attributes of innovations, knowledge and adoption pattern of small and marginal categories of farm women. The village has 962 persons with 150 families, predominantly of Brahmins and Thakurs. From each category of small and marginal farmers, 40 respondents were selected to collect data through interview schedule.

The respondents were young, literate, and of middle socioeconomic status. Friends, relatives, neighbours, charts, VCR, exhibitions were used as information sources. Women occasionally received information from print media and extension personnel. University extension personnel were considered the most credible information source. Women from small farms were found significantly higher in terms of material possessions and communication behaviour than were those from the marginal category. They have low knowledge about some selected nutrition practices and high knowledge on dosa, tomato chutney and peanut chikki. Education, simplicity-complexity and cultural compatibility were significantly and positively associated with knowledge. Age and cost of innovation were negatively associated with knowledge. Mass media exposure and communication behaviour were associated positively and significantly with knowledge and adoption.

(I) Socio-psychological Characteristics

M.A. Ansari and K. Singh (1985) conducted a study to examine the socio-psychological characteristics of rice farmers and to determine the differential comprehension and retention of messages espoused through selected communication media. The study was done in four villages in Nainital district. On the basis of literate and size of landholding 25 respondents were selected randomly from each village. Four treatments based on communication media were prepared on bio-fertilizer. Messages were validated by a scientist, who recorded the audio message. Treatments were assigned to groups at random. Knowledge tests were administered immediately after exposure to treatments, after 15 days and after 30 days.

The majority of the farmers had favourable attitudes toward the selected message. Media used in combination were more effective than when used individually, with the three message treatment being the most effective in terms of comprehension and retention, where age was negatively correlated with message retention. Education, socio-economic status and social participation were positively

correlated to comprehension and retention regardless of treatment. Attitude toward the message, risk orientation, and achievement motivation also were related positively to the dependent variables.

John. C. Joseph (1983) studied the interaction between mass media communication and socio-economic development of rural people including the agricultural communication and production in two wards Kaithakkad and Ernakulam in Kerala. Out of 639 buildings he selected randomly 200 respondents from 50 household from Ernakulam district and in Brahmapuram also he selected 200 respondents from 689 buildings by using structured interview schedule and analysed it through chi-square, Karl Pearson test to examine the use of mass media especially in agriculture communication in that area. His findings show that due to lack of proper communication in Brhamapuram area was less developed than Kaithakkad. The farmers of that area are using new agricultural implementation including fertilizers, pesticides, insecticides etc.

(m) Researches on Technology Utilization in Agriculture

Sharma (1994) conducted a study on 108 randomly selected farmers drawn from 8 villages in the vicinity of intensive cattle development projects, Gurgaon district Haryana, India. Almost two thirds of farmers were found to be low range- and one third of them in medium range of adoption of marketing practices. The study established that three traits; viz., communication behaviour, socio-economic status, attitude towards dairy farming had positive and highly significant correlation with the adoption of marketing practices. The constraints perceived by the farmers in the adoption of marketing practices included purchase of milk by cooperative societies on a fat percentage basis with no consideration SNF, non-existence of milk cooperative societies in villages and problems of transport of milk to societies located at a distance. Relational analysis established that communication behaviour played a substantial role in mitigating the influence of constraints in the marketing programme.

Sharma (1998) stated that the responses from 200 farmers in three selected districts of Punjab State and revealed that the adoption of recommended technology for weed control in mango orchards was very poor. The use of weeds as fodder, high cost of herbicides, lack of technical guidance and lack of time were identified as major constraints in the adoption of recommended practices for control of weeds and

fruit drop in mango orchards. He further stated that weed control in mango orchards in Punjab State farmer respondents faced major constraints in the adoption of weedicides were: lack of technical guidance and lack of time. It was suggested that the extension scientist should promote awareness through organization of short term training programmes, distribution of literature and maintenance of regular contacts with mango growers.

Prasad et al. (2000) conducted a survey in 12 villages of Ranga Reddy district in Andhra Pradesh, India to study the extent of adoption of dryland agricultural technologies among the farmers. The study result showed that majority (78.0%) of the respondents had adopted off-season tillage for soil and water conservation and alternate land use technology. Recommended seed rate and plant protection, both were sorghum and castor as well the recommended time of sowing for the former and variety for the later were adopted by majority of the respondents.

Tilak (1993) in his article 'education and new new technology in agriculture' expressed the impotence of education for enhancement of farmers' capacity to maximize the perceived profit function by allocating the resources in more effective manner, by choosing which and how much of each output to produce and in what proportion to use the inputs.

Janaiah and Hossain (2003) conducted farm level studies on hybrid rice technology from Philippines, Vietnam, Bangladesh, Tamil Nadu, Andhra Pradesh and Karnataka and reported that hybrid rice had shown higher yielding potential under farmers field in all the study sites, except in Tamil Nadu. Yield grains of hybrid rice were associated with additional production costs in all the study sites. In India, lower market price for hybrid rice grown was reported, which resulted in negative relative profitability for hybrid rice farmers. This implies that there was much marginal improvement/ refinement in the technology over the period in India. It explains the slow adoption of hybrid rice in India. It also shows that small and marginal farmers in North and central Vietnam, and Bangladesh have more interest than India and Philippines in hybrid rice.

Sharma et al. (2001) conducted a study on attitude of tribal farmers towards adoption of modern and indigenous technology of agriculture in Surajpur Block of Suruguja in Chhattisgarh state during 1977-78. Out of 119 villages, in total six

villages were selected. From each village 20 farmers were selected randomly by lottery method. They collected statement through interview schedule regarding attitude towards indigenous and modern technology of rice cultivation with three continuum scale (less favourable and more favourable). They found that majority respondents showed favourable attitudes towards indigenous technology and 27.5% reported highly favourable attitudes. Only 24% showed farmers commented less favourable responses towards indigenous technology. On the other hand, 72% of the farmers' favourable attitudes towards modern technology and 9% farmers commented more favourable towards adoption of modern technology. They finally concluded that farmers' adopted of indigenous technology due to it required less input, low cost, locally available, and compatible to their farming situations.

Saravanan and Shivalinge Gowda (2003), in their article "Agricultural Extension in the 21st Century-Challenges and Strategy" have mentioned that although extension service plays an important role for self-sufficiently in food grain production but they are disappointing in transferring the agricultural information in developing countries. Indian agriculture has recorded as knowledge-practice gap. To them main causes of this gap are inadequate effective extension education, inadequate input supplies, inadequate support and marketing infrastructure. They also pointed out that technologies derived from 'top down' centralized researches are inappropriate to farmers. Besides, current extension systems are not suitable to overall farming system. They have opined that public extension policy and extension personnel never considered women cultivators as independent entities. At last they suggested agricultural extension services demands structural and functional changes through appropriate strategies such as farmers participatory technology generation and dissemination, more concentration on women cultivators and application of information technology.

Ghosh (2003) in Her article "Extension on Agricultural Development: A Learning Process" has explained the use of new technology, stress on mechanization of farming, availing of irrigation facilities, use of improved seeds, pest and diseases causing crop loses- all these depend on the knowledge, skill willing inclination of farmers to adopt these. The adoption of new practices goes through five stages namely awareness, interest, evaluation, trial and adoption. She opines that mass media and

extension workers have their greatest impact increasing awareness and evoking interest.

Singh (2000) in his article 'Education, Technology Adoption and Agricultural Productivity' has discussed the importance of education in relation to adoption of agricultural technology. The study shows that agricultural productivity directly related with technology adoption and its diffusions largely influenced by the education of the individuals of the society. It is reported that the education and skills of the agricultural workers are significant factors in explaining the inter-farm, inter-regional and inter-country differences, the agricultural performance, along with the availabilities and potential of natural resources of land and water, and infrastructure and institutional investments in inputs, credits research etc.

(n) Perceptions of Communication and Farmers about Extension Approaches

Melkote Srinivas (1992) studied in the Jagtial extension sub-division of the Sriramsagar project of the training and visit (T&V) system of intensive extension. Sriramsagar project command is located in Karimnagar district in Andhra Pradesh state, India. The intensive agricultural extension programme popularly known as Training & Visit (T&V) system is organized and administrated under four command areas in the state of Andhra Pradesh (1983). These command areas were selected by the state government for intensive area development and modernization of agricultural technology with special emphasis on optimum utilisation of land and water and maximization of agricultural output. They randomly selected Sriramsagar project command, Karimnagar district of Andhra Pradesh. The main objective was to know the extent of comprehension of the new extension messages by the village level workers and the variability in comprehension level of extension messages among the village level workers. He used interview schedule to measure the comprehensive VLW of the extension messages. The finding shows that the comprehensive levels of VLWs and the variance in the scores, frequency distribution were computed for each of the variables and he found that mass media helps properly in the agricultural improve in that area.

Iqbal (2004) conducted a study in Punjab on the assessment of competency level possessed by the extension personnel of the Department of Agriculture and reported that majority of the respondents working in the public sector extension

approach (Department of Agriculture, Government of the Punjab) were experienced. Hence, all of them were aware of and competent in using demonstration techniques for introducing new agricultural technology among the farming community. On the other hand, Naz (1987) reported that most of the farmers of the study were aware of the agricultural extension services in the Punjab but were not satisfied with these services due to high cost of recommended agricultural inputs, non-availability of fertilizer and seeds in time, irregular and selective staff visits and their poor knowledge.

Sharma et al. (1999) maintained that access to information and improved communication is a crucial requirement for sustainable agricultural development. Modern communication technologies when applied to conditions in rural areas can help improve communication, increase participation, and disseminate information and share knowledge and skills. It is being said that "Cyber Extension" would be the major form of technology dissemination in the near future. However, it was observed that the rural populations still have difficulty in accessing crucial information in order to make timely decisions. It is essential that information availability is demand-driven rather than supply-driven. The challenge is not only to improve the accessibility of communication technology to the rural population but also to improve its relevance to local development.

Sulaiman (2003) reported that farmers' organizations and producers' cooperatives provide a wide range of extension support to farmers, but their presence is restricted to very few crops/commodities and specific regions. Notable among them is the Maharashtra Grape Growers Association. Extension services provided by dairy cooperatives also have been exemplary. Newspapers (especially local language dailies), farm magazines and electronic media are important sources of information for farmers. Input companies especially fertilizer firms providing agricultural consultancy to farmers is on increase. Private extension initiatives by agri-business companies have been expanding in India, such as Mahindra, Rallis and ITC. Mahindra and Rallis models provide an integrated service ranging from information field visits, quality inputs, reliable access to output markets and non-exploitative and timely credit. It also showed the increasing willingness of farmers to pay for quality services in agriculture.

Patil (2003) reported that effective dissemination of research results through extension is evident from the food sufficiency achieved as a result of increased agricultural production in the country. India has tripled its food production over the last 4 decades, to reach the present level of 195 million tons per year due to its extension efforts and contribution of scientists in green revolution. Manish Kumar also studied at Rajapur village (273 families) under Rudrapur Block of Udham Singh Nagar district of Uttaranchal which was selected through purposive sampling, collecting data by using interview schedule shows that Gram Sewak was playing an important role in agricultural information in rural areas (Tripathi et al. 1984).

Briefly the existing literature has clearly revealed the effect of communication on agricultural development in different places. Mass media and interpersonal communications are not exclusive of each other; rather the two modes are complementary and their effect in diffusion of new ideas in agriculture are mediated by structural and socio-psychological factors such as age, sex, caste, community, literacy, religion, income, size of landholding and communication and behaviour. Since there are found agro-climatic and cultural variations in India, the study has attempted to understand the patterns of communication of development in agriculture in Assam.

Therefore, the following research questions were framed in the study to investigate the agricultural communication and development in Sivasagar district:

- (i) What sources of information are used for communicating agricultural innovations among the villagers?
- (ii) What are the most effective sources of information for communicating innovations among the villagers?
- (iii) What kind of relationship of the social variables like age, sex, education, religion, caste, community, income, size of land etc is found with agricultural development in the villages?

OBJECTIVES OF THE STUDY

The major objectives of the study are as follows:

- (i) To analyse the patterns of communication in agricultural development
- (ii) To find out the most effective interpersonal and mass media sources of communication in agricultural development
- (iii) To understand the social structures of age, sex, education, religion, caste, community, income, occupation etc. intermediating communication in agricultural development

HYPOTHESES

The following hypotheses are tested in the study:

- (i) Interpersonal communication is more effective than mass media communication in diffusion of agricultural innovations among villagers.
- (ii) Socio-cultural attributes of villagers have no relationship with the effectiveness of mass media in diffusion of agricultural innovations.

RESEARCH METHODOLOGY

The study examines the patterns of communication and their variability on account of socio-cultural attributes of villagers in bringing about agricultural development.

(i) Operational Definitions of Key Concepts

Communication

Communication is an activity or process of expressing ideas, and feelings or giving people information and others; it is a method of sending information especially through telephones, radio, computers, roads and railways, between two persons, or between one person and many, in a collectivity or a group. It should also be treated as an object which includes messages, letters or telephone call. There are, thus, broadly, two modes of communication: interpersonal communication and mass media communication.

Every social system consists of animate creatures that interact among themselves in their quest to survive in their social environment. Every living creature communicates. As human beings, we communicate with the whole of our body. In fact, every part of human body communicates something to others. The whole of human environment is surrounded by messages, some of which are purveyed intentionally and are consciously received and acted upon. A lot of human messages get lost en route. Most of our human problems can be traced in part to poor communication of messages. Human communication is necessary for the survival and growth of any society.

Agricultural Communication

Basically, an understanding of extension communication systems in a complex chain of interaction is a major determinant of the potential success of a scientist in a research institute (Siyanbola, 1996). Sustainable development in the agricultural sector is dependent on generation of appropriate technologies and creation of effective communication strategy for dissemination of recommended techniques to end-users (Dimelu and Anyanwu, 2005).

Communication is conceptualized as a process of information flow by which ideas are transferred from a source to a receiver with the intent to change his /her knowledge, attitude and /or skill (Adebayo, 1997). It is the key process in information dissemination in agriculture. The dissemination of information from point of development to the point ultimate use is an important concept in agriculture extension delivery. For technology to be relevant, its existence must be known –a condition, which presupposes communication.

Adebayo (1997) explained that, adoption and transfer would hardly take place unless the farmers (receiver) attaches the correct and intended meaning to the technology (message) and also responds favourably as intended by the extension agent (source). It is necessary to bridge the gap between available knowledge on improved technologies and actual practices, effective information delivery since which is the missing link between the research – extension interface, and practical application of the results by the peasant farmers (Entsua Mensail, 1993).

Agricultural communication as a branch of study in agriculture, deals with the planning and management of agricultural information and methods of effectively communicating agricultural technology in order to bring about desired changes in farmers' behaviour and their farming practices for improved living. In the context of agricultural extension services, agricultural communication is a process by which extension workers exchange attitudes, share knowledge and skills on behalf of their organizations with farm families through a medium in ways that each gain an understanding and use of the message (Agbamu,2006). Agricultural communication enhance a two-way flow of information in which farmers share information among themselves or an agricultural organization delivers message to farmers in such a way that both farmers, or the agricultural organization and the farmers establish commonality in meaning over the shared information and messages delivered with the intention of improving the knowledge, attitude and skills of farmers in given innovations.

Agricultural Development

Agriculture is the production of food and goods through farming/domestic plants and introduction of new implements, inputs, facilities and services in agriculture signify agricultural development.

In the study it is meant for new implements (tractor, power tiller), fertilizers (organic, inorganic), HYV seeds (775 Joha, MTU 7029), pesticides and insecticides (DNA, Karate), irrigation techniques, cropping patterns, institutional borrowing (banks, cooperatives), etc.

The study explains the pattern of agricultural communication and development in comparative framework with reference to the four villages; namely, Charal, Bhuyan, Lahdoigarh and Borbahoni village. To understand these changes and development in agriculture, structural-functional perspective has been used in the social science researches on rural masses. The present study has adopted this framework after a thorough examination of various theoretical frameworks which are discussed here.

(ii) Theoretical Framework

Development is a normative concept, something which refers to the desire to improve the quality of life, an intentional project, a sum of actual efforts to change conditions on the ground and their effects. It is a process of social change. Agricultural development is communicated among farmers, which changes not only their agricultural practices but also their social life as a whole. From the review of the literature it is found that the researchers have used two theories of communication; viz., diffusion of innovations theory and magic multiplier theory to understand the communication of agricultural development among farmers. These two theories are briefly discussed here.

Communication Theory of Innovation Diffusion

The theory was pioneered in 1943 by Bryce Ryan and Neil Gross of Iowa State University. It traces the process by which a new idea or practice is communicated through certain channels over time among members of a social system. An Innovation is an idea, practice or object perceived as new by an individual or other unit of adoption. The diffusion of innovations involves both mass media and interpersonal communication channels (Rogers 1996). That is, by sharing communication channels such as interpersonal communication or mass communication people can get information of an innovation and perceive its innovation as useful. Lasswell (1948) presented a well-known model of communication that is analyzed as five parts, S-M-C-R-E (e.g., sender-message-channel-receiver-effect). Rogers (1995: 19) mentioned that “this S-M-C-R-E communication model corresponds closely to the elements of diffusion”. Specifically, (1) sender can be inventors or opinion leaders, (2) message can be a new idea or product, (3) channels can be interpersonal or mass communication, (4) receivers can be members of a social system, and finally (5) the effects can be individual’s adoption or social change. In the diffusion theory, ‘Time’ variable is a very important factor. According to Rogers (1995), time variable is involved in diffusion in (1) the innovation-decision process; (2) innovativeness; (3) an innovation’s rate of adoption.

Most innovations have an S-shaped rate of adoption. Diffusion research has attempted to explain the variables that influence how and why users and audience adopt a new information medium, such as the Internet. According to evolution of media technology, interpersonal influences are important even though in the past the

individual is usually the unit of analysis. Also, critical mass becomes an important factor in adopting new media because new media are interactive tools and thus are required by many users to gain efficiency. That is, the more people use, the more people get benefits. In this sense, diffusion theory not only can apply to practical things, but also can be related to digital divide.

There are five different types of adopters in the diffusion process, according to Innovativeness: “(1) Innovators (venturesome), (2) Early Adopters (respectable), (3) Early Majority (Deliberate), (4) Late Majority (skeptical), and (5) Laggards (traditional)” (Rogers, 1995, pp. 183-185). Rogers defined this term as “the degree to which an individual is relatively earlier in adopting new ideas than other members of his social system” (Rogers, 1995, p. 40).

When it comes to the process of innovation-decisions, Rogers (1995) mentioned that there are five stages: (1) Knowledge + or – (selective exposure or awareness of news) (2) Attitudes + or–(people have positive or negative attitude toward innovations) (3) Adoption (Decision): people decide to adopt the innovation (4) Implementation (regular or standard practice) (5) Confirmation (comparing and evaluating)

Rogers introduced perceived characteristics of innovations that consist of (1) relative advantage, (2) compatibility, (3) complexity, (4) triability and (5) observability. Based on these five criteria, individuals perceive an innovation as new or useful and decide to adopt it. When important factors in adopting new media because new media are interactive tools and, thus, are required to many users for getting efficiency. That is, the more people use, the more people get benefits.

The model describes the factors that influence people's thoughts and actions and the process of adopting a new technology or idea.

Magic Multiplier Theory

This theory observed that the task of media should be to alter people's psychological states and thinking ways. The important role of media is to teach the skills that are necessary for modern society. Media can do this by disseminating information about these skills. Schramm (1967) argued that by establishing wide range of media systems the knowledge and skills can be multiplied much more rapidly and inexpensively.

The earliest theories were those propounded by Western theorists **Siebert, Paterson and Schramm** in their book *Four Theories of the Press* (1956). These were termed "normative theories" by **McQuail** in the sense that they "mainly express ideas of how the media ought to or can be expected to operate under a prevailing set of conditions and values." Each of the four original or classical theories is based on a particular political theory or economic scenario.

Of these two theories, the diffusion of innovation framework appeared most in the studies conducted by various scholars. In the four villages of Sivasagar district also it is seen that an innovation is generally diffused mouth-to-mouth, and to some extent through media, among villagers during their contacts in day-to-day life as well as their gatherings on socio-religious occasions. Hence, the communication theory of innovation diffusion has been used as a frame of analyses in the study.

(iii) Sources and Types of Data

The study has sourced field (oral) and documentary data. Oral data have been collected from the villages and documentary data from government and other records.

(iv) Universe and Units of Study

The four villages, one each, of predominantly General Castes, Scheduled Tribes, Scheduled Castes and Tea Garden villagers in Sivasagar constituted the universe and their households have been the units of study for data collection. The data have been collected from Charal/Hira village which is situated at a distance of one kilometre from NH no. 61 near Amguri town and approximately 27 kilometres for district headquarter i.e. Sivasagar. The village is surrounded by bamboo trees, tea garden and large cultivated field in North, west and southern part respectively. Kathkotia Baruah road divided the village into two parts which is connected to Geleki (famous for stone, coal, oil etc.). The total population is 257 distributed in 55 households. Among them 133 are male and 124 are female population. The second study village is known as Bhuyan village which is situated at north side of Amguri town and south side of Sivasagar town under same sub-division. The village is surrounded by bamboo and large cultivated field and also well connected by road, electricity and water supply facilities. The third village is purely Mishing tribe (ST) village and it is situated just near to north-east side of Halwating Tea Estate and Janjhi River respectively. The fourth village is known as Borbohoni or Purona Baghjan. It is

a mixed village of different castes and community. Out of 101 households 78 families belong to Oriya community, 14 belong to Ahom, 5 belong to Bengali, 3 belong to Muslim and 1 to Nepali community. One side of the village is surrounded by Baghjan Tea Garden and the other side by bamboo and trees. The village is situated at 3/4 km distance from present Nagaland boarder in east.

(v) Selection of the Units

Sivasagar district comprises 874 villages, most of which are mixed villages. Some of these are predominantly having General Caste, Scheduled Tribe, and Scheduled Caste or tea garden labour populations. Four villages, one each, of the types was selected purposively and all of their households were taken for data collection.

(vi) Tools for Data Collection

For collection of data an interview schedule was constructed and administered to all the households in the four villages. The schedule contained questions, personal information, socio-economic background of villagers, agricultural communication, information sources, contact with fellow farmers, mass media, and agricultural officials for improved more production.

(vi) Methods of Analysis

Structural and functional method has been used to analyse the communication of innovations through their diffusion in the age, gender, caste, class and other social structures. Thus, it combines the diffusion of innovations framework with the structural-functional method. Besides, simple percentage and tables have been used to analyse the data.