AGRICULTURAL INFORMATION COMMUNICATION AND ADOPTION OF INNOVATIVE PRACTICES IN NAGALAND

A CASE STUDY OF DIMAPUR DISTRICT

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I, A. Alem W. Longchar, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to any body else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

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INTRODUCTION

1.0 Introduction

Today's society is information-driven. In other words, there is no sphere of human life where information is not an indispensable constituent. The nations today stands divided between information-rich and information-poor. It is evident from the way economic, political and technological powers of a nation are measured by magnitude of availability of information and its meaningful utilisation by the citizens. In fact, information today as a resource has the value that is capable of transforming and improving the living standards of the individuals and thereby brings about progress in the society. In this regard, Martin (1995) was very assertive when he pointed out that information has been a key element in the life of all societies— from those of the hunter-gatherers to the so-called wired cities of our present-day nations. In our day-to-day life, dependence on information keeps ever increasing. The need for information is felt by every section of the society. In fact, access to right type of information and proper utilisation of the same constitutes a major feature of today's society.

The advances in information and communication technologies have incalculably accelerated the processes of generation, organisation and communication of information cutting across geographical and cultural barriers. And as such, today the problem is of information plenty and not of information scarcity. This has necessitated for information managers and professionals to

acquire, organise, consolidate and repackage information tailored to meet the specific information needs and requirements of the end-users. Consequently, various information systems have evolved over the years to cater to the needs of various organisations and individuals.

1.1 Agricultural Information Systems

There are many information systems even in the field of agriculture. Among others, some of the prominent Agricultural Information Systems are being described as below:

1.1.1 International Bibliographic Information System for the Agricultural Sciences and Technology (AGRIS)

AGRIS is the International Bibliographic Information System for the Agricultural Sciences and Technology. Created by Food and Agricultural Organisation (FAO) of the United Nations in 1974 to facilitate worldwide information exchange on agriculture and became operational in 1975. AGRIS is managed centrally by the World Agricultural Information Centre (WAICENT)/FAOINFO Dissemination Management Branch of the Library and Documentation Systems Division (GIL) of FAO, Rome, Italy. To date, there are 240 national, international and intergovernmental centres participating in AGRIS.

AGRIS is a cooperative system in which it facilitates participating members to provide references to the literature/documents dealing with all aspects of agriculture including forestry, fisheries, human nutrition and environment and in return, share with information provided by the other participants. Also, the collected information is distributed by AGRIS using a series of CD-ROMs among the participating countries.

Other services of the AGRIS include developing training material and courses, Agrindex, developing and distribution of AGRIS working methodologies, AGROVOC thesaurus, software for AGRIS input data preparation (AGRIN/AGCHK) and distribution of the UNESCO's CDS/ISIS database software (AGRIS, 2004).

1.1.2 Current Agricultural Research Information System (CARIS)

CARIS is the Current Agricultural Research Information System. It was created by FAO in 1975 to identify and to facilitate the exchange of information about current agricultural research projects being carried out in or on behalf of developing countries. CARIS and its global database are managed centrally by the World Agricultural Information Centre (WAICENT) / FAOINFO Dissemination Management Branch of the Library and Documentation Systems Division (GIL) of FAO, Rome, Italy.

An international system, working on a cooperative basis, CARIS identifies research projects dealing with all aspects of agriculture (including forestry, fisheries, human nutrition and environment). Presently, 137 national and 19 international and intergovernmental centres are participating in CARIS. These nations and centres then submit exhaustive information on various projects to CARIS, which in turn are distributed by CARIS on-line through the FAO Web Server, which includes CARIS CD-ROM, CARCD (CARIS Current Database), CARIH (CARIS Historical database) and SIS (SPAAR database). Other Services of the CARIS include, diskettes or magnetic tapes containing information on a country or region provided to CARIS participating centres on request; national inventories of research programmes, developing and distribution of CARIS working methodologies, AGROVOC Thesaurus, software for CARIS input data preparation (CARIN/CACHK), distribution of the UNESCO's CDS/ISIS database software for PCs and training material and courses (CARIS, 2004).

1.1.3 Commonwealth Agricultural Bureau International (CABI)

Commonwealth Agricultural Bureau International (CABI) initially named Imperial Agricultural Bureaux was changed to Commonwealth Agricultural Bureaux in 1948. It was established in the first decade of the 20th century in Wallingford, UK, with the purpose of generation, dissemination and use of

knowledge in agriculture and related fields to enhance development, human welfare and the environment. However, in the first decade of the 21st century, CABI's scope has broadened further to embrace the whole of the applied life sciences. Initially covering Entomology (in 1910, the Entomological Research Committee was formed, and in 1913 the Imperial Institute of Entomology), it grew quickly to include Mycology, Parasitology, and Biological Control and then later virtually every field in agriculture and associated disciplines.

CABI is governed by an independent board- an Executive Council and a Quinquennial Review Conference of Member Countries. CABI operates globally from its cooperate head office in Wallingford, UK and various regional centres in Europe, Africa, Asia, North America and the Caribbean. CABI activities are carried out by its two divisions namely, CABI Publishing and CABI Bioscience. The former publishes bibliographic database, books, primary journals, CD-ROMs and Internet resources in the applied life sciences with extensive coverage from the participating members to various categories of users such as farmers, researchers, extension staff, agro-business companies and the latter is dedicated to research and impart training to institutions in applied biosciences.

The CABI international activities such as Information for Development (IFD) Programme (to assist developing countries in acquisition and management of scientific information), Knowledge for Development Programme

(to assist members countries to overcome barriers to the flow and sharing of knowledge that are hindering development) and Compendia Programme (compilation of experts inputs on chosen topics into global knowledge bases) is supported by both divisions but primarily implemented by CABI Publishing (CABI, 2004).

1.1.4 SAARC Agricultural Information Centre (SAIC)

The problems and prospects of agriculture and ecology coupled with geographical boundaries and historical ties of seven SAARC countries (South Asian Association for Regional Cooperation) are more or less the same. Keeping this in view, SAARC Agricultural Information Centre (SAIC), the first regional institution of SAARC, started functioning in the premises of Agricultural Information Centre (AIC) of Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh, in January 1989, with the following objectives:

- To establish regional information network on agricultural and allied disciplines.
- To identify and document literature pertaining to agriculture, forestry, fisheries, livestock and allied disciplines.
- To serve the agricultural information needs of the member countries.

- To promote new and better techniques for handling and dissemination of agricultural information.
- Collection of information and dissemination of the same in the area of proven agricultural technologies and dissemination of the information on effective farm practices and development as well as introduction of emerging new and frontier technologies.

The SAIC functions include collection of information on agriculture and its allied disciplines and in turn provide access to various users from the region. Further it provides services through bibliographies, directories, SDI, microfiche and organises and provides training on information and communication sciences to the member countries. It also establishes linkages with international information networks like AGRIS, CARIS, CABI, etc. (SAIC, 2004).

1.1.5 Indian Council of Agricultural Research (ICAR)

Indian Council of Agricultural Research (ICAR) is an autonomous apex organisation at the national level responsible for the organisation and management of research and education in all disciplines of agricultural sciences. The Imperial Council of Agricultural Research (ICAR) was formally born on 16 July 1929 as a Registered Society under the Societies Registration Act, 1860, on the recommendations of the Royal Commission on Agriculture, to promote, guide and

coordinate agricultural research throughout India. After 1947, the ICAR came to be known as the Indian Council of Agricultural Research located at Krishi Bhavan, New Delhi.

ICAR acts as a repository of information and provides consultancy on agriculture, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension, agricultural education, home science and agricultural information communication. It co-ordinate agricultural research and developed programmes and develops linkages at national and international level with related organisations to enhance the quality of life of the farming community. ICAR has established various research centres in order to meet the agricultural research and educational needs of the country. It is actively pursuing human resource development in the field of agricultural sciences by setting up numerous agricultural universities spanning the entire country. The Technology Intervention Programmes also form an integral part of ICAR's agenda that establishes Krishi Vigyan Kendras (KVKs) responsible for training, research and demonstration of improved technologies.

The ICAR is also running an Agricultural Research Information Centre (ARIC) as the central source of information on all research projects and schemes financed by the ICAR. The ARIC is the national input centre for the AGRIS and CARIS agricultural databases of the FAO. The ARIC is also the national focal

point for the SAARC Agricultural Information Centre (SAIC), Dhaka. It has published several directories in addition to a half-yearly directory of conferences, seminars, symposia and workshops in agriculture. It also provides on-line up-linking and down-linking facilities to the ICAR system and to the agricultural information system of the entire world.

The Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India, negotiates on behalf of the ICAR with foreign governments for bilateral and multilateral collaborative agreements. The ICAR has close collaboration with World Bank, UNDP, AGRIS, FAO, SAARC, CABI, Swedish Academy for Research Co-operation, International Centre for Research in Agro-forestry (ICRAF), the Ford and the Rockefeller Foundation, etc. (ICAR, 2004).

1.2 Agriculture in India

Agriculture is the dominant sector of the Indian economy and crop production occupies the most important part of agriculture (Phukan, 1990). The economic growth of the nation to a great extent lies in the agricultural sector whereby higher priority has been accorded to the development of agriculture and allied sector. In the national context, one of the major concerns of the country's first five-year plans has been the program for achieving self-sufficiency in food production and

increasing agricultural production. Thus, from a nation dependent on food imports to feed its population, India today is not only self-sufficient in grain production but also has a substantial reserve to export outside. This increase in agricultural production has been brought by a program of agricultural improvement called the Green Revolution initiated by government during 1970s by bringing additional area under cultivation, extension of irrigation facilities, use of improved high-yielding variety seeds, better techniques evolved through agricultural research, water management, plant protection through judicious use of fertilizers and pesticides, cropping practices and education to farmers. Further, even per capita net availability of food grains increased significantly from 467 grams per day in 1999-2000 as compared to that of 395 grams in the early fifties (Indiaserver.com, 2004) despite population increase from 361 million in 1951 to 1027 million in 2001 (Provisional Population Census, 2001). Food-grain production also increased from 89.36 million tons in fiscal year 1964-65 to a level of 211.32 million tons in fiscal year 2001-02.

Today the agriculture sector contributes 24.2 percent (triennium ending 2001-02) to the gross domestic product (GDP) and provides livelihood support to about two-thirds of country's population. Further, the agriculture sector provides employment to 56.7 percent of country's work force and is the single largest private sector occupation (Planning Commission, 2002). Agriculture accounts for

about 18 percent share of the total value of the country's exports and provides raw material to a large number of industries (textiles, silk, sugar, rice, flour mills, milks products) (Indiaserver.com, 2004). However, if the indirect share of agricultural products in total exports, such as cotton textiles and jute goods, is taken into account, the percentage becomes much higher. The agriculture sector therefore acts as a bulwark in maintaining food security and in the process national security as well.

Thus recognising the crucial role played by the agriculture sector in enabling the widest dispersal of economic benefits, the Tenth Five Year Plan (2002-2007) has emphasised that agricultural development is central to economic development of our country (Planning Commission, 2002).

1.3 Agriculture in Northeast India

The economy of the northeastern states, comprising Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura is mainly agrarian. Almost 90 percent of the region's rural populations are entirely dependent on agriculture (North Eastern Council, 2005). The region's agricultural system is predominantly traditional. The region offers scope for cultivation of a wide variety of agricultural crops because of its diversities in topography, altitude and climatic conditions.

The region is considered as the home of origin of many crops such as rice, cucumber, beans, yams, mandarin oranges and other citrus fruits. Food crops such

as cereals, pulses and oil seeds are grown in the region although rice is by far the most important crop and occupies major area of cultivation as compared to other field crops.

Among the north eastern states mono cropping is the predominant method of cultivation. Thus, in the absence of multi-cropping, little or no surplus is generated in the agricultural sector. The agricultural produces are sold mainly in the local markets, and mostly in the form of primary produce without significant value-addition. The extent of cultivable land in the north eastern region varies from state to state. This is primarily because of the geographic isolation; infrastructure deficiencies, the socio-economic structure and hilly terrains that constitute nearly two-thirds of the region's geographical area and as a result large sized landholdings are not feasible. Also, the average plot size is too small for mechanisation of agriculture and adoption of modern farming practices. Therefore, subsistence farming is predominant in the north eastern region and there is hardly any commercial surplus. As par the CMIE report on Agriculture (1997-1998) during the period of 1986-87 to 1991-92, the performance of north eastern region agricultural sector was satisfactory, but in the period of 1991-92 to 1996-97, the north eastern region agriculture could not maintain the pace of improvement of agriculture with the Indian agricultural scenario (North Eastern Council, 2005). This is because of low usage of HYV seeds, fertilizers and other agricultural inputs like irrigation,

credit, improved agricultural implements, etc. and to do away with the traditional form of cultivation (*jhumming*). However, in spite of these factors, there are vast potentialities for development of agriculture as a whole in this region, due to the wide variation in climate and altitude, high rainfall and humidity, soil types, water resources and diversity of crops, etc.

1.4 Agriculture in Nagaland

Agriculture is the dominant sector of Nagaland and over 85 percent of the population of the state are directly dependent on agriculture (nagaland.nic, 2005). Among the various crops (maize, oilseeds, tapioca, millets, jobs tears, taro, yam and potato), rice, being the staple food of the people, occupies the total area of and constitutes the percent of total food grain production in the state. Plantation crops like cardamom; tea, coffee, spices, rubber, sugarcane and non-traditional winter crops such as wheat, barley, pulses and oilseeds are gaining some popularity among the local farmers.

As per the state's statistic, out of 849982 workers in the state, 544432 are cultivators and 33852 are agricultural labourers. The total farming household consists of 135900 numbers. As compared to the total geographical area of the state of 1657900 hectares, the total cultivable area is 722464 hectares. The cross-cropped area and cropped area of the state stands at 324429 hectares and 270135 hectares respectively, while the net irrigated area during the year 2001-02 was

estimated at only 63800 hectares. Further during the year (2001-02) the cropping intensity in the state was found to be 120 percent with overall food grain production standing at 355300 metric tonne (Directorate of Information and Public Relation, 2002).

1.5 Agriculture in Dimapur

Agriculture is the main stay of Dimapur district and out of 102260 workers in the district, 28994 are cultivators, 4680 are agricultural labourers. The total area under agriculture is 53613 hectares covering about 216 villages (Directorate of Information and Public Relation, 2002).

The major crops grown in the district during the *kharif* season are paddy, maize and soybean and during the *rabi* season are mustard and linseed. Some of the commercially cultivated crops are paddy, maize, mustard, linseed, sugarcane, tea and areca nut (betel nut).

Dimapur district specialises in various form of agricultural practices, viz.; double cropping system, intensive and extensive cultivation through mechanisation, integrated farming system practices and even has regulated market system for agricultural produce. The district is considered as one of the *rice bowl* of the state. Moreover, there is ample potentiality in the food grain production and development of agro-based industries such as processing and value addition.

1.6 Nagaland- *a profile*

Nagaland formally known as Naga Hills was designated as a districts of Assam in 1866. Later in 1957, it was re-named as Naga Hills Tuensang Area (NHTA) by including the erstwhile un-administered area of Tuensang district. The State of Nagaland Act 1962, formally gave the district a new name- Nagaland.

Nagaland, the land of song and music, was inaugurated on the 1st December 1963 as the 16th state of Indian union. One of the amazingly beautiful states of the Indian union is predominantly a tribal state.

1.6.1 Location and Area

The state of Nagaland lies between 25°60'N and 27°40'N latitude of equator and between the longitudinal lines 93° 20' E and 95° 15'E having an area of 16579 sq. kilometres and is situated in the northeastern part of India (Directorate of Economics and Statistics, 2004). The state is bounded by Assam in the north and west, by Myanmar and Arunachal Pradesh in the east and Manipur in the south and runs more or less parallel to the left bank of the river Brahmaputra (Map-1).

1.6.2 Topography and Soil

With the exception of some plains areas on the southwestern side the rest of the state is very severe, full of hilly ranges, which break into a wide chaos of spurs

Nagaland

Map 1: Location Map of Nagaland State

and ridges. The altitude varies between 194 metres and 3040 metres. The Naga Hills runs through the state, with snow cape Saramati as its highest peak (3840 metres). Other peaks in the state are Chikho, Japfu, Kupamedzu, Tuyi and Veda.

Soils of Nagaland are derived from tertiary rocks belonging to Barail and Dirang series. Although the total geographical area of the state is very small, a great variation in soil types occurred due to the variation in topography and climate. Soils found in the state are generally fertile, acidic in reaction, rich in organic carbon but poor in available phosphorus and potash contents (Directorate of Agriculture, 1986).

1.6.3 Climate

The state is blessed with pleasant climate all the year round. The temperature in summer (June to September) varies between with minimum 16°C and 31°C maximum and during winter (October to February) with minimum 4°C to 24°C maximum. The state of Nagaland records abundant rainfall with average rainfall varying between 2000mm to 2500mm (approx.). The heavy monsoon rain normally occurs from May to August with occasional dry spells during September to October and dry season begins from November and continues till April (Directorate of Tourism, 2002).

1.6.4 Population and Literacy

The population of the state stands at 1988636 (Provisional Population Census, 2001), out of which 1635815 is of rural population. Average density of the population is 120 per sq. km and the sex ratio of female per 1000 male is 909. Decadal growth rate (1991-2001) is 64.41 percent as compared to (1981-91) 56.08 percent. The state's total literacy rate is 67.11 percent where male is 71.77 percent and female is 61.92 percent ((Provisional Population Census, 2001).

1.6.5 Drainage System

The state is well fed by many rivers. The principal rivers of the state are Dhansiri, Doyang, Diphu, Milak, Zungki and Tizu. Some of the important lakes in the state are Shilloi, Toshu-Wozhu, Zanibu, Omoklushi and Awatsung.

1.6.6 Mineral Resources

The Geological Survey of India and the state department of geology and mining have revealed that Nagaland is endowed with vast resources of coal, limestone, iron, nickel, copper, slate, chromites, marble, petroleum etc.

1.6.7 Flora and Fauna

Nagaland is very rich in both flora and fauna. The natural vegetation of the state

can broadly be classified as sub-tropical moist deciduous forest, sub-tropical evergreen forests, temperate evergreen forests, and coniferous forests and degraded re-growth forest.

Some of the fauna found in the state are Mithun (Bison), stags, deers, sloth bear, elephant, tiger, hoolockgibbon, hornbill and trogopan pheasant, etc.

1.6.8 Livelihood pattern

Agriculture is the main occupation of the people of the state and around 68.03 percent of the state's total work force is engaged in agricultural activities (Directorate of Economics and Statistics, 2004). Large areas are used for *jhum* (shifting) cultivation. Horticulture and livestock rearing are other important activities of the people. Besides agriculture, people are engage in blacksmithy, small-scale industry units, handloom and handicrafts to meet their daily requirements during off-season. However, there is no appreciable manufacturing (large-scale) activity in the state.

1.6.9 People and Culture

The people of Nagaland belong to the Indo-Mongoloid stock. The colourful people of this state have a rich cultural heritage and tradition, for which the state is unparalled for the diversity of tribal culture it contain and being the home of 15

major and many more minor tribes spread over Nagaland eleven administrative districts. Major tribes are the Ao's, Sumi (Sema), Lotha's, Angami's, Konyak, Sangtam, Chakhesang, Rengma and Chang etc. Most of these communities are ethnically similar, having derived from an original common stock but their geographical isolation from each other has brought amongst them certain distinctive characteristic in languages, dress and customs. Different tribes of the state are easily distinguishable by their colourful and intricately designed costume like patternisation of shawl, jewellery and beads that they adore.

The people speak English, Hindi, Nagamese (an offshoot of Assamese and Bengali) and local dialects. English language is used as State official language and Nagamese (with no script) is used as a second language for all practical purposes among the various tribes. Every tribe uses a common script i.e. Roman Script as none of the tribes have a script of their own. Christianity is the major religion of the state, which comprises of 90 percent of the total population. The staple food of all the Naga tribes is rice with meat forming a major diet.

1.6.10 Transportation

Roads are the major means of transport in the state. The state has a railhead and an airport, both of which are located at Dimapur – *the gateway* of Nagaland.

1.6.11 Economy

The mainstay of Nagaland is agriculture. Besides agriculture, forests also constitute an important part of the state's economy. The state is also rich in mineral deposits. Presently, small-scale industries are also doing well and giving a great boost to the economical status of Nagaland, contributing to the net domestic product (NDP) at less than 1 percent while agricultural contribution is 27 percent (Government of Nagaland, 2005).

1.6.12 Administrative set-up

The state consist of eleven administrative districts, viz., (i) Kohima (ii) Mokokchung (iii) Tuensang (iv) Phek (v) Mon (vi) Zunheboto (vii) Wokha (viii) Dimapur and recently created districts by upgrading the three existing sub-division viz.; Longleng, Kiphire and Peren. Kiphire and Longleng were curved out of Tuensang district while Peren was created by bifurcating Kohima district. Kohima, the capital of the state, is situated at an altitude of 1444.12 metres above sea level.

There are nine towns, fifty-two rural development block and 1317 villages in Nagaland (Directorate of Economics and Statistic, 2004). The state has village councils, i.e., similar to Panchayati Raj prevalent in other states of our country, in almost all the villages to look after the day-to-day affair of the village.

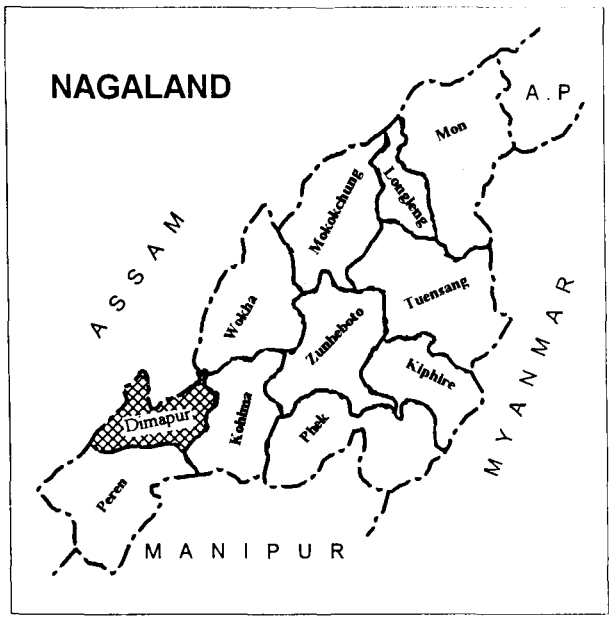
1.6.13 Local self-government

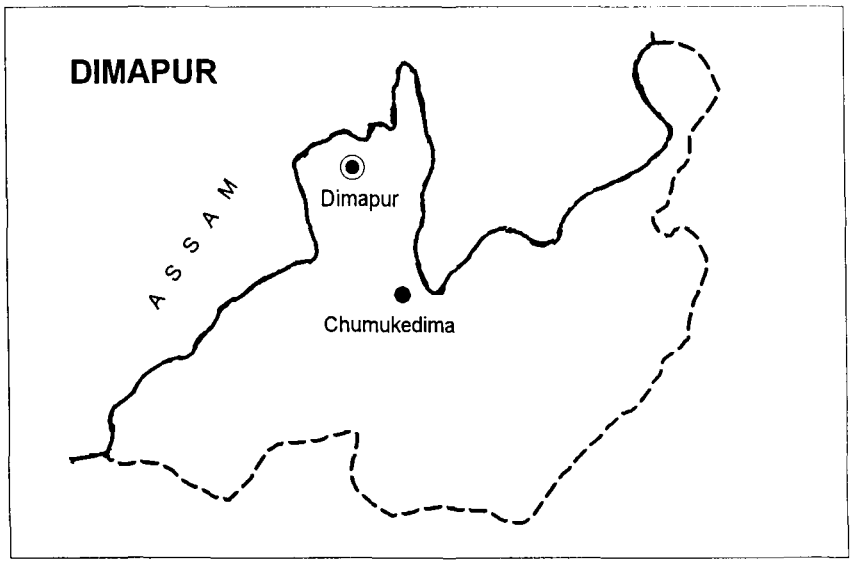
In Nagaland, village councils regulate the social life. The Regulation of 1945 (Government of India Act) gives powers of the tribal councils to try criminal as well as civil cases and to impose fines. So long as the parties belong to the same tract, the council tries all civil suits according to modern and customary law.

1.7 Dimapur- *a profile*

Dimapur the gateway of Nagaland was upgraded from a Sub-division to a full-fledged district on 28th April 1988 as the 8th district of the State. Dimapur, situated at an altitude of 260m above sea level, lies between 25° 54' 45" N latitude and 93° 44' 30" E longitude, having an area of 927 sq. km is bounded by Kohima district on the south and east, Karbi Anglong and Golaghat district of Assam on the west and north respectively (Map-2). With the exception of some hill areas on the northeast, the rest of the district is plain. It is the most fertile and the only plain area in the state. The district is well fed by many important rivers such as Dhansiri, Doyang, Diphu and Chathi etc.

This fast developing district is the most urbanised and also the commercial centre of the state. It is one of the fastest developing townships in the North East India. Dimapur has a railhead and the only airport in Nagaland. The national highway number 39 that connects Kohima, Imphal and the Myanmar border at





Dimapur

Map 2: Location Map of Dimapur District

Moreh town passes through the district. Kohima, the state capital, is just 74 kilometres away from Dimapur. The district is unparalled for the diversity of tribal culture it contain. Moreover, migration of people from the surrounding districts of the state has not only given Dimapur a cosmopolite nature but also has contributed significantly to the overall development of the district.

The district is blessed with pleasant climate all the year round. The temperature varies between 7°C (January) and 36°C (July-August), with humidity ranging from 53 percent (January-February) to 93 percent (July-August) and annual average rainfall of 1504.7mm.

The district has a heterogeneous population with the majority comprising of Naga tribes from all over Nagaland along with Kacharis, Kukis, Nepalese, Dimasa, and Garos etc. The district has a total population of 3,08,382, out of which 184490 are of rural population. Average density of the population is 333 per sq. kilometres and the sex ratio of female per 1000 male is 854. Decadal growth rate (1991-2001) is 73.30 percent as compared to (1981-91) 54.97 percent. The district total literacy rate is 78.15 percent, which is third in the state, where male is 82.16 percent and female is 73.34 percent (Provisional Population Census, 2001).

Agriculture is the main occupation of the people of the district. Besides agriculture, forests, horticulture, fishery and livestock rearing also constitute an important part of the district's economy. The people are also engaged in

blacksmithy, handloom and handicrafts during off-season. The district is also rich in mineral deposits such as clay, glass sand and petroleum. Presently, Dimapur have two industrial estates with 645 small-scale industries, which are doing well, giving a great boost to the economical status of district and the state (Directorate of Economics and Statistics, 2004). Moreover, there are a number of important institutes and centres in the district such as ICAR, State Horticulture Research Centre, School of Agricultural Science, Nagaland University and State Integrated Extension Training Centre, etc.

The district consists of 7 administrative circles and four rural development blocks, viz., (i) Medziphema (ii) Kuhuboto (iii) Nuiland and (iv) Dhansiripar. All together there are 7 administrative circles, 2 towns, 4 rural development block and 216 villages (inhabited) in Dimapur (nagaland.nic, 2005). The district has village councils in almost all the villages to look after the day-to-day affair of the villages. Chumukedima situated at an altitude of 260 metres above sea level and 20 kilometres away from the main town of Dimapur, has been identified recently as the district headquarters. At present, the district headquarter is situated at Dimapur (Directorate of Economics and Statistics, 2004).

1.8 Institutions engaged in Agricultural Research and Communication of Agricultural Information in Nagaland

The following are the activities and services of the institutions engaged in agricultural research and development in Nagaland.

1.8.1 *Department of Agriculture, Government of Nagaland*

The history of the department dated back to 1956, when the Naga Hills was a district under Assam. Subsequently, the Agriculture Department came into being in the year 1963 as full fledge department (Directorate of Agriculture, 2001). Some of the objectives and strategies of the department are:

General objective-

- Sustainable development of agriculture in the state towards sustainable livelihood and food security.

Specific objectives-

- To increase crop productivity levels.
- To cover more area under high yielding of crops.
- To introduce improve farming systems.
- To strengthen research activities.
- To work out alternative land use system for shifting cultivation.
- To increase paddy production.

Strategies-

- To cover more area under HYV rice.
- Adoption and adaptation of proper crop management practices.
- Use of organic manures and bio-fertilizers.
- Improving communication & transportation system for farmers.
- Strengthen Agricultural Research activities and improve extension services.

The agricultural publicity and information wing which forms an integral part of the agriculture department organises exhibitions, farmer's fair, training, demonstrations and also co-ordinate and collaborate with various agencies and organisations working in the state to disseminate information pertaining to agriculture to the farmers.

1.8.1.1 Organisational Structure of Directorate of Agriculture, Nagaland

In the state of Nagaland the Director of Agriculture is the head of Directorate of the Department of Agriculture and is responsible for the overall functioning of the Directorate. The Director is assisted by one Additional Director and several Joint Directors and Deputy Directors. The Director formulates all policies and programmes with the assistance of subordinate staff. The Director also directly control the District Agriculture Officers (DAO) at districts levels, Sub-divisional

Agriculture Officers (SDAO) at sub-division levels and other establishments such as State Agriculture Research Station, Sugar Nursery, Integrated Extension Training Centre, Sub-division Officer (SDO) store, various laboratories such as seed testing, bio-fertilizers, bio-control and chemist laboratory, Agriculture District Training Office, seeds farm and gardens etc. in the state.

The generated information on agriculture from outside the state and from various laboratories, research and training institutes situated in the state are usually communicated to the farmers directly through the extension wing of the State Agriculture Directorate and also in collaboration with other agencies.

Figure 1.1 depicts the organisational structure of the working of the Directorate of Agriculture, Nagaland.

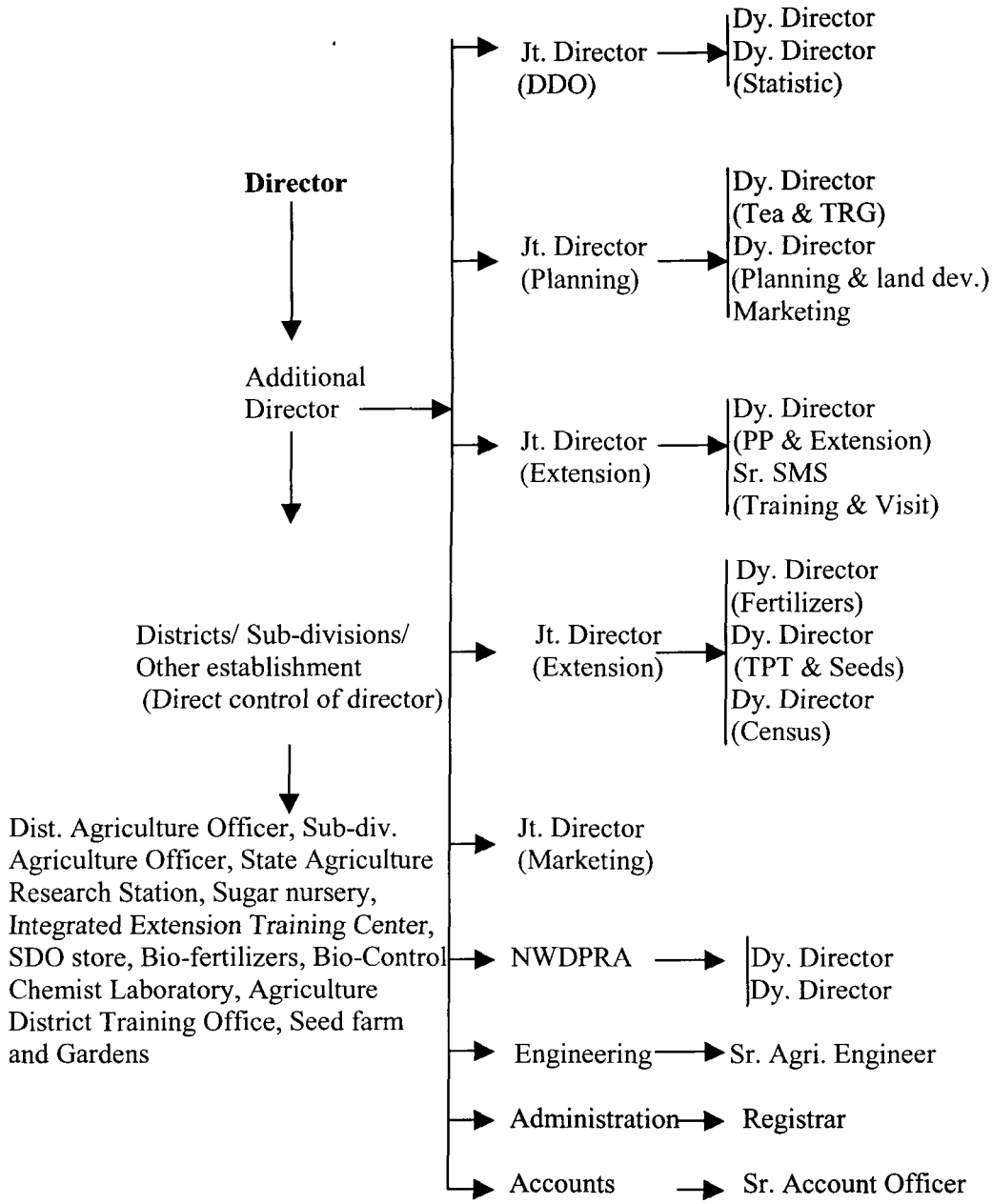


Figure 1.1: Organisational Structure of Directorate of Agriculture Nagaland, Kohima.

Source: Directorate of Agriculture Nagaland, Kohima.

1.8.1.2 Organisational Structure of District Agriculture Office, Dimapur

At the district level the District Agricultural Officer (DAO) works with the assistance of two or more Sub-Divisional Agricultural Officers (SDAO). The district is further divided into sub-divisions, which are headed by SDAO and in turn are assisted at the circles and block levels by Agricultural Officers (AO) and Agricultural Inspectors (AI). At the village levels the Agricultural Inspectors (AI) are assisted by village level workers (VLWs) and field assistants to carry out various extension activities.

Figure 1.2 depicts the organisational structure of the District Agriculture Office, Dimapur.

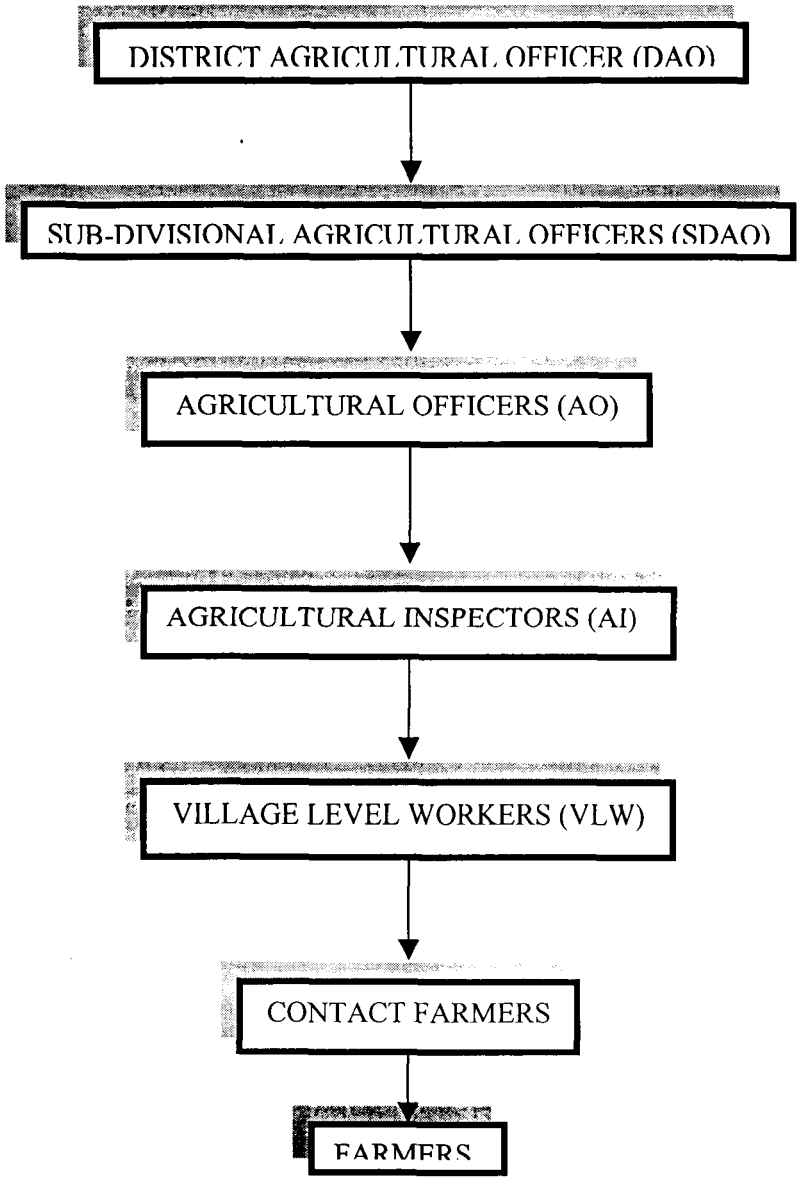


Figure 1.2: Organisational Structure of District Agriculture Office, Dimapur, Nagaland.

Source: District Agricultural Office Dimapur, Nagaland.

1.8.2 Indian Council of Agriculture Research (ICAR), Jharnapani, Dimapur

The ICAR was established in the year 1975, for the state of Nagaland, in Jharanapani, about 27 kilometres from Dimapur. Some of the objectives of ICAR are:

- To conduct research for development of suitable location for specific sustainable agricultural production technologies through different farming system models involving agri-horti-silvi-pastoral system supported by livestock-api-aquacultural techniques.
- Development of crop and animal production package of practices through the assessment and refinement of the production technologies so developed.
- To conduct on and of farm research trails and to impart training to extension functionaries and unemployed youth in order to percolate down the evolved technologies in collaboration with the line departments.
- To act as a repository of agricultural information network for state, regional and international linkage.

The ICAR is also engaged in research and extension activities in agricultural crops particularly related to rice, maize, oilseed and pulses. Research

and extension activities are also in progress in the field of horticultural crops, pigs, rabbits, poultry and cattle production. Moreover the activities related to plant protection and animal health (is) are also going on in the ICAR.

The Krishi Vigyan Kendra (KVK) unit looks after the extension activities of the ICAR. Some of the objectives of the KVK are:

- The Kendra imparts learning through work experiences.
- The Kendra imparts training to only extension workers who are already employed or to the practicing farmers and fishermen. In other words, the Kendra caters to the needs of those who are already employed or those who wish to be self-employed.
- The syllabus and programme of each Kendra are tailored to the felt needs, natural resources and the potential for agricultural growth of that area.

The main functions of KVK are:

- To organised skill oriented training in different subjects for farmers as well as for grass root level workers (horticulture, agronomy, agricultural engineering, home science and extension.).
- To maintain instructional-cum-demonstrational farm on the basis of integrated hill farming system to provide work experience to extension workers.

- To organise specialised training in various subjects (horticulture, agronomy, agricultural engineering, home science and extension.) to extension workers of north eastern hill region.
- Carry out demonstration on major crops (paddy, maize, groundnut, vegetables etc.) and on improved technology at farmer's field.
- Development of wasteland on horticulture and livestock based land use system.

Other extension activities of the ICAR are:

To publicise and propagate the improved technology, the centre organising different programme like field day, farmers fair, women's day, exhibition, radio talk, TV coverage, film shows and ex-trainees meets etc. Moreover the technical personnels of KVK and scientist of the ICAR constantly monitor the programme in operational areas and rendering time-to-time technical advice to the farmers (ICAR, 2005).

1.8.2.1 Organisational Structure of Indian Council of Agriculture Research, Jharnapani, Dimapur

The ICAR, Dimapur, is headed by Joint Director and is assisted by the administrative officers, In-charge KVK, scientists and several other staff. The Joint Director of the Centre coordinate link between the central and the state level institution. ICAR has its own technology transfer unit for the promotion and

adoption of improved technologies among farmers, under the KVK. In ICAR, the research activities in agriculture and allied fields are carried out by scientists and research associates and the generated information may either be transfer to the KVK or directly to the farm managers to be communicated to the farmers.

Figure 1.3 depicts the organisational structure of the Indian Council of Agriculture Research (ICAR), Jharnapani, Dimapur.

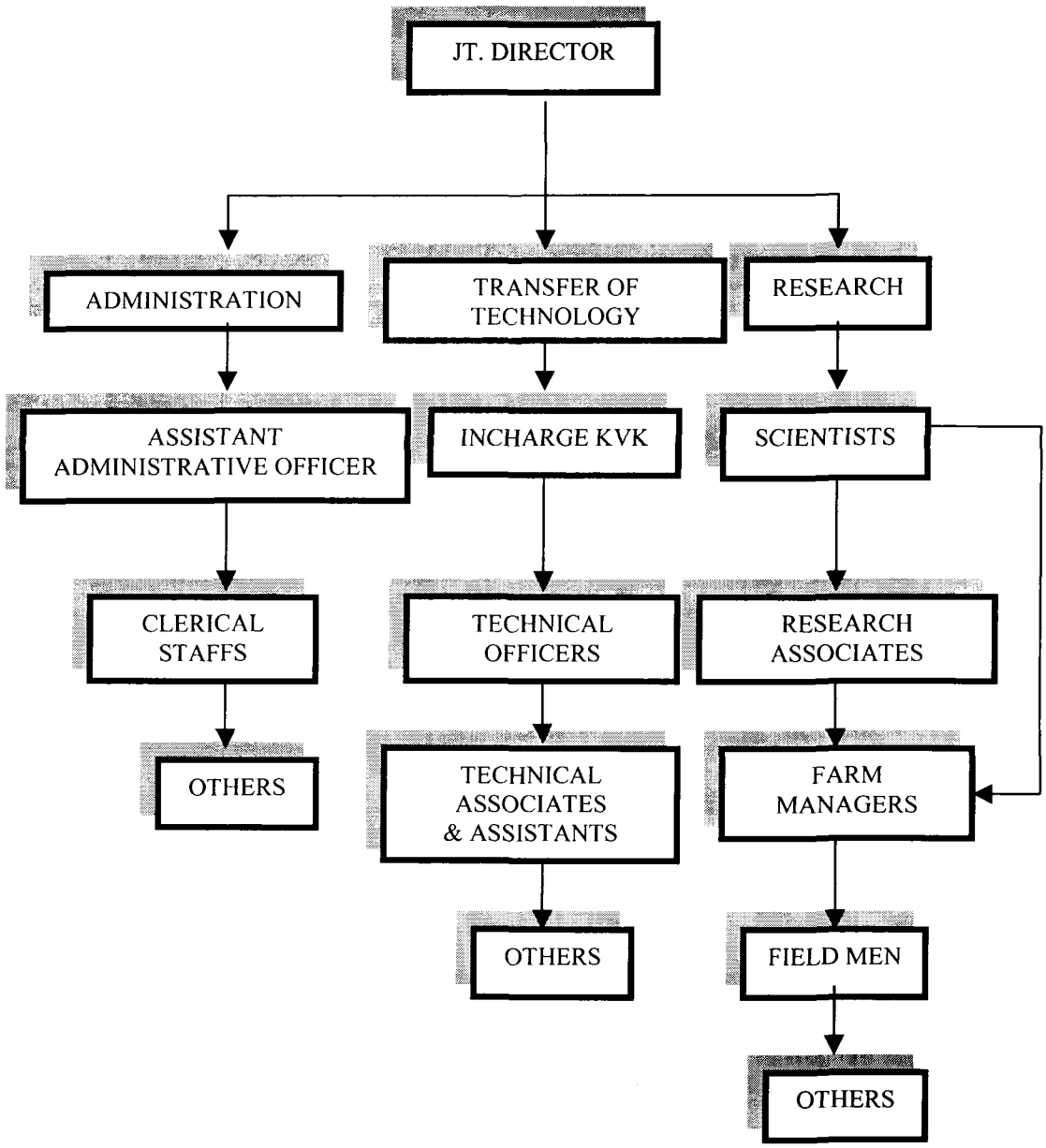


Figure 1.2: Organisational Structure of Indian Council of Agriculture Research (ICAR), Jharnapani, Dimapur, Nagaland.

Source: Indian Council of Agriculture Research (ICAR), Jharnapani, Dimapur, Nagaland.

1.8.3 School of Agricultural Science and Rural Development (SASARD), Medziphema

The need for an Agricultural College to impart training relating to local crops, soil and climatic conditions were felt for a long time both by the public and the government of the three states viz.; Meghalaya, Nagaland and Mizoram. With this in view, the School of Agricultural Science and Rural Development (SASARD) was established on the 20th October 1978, in Medziphema foothills of Pauna range, about 32 kilometres from Dimapur. The College since its inception was under the aegis of North Eastern Hill University (NEHU). However with the establishment of the Nagaland University in 1994, the school has become an integral part of the Nagaland University.

The school consists of the departments of agricultural economics and statistics, agricultural extension, animal production and management, plant pathology, horticulture, agricultural chemistry and soil science, entomology, agricultural engineering, soil conservation, genetics and plant breeding, rural development and planning. The school imparts studies leading to graduate and postgraduate degree. Some departments have undertaking Ph.D programmes.

Besides teaching and research, the college is also engaged in various extension activities to help in transfer of the latest technical know how to the farmers to increase agricultural production through, radio talk, TV coverage,

farmers' fairs, regular visits of farms, educating farmers through trainings and demonstrations, training extension workers and in-service personnels of the state.

1.8.4 State Agricultural Research Station (SARS), Yisemyong

Realising the need for agricultural research in order to accelerate agricultural development, State Agricultural Research Station (SARS) was established at Yisemyong, Mokokchung District, to cater the need of the state. The main objective of SARS is to attend to the local problems of farmers with special emphasis on location specific-production oriented research in the different agro-climatic zones of the State (Directorate of Agriculture, 2003).

1.8.5 Integrated Extension Training Centre (IETC), Medziphema

The IETC based in Medziphema in Dimapur district is the one and only training centre in the state. It is here the two-year diploma course of Village Extension Workers (VEW) is conducted besides other refresher courses for agriculture department officer and staff from time to time. Here the trainees are usually trained in the demonstration farms.

1.9 Innovation

Innovation in general term is the collection of events bringing about improvement of a given physical, social and intellectual structure with respect to its development, design, diffusion or use. In other words, innovation is creative change. The changes are brought about by either the new application of existing knowledge or by applying newly acquired or generated knowledge from new technology or discovery or invention (Panda, 1987).

1.9.1 Definitions

Rogers (1983) defines innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Further, Rogers highlight that if the idea seems new to the individual, it is an innovation. Here, the newness in an innovation need not just involve new knowledge. Also the newness aspect of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt.

According to Ban and Hawkins (1985), an innovation is an "idea, method, or object which is regarded as new by an individual, but which is not always the result of recent research".

Ray (1999) is of the view that "irrespective of the time period the idea or practice was originally developed, when a person first becomes aware of it is an innovation to that person".

1.9.2 Characteristics of Innovation

Among the many innovations introduced in an area only a few get adopted, due to the nature of the innovations. Thus some innovations are adopted more rapidly than others because the farmers perceive them to have different characteristics.

A number of literatures (Misra, 1968; Rogers, 1983; Ban and Hawkins, 1985; Ray, 1999 and Supe, 1999) have highlighted the relation between characteristics of an innovation and its rate of adoption. Misra (1968) opined that innovations must possess the following characteristic such as:

- *Geographic feasibility*- innovation that can be used in a given physical geographic environment depends on the location, climate, etc.
- *Cultural compatibility*- innovation can be adopted if they are in conformity with the cultural values, norms and customs of the people.
- *Technological simplicity*-in an area where technological level of the

people is low, a complex innovation cannot be introduced. Hence innovations that are simple to understand are adopted more readily.

- *Experimentally and Communicability*- an innovation, which can be experimented without much cost is likely to be accepted. Also an innovation, which can be easily communicated to others, has a better chance of being adopted than the one that is difficult to communicate.
- *Economic feasibility and Profitability* - innovation that are found to be economically gainful are readily adopted.

Rogers (1983) explained some of the characteristics of innovation as:

- *Relative advantage*- "it is the degree to which an innovation is perceived as better than the idea it supersedes". The relative advantage may have a number of dimensions such as wither the innovation enable the adopter to achieve the goals better or at lower cost than the previous.
- *Compatibility*- "is the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of the potential adopters". An innovation that is not compatible with the prevalent values and norms of a social system will not be adopted as rapidly as an innovation that is compatible.

- *Complexity*- "it is the degree to which an innovation is perceived as difficult to understand and use". An innovation should be, as far as possible, less complex for the adopters to understand and use. Some innovations often fail because they require complex knowledge or skills.
- *Trialbility*- "it is the degree to which an innovation may be experimented on a limited basis". Thus an innovation can be readily adopted if it can be tried first on a small scale.
- *Observability*- "it is the degree to which the results of an innovation are visible to others". Adopters often learn much from observing.

Similarly, Supe (1999) noted that a new idea (innovation) is adopted only if it possesses the following characteristics and natures such as;

- *Visibility*- a new practice will generally be adopted more quickly if it is visible.
- *Cost*- new practices that are less costly and involve less risk are generally adopted.
- *Divisibility*- innovations which can be adopted on a large scale on a trial basis are generally adopted more rapidly.
- *Utility*- any new practice, which is viewed as major improvement over existing methods, is likely to be adopted.

- *Group action*-innovations that required group effort may be accepted readily.

It must, however, be noted that the applicability of an innovation as viewed by experts would not be the same as the one viewed by the would-be-adopters. As in the case of agriculture it is the farmers who are the end users. Hence it is their own perception of the usefulness of innovations, which lead to the adoption of innovations (Misra, 1968).

1.10 Adoption

One of the areas of communication, which has received increasing attention, is the area of diffusion and adoption of new ideas and practices. Attention has been focused mainly on the nature of the process the steps involved therein, and how best this knowledge could be utilised in bringing about planned change in a social system.

1.10.1 Definitions

Wilkening (1951) described the adoption of an innovation as a "process composed of learning, deciding and acting over a period of time. The adoption of a specific practice is not the result of a single decision to act but series of actions and thought decisions".

Rogers (1983) defines adoption as a "decision to make full use of an innovation as the best course of action available".

Feder et al. (1985) defines adoption as "the degree of use of a new technology in a long run equilibrium when a farmer has full information about the new technology and its potential".

Thus, adoption can be understood as the process through which an individual proceeds from the stage of first knowing about an innovation to its final adoption.

1.10.2 Adoption Process

Wilkening (1951) pointed out that the adoption of a specific practice involves series of actions and thought decisions. Rogers (1983) conceptualised adoption process as "innovation-decision process- a process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea and to confirmation of this decision".

1.10.3 Stages in adoption process

A number of studies (Pedersen, 1951; Wilkening, 1951; Copp, 1958 and Rogers, (1983) have developed the concept of stages or steps in which an individual

decides to adopt an innovation. However, Ryan and Gross (1943) were probably the first to recognise that the adoption of a new idea (practices) consisted of stages. They distinguished the adoption process into awareness, conviction, trail, acceptance and complete adoption of the innovation. Similarly, Wilkening (1953) pointed out that the adoption of a specific practice involves series of actions and thought decisions. He identified four adoption stages- awareness, obtaining information, conviction and trail and adoption.

Rogers (1983) also mentioned that the stages in the adoption process may not occur in specified order and some of the stages may be skipped. As such evaluation of innovations occurs throughout the process and the process may not always lead to adoption. There may be rejection also and with more experience and information the innovation, which has been adopted, may be subsequently be discontinued. According to him the process has five stages that occurs overtime and consists of a series of actions. The stages are:

- *Knowledge-* an individual is exposed to innovations existence and gains some understanding of how it functions.
- *Persuasion-* an individual forms a favourable or unfavourable attitude toward the innovation.
- *Decision-* an individual engages in activities, which lead to a choice to adopt or reject the innovation.

- *Implementation*- an individual puts the innovation to use in this stage, until this stage the innovation-decision-process is more or less mental exercise.
- *Confirmation*- an individual seeks reinforcement for innovation he has made, but he may reverse his previous decision if exposed to conflicting messages about the innovation.

Summing up, adoption process can be understood as a type of decision-making process, in which there is evaluation of the innovations through various stages before the final adoption. However, it may be noted that in practice the adoption process does not always follow the different stages but it may rather overlap. Also the duration of each stages and the length of time between any two stages varies with the personal characteristics of the adopter and the nature of the group influence on the adopter.

1.10.4 Adopter Categories

In any setting, individuals constituting a community or society react differently towards innovations. Usually all individual do not adopt a new practice at the same time. Some may accept innovations much later.

Rogers (1983) has classified adopters into five categories according to the relative time at which they adopt a new practice. The five categories are:

- *Innovators* - They are the first to adopt a new idea. They are known as experimenters since they try out the new practices before anyone in their social system.
- *Early adopters* - they are not too far ahead then the average members of the social system. Potential adopters look to them for advice and information about the innovation. They do not test untried ideas, but quickest to use tried ideas in their own situations.
- *Early majority* - They adopt innovations a little earlier than the average members of the social system. They are neither very early nor relatively late to adopt an innovation.
- *Late majority* - They adopt new ideas just after the average members of the social system and adopt mainly because people have already adopted the innovation and getting benefit out of it.
- *Laggards* - Laggards are the last to adopt new ideas. They resist new practices until everyone else in the social system has adopted them. By the time they adopt it may already have been superseded by a more recent idea and cling to traditional attitudes.

1.10.5 Factors in Adoption of Innovation

Among the many innovations introduced in an area only a few get adopted as

adoption of innovations depend on the characteristic of innovations, flow of information and above all the receptiveness of the end-user (Misra, 1968).

Pandey (1989) observed that adoption of any innovations depends primarily on three factors, first the adopters awareness, second, suitability to the specific environment and third, the possible economic benefits of the innovations to the adopters. In other words the extent of adoption will defer from adopters to adopters depending on the socio-economic and the local environment. However, Longo (1990) highlighted that the adoption of innovations is not dependent only on the characteristics of the individuals or on the different ways information is transferred to the people. In fact the adoption of innovation also depends on the innovations themselves. The type of innovations, their characteristic and complexities, are the main aspects to be considered as to why people adopt or reject an innovation. In addition to the characteristic of the individuals and of the innovations, there are many other social, economic, psychological and cultural factors that will influence adopter's attitudes and behaviour towards change. Even information transferred through various channels and sources can play a decisive role in encouraging wither to adopt the new methods and practices.

1.10.6 Rate of adoption

Rate of adoption is the relative speed with which the members of a social system

adopt an innovation. It is measured by the length of time required for certain percentage of members of a system to adopt an innovation (Rogers, 1983; Supe, 1999).

Conclusion

Today, the utility of information is literally immeasurable. There is no field of human activity where information is not a component. The dependence of information in everyday life increases day-by-day. Information has become a necessity for everyone. Everybody needs information for some purpose or the other. In fact, Martin (1995) was right when he called information as the *life-blood* of society.

The necessity for information communication on agricultural innovations needs no emphasis. Unless the farmers have access to and acquired the latest knowledge of agricultural technologies, any attempt to improve food production is a remote possibility. In this line, Ania (1989) observed that non-provision of agricultural information in the developing countries has greatly limited the agricultural development. Similarly, Ozowa (1995) also highlighted that agricultural development could not succeed in many African countries due to the failure of information delivery system.

As par the Planning Commission Report (2002), agriculture extension machinery and information support in most States in our country have become

outmoded. The report, therefore, highlighted that there is a need to revamp the extension services in the country by using print and electronic media and information technology along with the involvement of the private sector, especially the input agencies and traders, which at present are considered the main sources of information for the farmers.

It is, therefore, imperative to give a deeper consideration on how gainfully agricultural information is being communicated to the farmers. Against this backdrop, the present study was carried out to assess the magnitude of agricultural information communication and its impact on adoption of agricultural innovations with special reference to Dimapur District of Nagaland.

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CHAPTER-II

LITERATURE REVIEW

2.0 Introduction

The process of diffusion of innovations has long been recognised but not until in Europe the original diffusion research was carried out as early as 1903 by Gabriel Tarde, a French judge. He observed certain generalisations about the diffusion of innovations that he called "the laws of imitations" and this became the title of his influential book, which was published in 1903. Trade identified the adoption or rejection of innovations as a crucial research question. He observed that the rate of adoption of a new idea usually followed an s-shaped curve over time. But his creative insights were not to happen until after a lapse of almost forty years (Rogers, 1983).

Although the background on the research on diffusion of innovations dates from the 1920s (after Tarde's work) it was not until in the 1940's, two rural sociologists, Bryce Ryan and Neal Gross (1943) at Iowa State University, published their seminal study of the diffusion of hybrid seed among Iowa farmers. They found that the rate of adoption of the agricultural innovation followed an S-shaped normal curve. Interestingly, this rate of adoption curve was similar to the S-shaped diffusion curve graphed by Tarde forty years earlier. As a result their now classic hybrid-corn study resulted in a renewed wave of research, more than any other study in this field, influencing the methodology, theoretical framework

and interpretations of later scholars in various disciplines, leaving an indelible stamp on the history of diffusion research up to the present.

During the 1950s, there has been a great increase in the number of studies on the diffusion of new ideas especially among the rural sociologists. Important pioneers in diffusion study were Wilkening, Lionberger, Beal and Bohlen, who have contributed immensely in strengthening this field of study.

Most diffusion studies prior to 1962 were conducted in the United States and Europe. However, in the early 1960s, there was a sharp take off in the number of diffusion studies in developing countries of Latin America, Africa and Asia as it was realised that the classical diffusion model could be usefully applied to the process of socio-economic development besides agricultural development. As a result, the study of diffusion on innovations has become worldwide within a short span of time. In fact, Rogers's (1983) publication *Diffusion of Innovations* synthesised diffusion research publications in rural sociology, education, anthropology, communication and other fields and argued that adoption of innovations has a vast body of literature with some 3,085 publications being reported up to 1983 from worldwide and the volume of literatures is growing even more. The obvious reason may be that as Rogers pointed that---- why there is so much interest in the diffusion of innovations is because "getting a new idea adopted, even when it has obvious advantages, is very difficult" (Rogers, 1983).

Being of inter-disciplinary interest diffusion and adoption of innovations has been conducted in various disciplines such as sociology, geography, economic, agriculture, management, education, communication studies, anthropology, library science (though only a few studies), etc. However, for the present study, literatures pertaining to those studies (diffusions) dealing with communication of agricultural information and the adoption of agricultural innovations were reviewed.

In this chapter the reviews have been made chronologically spreading over six decades on the studies conducted in India and abroad and is presented under the following main headings:

Information sources and channels

Factors responsible for the adoption of agricultural innovations

Factors responsible for the non-adoption of agricultural innovations

2.1 Studies conducted in India

In India, as early as 1960s, studies on the diffusion of agricultural innovations and their adoption have been carried out.

2.1.1 Information sources and channels

A. Mass media

Singh and Jha (1965) reported that, demonstration was the most effective source of information followed by exhibitions, film shows, radio, newspapers including leaflets, bulletins and other printed publications for the adoption of improved agricultural practices (Bute et al., 1981).

Khara and Singh (1970) study on the influence of extension methods upon adoption of improved seeds revealed that some of the effective methods were result demonstrations followed by farm and home visits. Further they revealed that the least effective methods for the adoption of improved seeds were posters, leaflets and training (Singh and Singh, 1970).

Rajagopalan and Singh (1971) study on the adoption of agricultural innovations, reported that the farmers of all the six villages acquired information on improved agricultural practices mainly through mass media. In this context, the authors found that farm demonstrations and cinema vans were more effective in disseminating information in the villages than radio and printed media.

In another study, Patel and Pandya (1973) found that among various sources of information, radio had occupied the third place, followed by printed materials and demonstration, while newspaper was the least used among the adopters.

Singh and Sharma (1973) while carrying out a study to assess the influence of TV in villages revealed that there was more adoption of agricultural innovations

in villages having access to TV programmes then those villages with no TV programmes.

In another pertinent study, Pandey and Prasad (1978) observed that mass media and extension activities were playing a significant role in adoption of agricultural innovations. Studies carried out by Murthy and Hanumanthappa (1979), Ahmad and Shamim (2000) also showed similar tendency.

Vijayaragavan and Subramaniam (1981) found that among the credible source of agricultural information for both the garden land and dry land farmers were radio and farm literatures. However, Sangha and Gupta (1985) in their study, placed TV as the most credible source of information for agriculture for the rural TV viewers, followed by radio.

Pandey (1989) reported that mass media were found to be least useful in communicating agricultural information to the farmers. Further it was revealed that there was no significant relation with the use of cosmopolite sources and extension contacts and with the adoption of agricultural innovations (Musib, 1989). Similarly, Sexena et al. (1990) pointed out that farmer's degree of mass media contact and visit to the research centre have no relationship with adoption behaviour of the farmers.

In another study, Kher (1992) indicated that, extension contact and participation in extension programmes by the farmers was found to be significantly associated with the adoption of improve practices.

Sangha and Kalra (1993) in their study on the pattern of mass media utilisation by farmers found that radio was used to the greatest extent with highest credibility, followed by TV, newspapers, agricultural magazines, audio-cassettes and agricultural films by the farmers for receiving agricultural information.

In order to assess the usefulness of a local daily as a medium for the dissemination of agricultural information to rural farmers, Sarmah and Sarmah (1997) observed that majority of the farmers interviewed (68%) have agreed that the agricultural information reaching them through the newspaper was timely followed by solving local farm problem (56%) and usefulness in enhancing the level of agricultural productivity (30%). It was also found that a large number of farmers (58%) were satisfied with the presentations (contents) in the local daily.

Joshi et al. (1997) had carried out a study to evaluate the role of All India Radio (AIR) in organising training programmes through a series of lectures on different aspects of recommended packages for cropping soybeans to the farmers. The study revealed that awareness level on agro-techniques was the highest, followed by the general information such as premier states, national productivity and nodal agencies for seed supply. Moreover, it was also revealed that, awareness

about the insect pests and diseases was low amongst the farmers, which the authors have attributed mainly to the complexity of the packages and the lack of understanding on the plant-weather-pest/disease relationship. Lastly, it was found that the awareness level of the farmers towards the post-harvest processing and storage was found to be very less.

In another study, Sharma and Khan (1997) argued that understanding the existing communication behaviour was essential before dissemination of new ideas and technologies to the farmers. In this context, they carried out a survey study and found that radio and television, followed by newspaper, other printed materials, magazines and films were the most used mass media sources for access to agricultural information by the farmers (Malik et al., 2000).

Choudhary et al. (1998) and Sohi et al. (1998) found that farmers mainly use sources such as advertisement, demonstrations, farmer's fairs and extension workers for the adoption of agricultural innovations.

Misra (1999) maintained that radio programmes, newspapers were among the important media through which the farmers in the rural areas come to know about the use of new agricultural technology. Similar, results were reported by Prakash and Srivastava (2000) that in rural settings, radio and television are considered to be the cheapest, reliable and the farthest-reaching mass media cutting across the literacy and distance barriers. They revealed that radio and

television programmes were found useful in acquiring new information related to agriculture, animal husbandry, fishery, etc. to most of the farmers. However, it was also found that to some of the farmers, radio and television programmes were helpful in acquiring additional information only, while some of the farmers opined that radio and television programmes only create awareness on various agricultural innovations.

Pant et al. (2000) revealed that among the personal cosmopolite source of information, farmers training in KVK, farmers fairs and exhibitions were frequently use by the farmers for the adoption of improved cultivation practices.

Kumar and Narayanaswamy (2000) found that farmer's exposure to different extension educational activities adopted more number of sustainable agriculture practices (IPM, bio-fertilizers, organic farming etc.). They argued that extension programmes encourages farmers to acquire more knowledge and skill apart from developing favourable attitude towards new technology.

Srivastava and Vardhan (2000) observed that shop display, jeep campaigning, hoardings, wall paintings, handbills pamphlets and media advertisement were various sources of information for the adoption of several brands of pesticides available in the market. Sinha et al. (2000) also revealed that the printed media such as advertisements, pamphlets, leaflets etc. were the most popular information channels for agricultural innovations.

Panda (2002) observed that the amount of institutional support received during the year towards agriculture and number of hours spent weekly by the head/chief earner of the family on extension education through trainings, radio and TV programme etc. contribute significantly to the adoption of modern agricultural technology.

On the basis of their study, Singh et al. (2002) concluded that, besides other sources of information for agricultural innovations, the big farmers and landlords preferred Punjabi magazine published by the Punjab Agricultural University. Further they also revealed that medium and small farmers preferred radio and TV as sources of information for agricultural innovations.

B. Interpersonal information sources and channels

In order to assess the communication channels used by the farmers for agricultural innovation, Bose (1965) carried out a study in West Bengal. He revealed that farmers came to know about agriculture innovation from the progressive farmers of their caste and from other experienced farmers.

Lakshamanna and Satyanarayana (1967) pointed out that neighbours and village leaders played an important part as sources of information at different stages of adoption of improved agriculture practices.

Misra (1968) study revealed that, besides the opinion leaders, other major sources of information for the diffusion of agricultural innovations were neighbours followed by relatives and extension agents.

Dudhani and Rao (1969) and Sanoria (1970) concluded that farmers used various sources of information such as village level workers, village leaders, neighbours, agricultural extension officers, block development officers, agricultural college students and lastly friends and relatives for seeking information on improved farm practices

Similarly, Khara and Singh (1970) carried out a study to assess the influence of extension methods on adoption of improved seeds. They categorised the extension methods into four viz.; individual contact methods, group contact methods, mass contact methods and indirect influence which includes neighbours, village level workers, relations and friends. Their study found that neighbours, followed by relatives and friends were the most effective sources for the adoption of improved seeds. Further, it was also revealed that methods under the category of indirect influence obtained the highest score whereas least was of group contact methods due to high rate of illiteracy among the cultivators (Patel and Pandya, 1973).

In another study on the adoption of agricultural innovations, Rajagopalan and Singh (1971) revealed that the farmers of all the six villages acquired

information on improved agricultural practices mainly through personal contacts.

Kalamegam and Menon (1978) reported that village level workers (VWL), deputy agricultural officer (DAO) for progressive village and neighbours, friends and relatives for the less progressive village were the most mentioned information sources for the adoption of agricultural innovations. Further their study also revealed that in the progressive village, VLW were given the maximum credibility and the less credible sources were the neighbours, friends and relatives. In case of less progressive village the authors found that the most credible sources of information were neighbours, friends and relatives with DAO as the least credible sources of information for the purpose of agricultural innovations. (Pandey, 1989).

Bute et al. (1981) reported that agricultural assistants and village level workers were most effective information sources for the cotton growers with 80 percent to 90 percent of the farmers sought advice and received information from these two sources. Further, they also revealed that other important sources of information were extension officers, friends, relatives, agricultural officers, block development officers, district agricultural officers and agricultural development officers.

Vijayaragavan and Subramaniam (1981) study highlighted that for the garden land farmers the most credible source of information was deputy agricultural officer, followed by Gram sevak, friends, neighbours and commercial

agencies. However, they found that for the dry land farmers it was Gram sevak, followed by friends and neighbours, deputy agricultural officer and commercial agencies (Swarkar and Kushwah, 1997). On the contrary, Sangha and Gupta (1985) placed agricultural university as the credible source of information for the farmers relating to agriculture followed by the block extension staff, relatives, friends and neighbours.

Singh and Ray (1985) found that small farmers' utilisation of personal cosmopolite sources of information i.e. extension workers and persons engaged in fertilizers promotion work, contribute positively and significantly to the level of fertilizers use. Further they found that personal guidance on better farming was found to play a crucial role in determining the level of fertilizers use of the farmers.

In another significant study, Musib (1989) found that the most important sources of information for the selection of crops were personal experience, family members, friends, neighbours, relatives, fellow farmers and workers in agricultural offices. For maturing of crops and pesticides, the most important information sources for the farmers were personal experience, friends, neighbours, relatives, market place and fellow farmers. With regard to irrigation, the farmers depended on personal experience, followed by friends, neighbours, relatives, family members and lastly workers in agricultural offices. In case of marketing and price

level, the author had identified information sources such as market, shopkeepers, personal experience, friends, relatives, family members and fellow farmers. The author had also highlighted that the other sources such as religious persons, school teachers, doctors, libraries and service holders were found to be least useful in communicating agricultural information to the farmers (Sohi et al., 1998).

Gogoi (1990) argued that interpersonal rural communication provides valuable insights into village life and its communication culture. It plays a catalytic role in formulating extension strategies and the adoption of farm technologies to foster development in rural areas. In this regard, he carried out a study to examine the intricate communication network pertaining to agricultural information among farmers in Punjab. The study found that opinion leaders were centralised in the communication networks in the progressive villages whereas in non-progressive villages it was diffused among a number of persons.

Bezbaruah (1994) study in Assam, confirms that farmers with close contact with personnel of agricultural extension service tend to adopt and use HYVs to a greater extent than the others.

In a survey study Sharma and Khan (1997) revealed that amongst the cosmopolite sources for agricultural information, agricultural extension officers were the most important institutional sources of information, followed by agricultural scientist, agricultural development officers and cooperatives

personnel. Further they revealed that for the personal localite sources the farmers mainly used neighbours, followed by friends, progressive farmers and relatives. However, private agencies and NGOs were found to have very less impact as far as the farmer's agricultural information needs are concern.

Agrawal (1998) argued that presence of youth club in the village that have adopted innovations had a profound effect on the external agencies as they tend to collaborate with the youth club to carry out developmental and agricultural programmes.

Choudhary et al. (1998) reported that the tribal farmers used more of the personal localite (neighbours, friends, relatives etc.) and personal cosmopolite (Extension workers, group meetings and discussions etc.) for agriculture innovations. Further they revealed that, both the tribals and the non-tribals farmers equally utilised the commercial and other private agencies as information sources for agricultural innovations.

In another pertinent study, Misra (1999) maintained that block centres, village-level workers, neighbours and public agents were among the important media through which the farmers in the rural areas come to know about the use of new agricultural technology. In this regard, he pointed out that village level workers were found to be most effective in reaching the villagers with appropriate information relating to agricultural innovations (Panda, 2002).

Pant et al. (2000) revealed that small, marginal and big farmers frequently used personal localite sources such as friends, neighbours, relatives, progressive farmers, local leaders and cosmopolite sources such as village extension workers for the adoption of improved cultivation practices. However, study carried out by Malik et al. (2000) found that input dealers have emerged as the most important source for agriculture information to the farmers followed by government extension agents. They argued that since the input dealers do wholesale trading of agricultural produce and provide credit to the farmers to purchase inputs from their shops, the farmers usually discusses their farming problems and in the process gather information pertaining to agriculture.

Srivastava and Vardhan (2000) observed that retailers, followed by farmers and relatives, sales representative, extension officers and workers were some of the various sources of information were utilised by farmers for the adoption pesticides.

Naidu et al. (2000) reported that a farmer's major sources of information for adoption of plant protection measures (IPM) were research stations, progressive farmers and input suppliers.

A study carried out by Singh et al. (2002) found that government officers and Agriculture University were the major sources of information for the big farmers and landlords, Where as the medium and small farmers prefer other

sources of information such as commission agents, friends and relatives. Further the study also revealed that sources of information used by the large farmers were much varied and reliable as compared to those of the medium and small farmers who largely depend upon the informal sources such as commission agents, friends, relatives, neighbours and government officers.

2.1.2 Factors responsible for the adoption of agricultural innovations

A. Age

Dhaliwal (1965) reported that age of the farmers was significantly associated with adoption of agricultural innovations. Similar, findings were reported by Jha and Shekhawat (1972) and Sexena et al. (1990).

Dudhani and Rao (1969) revealed that younger farmers (26-30 years) were more energetic and the rate of acceptance and adoption of innovations were faster than the older group of farmers. Sanoria (1970) found that older aged group (41 years and above), were the highest adopters of improved farm practices. Singh and Prasad (1974) also indicated that farmers between the age group of 30-45 years have adopted more of agricultural innovations. In a similar study Murthy and Hanumanthappa (1979) reported that age of the farmers were positively significant with the adoption of agricultural innovations. On the other hand studies conducted by Choukidar and George (1972); Pandey (1989); Kher (1992); Santra

and Barman (1997) found that age of the farmers were not playing any significant role in the adoption of agricultural innovations.

In another pertinent study, Swarkar and Kushwah (1997) observed that age of the women farmers were associated with the decision-making process in adoption of improved agricultural practices. Agrawal (1998) in his study found that adoption of agricultural innovations was higher among the middle-aged farmers as compared to the young and old aged group. However, studies carried out by Naidu et al. (2000); Kumar and Narayanaswamy (2000) and Panda (2002) found no significant role of age with the adoption of agricultural innovations.

B. Education

Bose (1961) study on the characteristics of farmers who adopted improved agricultural practices in 10 villages in West Bengal found that literacy has a positive effect on the percentage of farmers adopting new practices (Bezbaruah, 1994).

Dudhani and Rao (1969) study also found that farmers who had received formal education (primary, middle or high school level) had adopted more than those who had not receive any formal education (Bute et al., 1981). Similarly, a study carried out by Sanoria (1970) also highlight that adopters of improved farm practices had education upto primary standard.

Study conducted by Singh and Singh (1970) and Rajagopalan and Singh (1971) found that there existed significant association between educational status of the family and education of the farmers and the adoption of improved agricultural practices (Singh, 1970). Their findings were in conformity with the later study of Jha and Shekhawat, 1972; Singh and Prasad, 1974; Pandey and Prasad, 1978; Vijayaragavan and Subramaniam, 1981; Patel, 1983. However, in a related study Sharma and Nair (1974) reported that there was no significant difference in education level between adopters and non-adopters of innovations.

In another study, Pandey (1989) revealed that higher the level of education, greater was the adoption of agricultural innovations. Murthy and Hanumanthappa (1979) and Sexena et al. (1990) also revealed positive correlation between educational status of farmers and adoption of agricultural innovations (Santra and Barman, 1997; Agrawal, 1998). But, Kher (1992) study however revealed that education did not indicate any significant relationship with the adoption of agricultural innovations.

Kumar and Narayanaswamy (2000) reported that educational level of the farmers was associated with the adoption of sustainable agriculture practices (IPM, bio-fertilizers, organic farming etc.). They concluded that higher education exposes farmers to more information sources and channels. Ahmad and Shamim (2000) are also of the similar view that educated farmers are well informed about

agricultural innovations, as a result they become more mobile, more liberal and more receptive to agricultural innovations and are capable of working out precisely the benefits and loss before adopting innovations. Thus they concluded that education to a great extent influence the adoption of agricultural innovations. However, Narayanamoorthy (2000) reported no correlation with the farmer's education and the adoption of agricultural innovations.

Panda (2002) study revealed that farmers with low level of education have adopted less HVY paddy as compared to medium and high education farmers. However, the average intensity of cropping was found to be the highest for those with medium level of education followed by low level and the least by the high level of education households. Further the study also revealed that the rate of adoption of modern agricultural technology was found to vary significantly with the level of education of the farm household.

C. Socio-economic characteristics

Reddy and Singh (1965) revealed that there was significant association between various socio-economic factors (size of land holdings, occupation, social participation, income and tenure status etc.) with adoption of improved agricultural practices (Patel and Singh, 1970; Singh and Singh, 1970; Rajagopalan and Singh, 1971; Pandey, 1989; Kher, 1992). Dudhani and Rao (1969) revealed

that farmers having medium and large landholdings and along with medium and higher income had adopted more than those with lesser landholdings and lower income (Sanoria, 1970). On the contrary, Singh (1970) found that size of land holding is independent of adoption of improved agricultural practices (Murthy and Hanumanthappa, 1979)

Rajendra (1973) found that adoption level of improved farm practices by farmers is significantly associated with their socio-economic status (Bute et al., 1981). On the other hand, Solanki and Thoral (1975) are of the view that socio-economic status of the farmers had no relationship with the adoption behaviour.

In another study, Vijayaragavan and Subramaniam (1981) revealed that garden land farmers were more progressive and adopted many agricultural innovations to a greater extent than that of dry land farmers as they were found to have more income (Panda, 2002).

Singh and Ray (1985) found that medium farmers who had larger size of land holding used higher level of fertilizers. Similarly, Sexena et al. (1990) pointed out that factor such as the size of landholding was found to have positive and significant relationship with adoption of wheat (Bezbaruah; 1994). In another study, Kher (1992) revealed that farm size (land holding) did not show any significant relationship with the adoption (Naidu et al., 2000).

Swarkar and Kushwah (1997) observed that factors such as farmer's socio-economic status, getting initial and additional information, identification of the problems and urban contact were associated with the adoption of improved agricultural practices. Similarly, a study carried out by Santra and Barman (1997) revealed that the socio-economic factors such as size of family, size of holding, irrigation facilities and annual incomes of the farmers were highly associated with the adoption of innovations. However they found no significant correlation with the availability of irrigation facilities and the adoption of innovations.

Agrawal (1998) reported that village which had adopted innovations, were more progressive then the non-adopted villages as they had more acreage of irrigated land coupled with village youth club who collaborate with external agencies for the introduction of new innovations.

In his study, Sharma (1999) found that adoption of the agricultural innovations, however, depends on certain socio-economic factors and not only on the spatial factors. According to him, social conditions greatly influence the perception of the farmers as manifested in their decision-making process with relation to the adoption of agricultural innovations.

Ahmad and Shamim (2000) and Kumar and Narayanaswamy (2000) are of the view that there is positive correlation between the size of land holding, tenure status, irrigation facilities, access adequate and timely availability credit and

subsidies, inputs, yield, social status (caste, occupation, educational level, standard of living, family income, involvement in political, cultural and social activities) with the adoption of agricultural innovations.

In a similar study, Kshirsagar et al. (2002) also revealed that size of operational holding and family size was significantly correlated with the adoption of improved varieties of rice.

2.1.3 Factors responsible for non-adoption of agricultural innovations

Sanoria (1970) pointed out that some of the socio-economic factors responsible for the non-adoption of improved farm practices were farmer's age, illiteracy, small landholdings and low income.

Rajagopalan and Singh (1971) revealed that one of the major impediments towards adoption of agricultural innovations was the lack of effective communication on the part of the implementing agencies (Desai et al., 1997).

In another study, Sharma and Nair (1974) observed that the most important reason for non-adoption of high yielding varieties of paddy was lack of timely supply of inputs.

Bute et al. (1981) reported that the main constraints for non-adoption of agricultural innovations were due to lack of finance, lack of technical guidance on the part of implementing agencies and non-availability of quality seeds,etc.

Pandey (1989) also found that lack of information on various developmental activities, biased attitude of government officials, lack of finance, inadequate irrigation facilities and high cost of fertilizers, etc., were some of the impediments towards adoption of agricultural innovations.

Sexena et al. (1990) in their study reported that the reasons for non-adoption of rainfed wheat technology were lack of awareness of the latest technology, non-availability of credit and the seed at the right time and its cost.

Swarkar and Kushwah (1997) concluded that the major factors hindering the adoption of agriculture innovations were non-availability of technical knowledge, lack of skill and techniques, limited land, insufficient irrigation, scattered small plots and limited resources, etc.

In another related study, Sohi et al. (1998) reported that poor adoption of chemical weed control amongst the farmers were due to lack of knowledge, non-availability of weedicides, lack of equipment, high cost of weedicides, financial problems, small size of land holdings, lack of technical help and no previous experience of applying weedicides.

In another study, Singh and Sharma (1998) observed that the most important reason for non-adoption of improved paddy technology was lack of awareness and lack of complete knowledge of the technology, preference for the traditional varieties, lack of timely guidance from the officials and lack of finance.

Agrawal (1998) remarked that some of the constraints encountered in the adoption of agricultural innovations in the two villages in Orissa, were non-availability of inputs, lack of capital and credit facilities, poor quality of inputs, high risk of loss and less economic gain from the agricultural innovations.

In his study, Sarma (1999) argued that since adoption of innovation was a process of learning, lack of proper information flow from the dissemination centres to the farmers was a major barrier in the adoption of innovation.

Naidu et al. (2000) found that factors such as the size of land holdings, farmer's age and their educational status, etc., were some of the major constraints coming in the way of adopting the agricultural innovations. A study carried out by Sinha et al. (2000) also pointed out that lack of exposure to mass media, illiteracy and decrease in land holding size and financial problems were some of the constraints affecting the level of adoption of the agricultural innovations.

Prakash and Srivastava (2000) revealed that only half of the farmers selected for the study were found to have adopted agricultural innovative packages disseminated through the radio and television programmes to which the authors attribute mainly to the high price and non-availability of required inputs and ignorance of the appropriate sources and channels of information.

In another pertinent study, Chauhan et al. (2002) revealed that non-availability of desired variety of seeds and lack of funds (was) were found to be the most

important hindering factor in the non-adoption of improved seeds.

Kshirsagar et al. (2002) in their study, cited that tenure status of the land, distance of the field from the house and local environmental conditions where some of the reason for non-adoption of improved varieties of rice by the farmers.

2.2. Studies conducted abroad

Ryan and Gross (1943) were probably the first to carry out study on adoption of new ideas (innovation). Much later Wilkening (1953), Beal (1957), Rogers (1961) carried out extensive study and contributed immensely to the study of diffusion of innovations and their adoption.

2.2.1 Information sources and channels

A. Mass media

In Holland, Ban (1957) study on the characteristic of progressive farmers found that progressive farmers were those who had had received vocational training in agriculture. Fett (1971) in his study in Brazil concluded that in almost all the four *municipios* a substantially larger percentage of the mass media users were high adopters of improved farm practices irrespective of their educational status. Similarly, Longo (1990) in her study in Brazil, considered mass media, that includes radio, television, printed materials, through which information is transmitted to the farmers. She divided the farmers into three categories, viz. crop

farmers, animal breeders and farmers engaged in both the activities. Relating to the first and the third category of farmers, her findings revealed that mass media played a significant role in explaining adoption of crop innovations, while interpersonal communication network was found to be more effective in the farmer's adoption to innovative farm practices, particularly in the crop farmer's first contact with innovations. However, there was no significant difference found between the mass media and interpersonal communication on the animal breeder's on adoption of innovations, except that of printed media through which the first contact with innovations was indicated. Even in the third category, there was no effect on the farmers' adoption to innovations in animal husbandry. In all the above cases, the extension services were found ineffective in diffusing farm innovations.

In order to assess the adoption of integrated pest management practices, Thomas et al. (1990) conducted a study in six geographical regions of Texas. The study revealed that group meetings attended by the farmers had positively influenced the adoption of number of IPM practices. However they found that printed materials (extension bulletins, newspaper, magazine, handbook, IPM newsletter, chemical company publications) had produced only a negligible effect on the adoption. On the contrary a study carried out in Montana, provided evidence that use of farm magazines as a source of information has a direct

effect on the adoption of two types of sustainable agriculture practices (Saltiel et al., 1994).

Miah and Halim (1994) reported that information sources preferred by the farmers, in obtaining farming information for mass media sources were radio followed by posters, television, leaflet/printed materials and demonstration plot. On the otherhand, Eboh (1994) concluded that mass media had played minimal direct roles in women's sources of farm ideas and information (Dung et al., 2004).

Straquadine and Haybe (1994) study found that among the three groups of farmer's viz., contact farmers, fellow farmers and other farmers, only contact farmers had direct contact with the extension service for the adoption of improved maize (Colverson, 1995).

Keeping in view the importance of marketing information for farmers, Tackie et al. (1996) carried out a study to ascertain if farmers would adopt an innovation regarding grading and packaging fruits and vegetables. In this regard, they conducted a series of workshops for small and mid-size farmers from four counties from South Central Alabama Counties. These workshops were intended to teach farmers about improved ways of marketing their produce in order to increase their income and knowledge in contemporary ways of marketing. The results of their study indicated that about 22.0 percent of the farmers said the workshops were very good. Most farmers (94.4%) thought the general value of the

workshop was high (very good and excellent) and the information was very useful to them, 79.3 percent indicated that the grading and packaging information they received helps them select a uniform and better product, and hence get better produce to sale; 88.9 percent stated they got higher prices than usual due to using grading and packaging information. They concluded that most of the farmers had adopted and were using the information they received from the workshops in their marketing practices.

Chizari et al. (1997) concluded that rural women participation in extension education programme did not have any significant influence on the participation of in the rice production activities.

In an evaluation study, Chitere (1998) revealed that the main factors responsible for the adoption of IPM in an ICIPE/UNECA sponsored pilot project were contact with the project technicians and extension workers and visit to the trail fields. This study is in conformity with the findings of Evenson and Mwabu (1998) who also reported that farmer's contact with extension staff increased the farm productivity.

Two African studies carried out in Ethiopia (Beyene et al., 1998) and Tanzania (Mafuru et al., 1999) on the adoption of improved wheat and maize highlighted that farmer's main sources of information were radio, followed by printed media and seminars.

Mitchell et al. (2001) while evaluating the west side on-farm demonstration project, in California's Central San Joaquin Valley, revealed that most farmers agreed that the information provided in the newsletter helped them to understand better pest situations in their fields, learn new concepts, and make better decisions. Further they revealed that the participant found on-farm demonstration project successful in terms of exchanging and extending information between the farmers, consultants, extension researchers and representatives from other public agencies. Besides, a majority of participating farmers reported a general increase in their knowledge about the function, selection and management of cover crops and soil management during the project.

Llewellyn et al. (2002) study in Australia revealed that exposure to extension programme especially through printed media and group meetings have influential roles in determining integrated weed management (IWM) adoption. According to them, information exposure through extension contact increases the grain grower's perceptions of the economic value and usefulness of IWM practices resulting in increased adoption.

In order to assess the agricultural information preferences of the farmers, Maddox et al. (2003) carried out a study in North Carolina. On the basis of their study, the authors revealed that most used channels for agriculture information was the magazines, followed by organisational newsletters, bulletins and fact

sheets, on-farm visits and meetings. Further it was also revealed that farmers never used farm tours and radio for the purpose of agricultural information.

A study carried out in the south-eastern Kenyan rangelands (Munyasi et al., 2003) found that among the various sources used by farmers of two divisions, radio, TV, demonstration plots and field days were most effective with regard to the adoption of pasture weed management technologies. However, they found that seminars, pamphlets, brochures and newspapers had minimum effect in both the divisions.

In another related study, Mwangi et al. (2004) made an attempt to assess farmer's adoption of recommended maize technologies in Mbeya region of the southern highlands of Tanzania. The authors reported that female-headed households having radio had a significant influence on the adoption of improved maize. In case of male-headed households it was observed that radio-ownership had influenced the adoption of fertilizers. However, it was found that female-headed households farmers were benefited less from the extension services.

In order to assess the impacts of participatory extension programs on crop productivity, Mulugeta (2004) conducted a study in the northern Ethiopian highlands. His study revealed that training programs and extension visits produce significant impact on crop productivity and increase higher uses of modern inputs such as fertilizer. Further, it was revealed that non-extension visit by the

implementing agencies has a negative effect on the crop productivity and usage of fertilizers amongst the farmers.

Wekesa et al. (2004) conducted a study to identify technical and socio-economic factors affecting adoption of improved maize technologies in Coastal Lowlands of Kenya. The study revealed that institutional environment (extension contact, attending training courses) and listening to radio programmes have significant impact on the adoption of improved maize varieties and fertilizers. Further, their study also revealed that, extension contact did not play any role in farmer's adoption of fertilizers.

B. Interpersonal information sources and channels

Ryan and Gross (1943) classic study on the adoption of hybrid seed corn in Iowa revealed that hybrid seed salesmen were most important in awareness stage and the neighbours were most important in convincing the farmers to adopt the hybrid seeds

Durrani (1987) revealed that rural libraries and other information agencies in Kenya, had failed in their agricultural information services, as they remained mere prototypes of the agencies in the urban settings thus ignoring the specific problems and information needs of the rural people.

Longo (1990) in her study revealed that interpersonal communication network was found to be more effective in the farmer's adoption to innovative farm practices, particularly for farmer's cultivating only crops first contact with innovations. Further, it was found that amongst the animal breeders and farmers practicing both, the interpersonal communication network did not play any significant role in the adoption to innovative farm practices.

In another pertinent study, Thomas et al. (1990) found that private consultants had significant and positive influences on the adoption of integrated pest management practices among farmers in six geographical regions of Texas. Further, it was also revealed that two sources of information, namely extension agents and university researchers had positively affected the number of integrated pest management practices adopted practices by the farmers.

Kaniki (1991) reported that only few of the farmers had used the agricultural libraries for the purpose of agriculture. He cited that it was their ignorance of the existence of the libraries, reluctance to go to the library, time constraints and for some; it was their inability to read and write.

In another study, Eboh (1994) revealed that major source of information for agricultural innovations amongst the farmwomen were farmer's organisation such as cooperatives and informal periodic women's meetings, husbands and extension agent. However, the author concluded that extension agent had played minimal

direct roles in women's sources of farm ideas and information.

Saltiel et al. (1994) maintained that farmer's access to information sources such as extension agents plays a stronger role in the adoption of the management-intensive practices then it does for the low-input technologies indirectly though perceived profitability.

Miah and Halim (1994) in their study reported that information sources preferred by the farmers, in obtaining farming information, were friends, relatives, neighbours, input supply dealers, village leader/experienced farmer, school teacher, block supervisor, research workers and contact farmers.

King and Rollins (1995), while carrying out a study in USA to assess the information sources used for fertilizer, concluded that fertilizers' dealers were rated the number one source for knowledgeable and locally relevant information. The extension agent was the second most frequently reported source for awareness and education about the pre-sidedress nitrogen test (PSTN).

A study carried out by Colverson (1995) identifies NGOs, university, women's and church groups as the main source of information through which rural women get access to agricultural information.

Kaliba et al. (1998a) study in Central Tanzania found that for the adoption of maize production technologies the three most important information sources amongst the farmers were extension agents, other farmers and NGOs. They further

revealed that fertilizer use was not influenced by adoption of improved varieties alone rather they found that the significant variable influencing the adoption of fertilizer was extension services.

Beyene et al. (1998) study on farmer's seed sources and management of bread wheat in Wolmera Woreda, Ethiopia, revealed that agricultural extension agencies (Ministry of Agriculture Office and Holeta Research Centre) followed by NGOs and other farmers have been the main source for the adoption of improved maize production practices.

Kaliba et al. (1998b) study in Eastern Tanzania found that the most important sources of information for improved maize production technologies for farmers from both lowlands and intermediate zones were extension and research centres and other farmers. In a similar vein, Mafuru et al. (1999) study in Lake Zone, Tanzania, remarked that extension services were significantly and positively associated with the adoption of improved maize and fertilizers (Mwangi et al., 2004).

Neill and Lee (2001) made an attempt to assess the adoption and disadoption of Sustainable Agriculture in Northern Honduras. The study revealed that majority of the farmers had adopted the maize-*mucuna* system after they observed their neighbours. However, they noticed that extension visit to the farmer were not significant with the adoption of the maize-*mucuna* system. In

another related study in Honduras, Arellanes and Lee (2003) observed that NGOs and other development organisation had to a great extent promoted the adoption of minimum tillage. The finding of this study is in line with that of Zweekhorst et al. (2004).

Munyasi et al. (2003) had undertaken a study in south-eastern Kenya rangelands to identify the information sources and dispersal channels used by the farmers for pasture weed management technologies. For the purpose of the study, the authors had taken two divisions. It was found that the most effective sources and channels of information used by farmers of two divisions were extension agents and local organised groups.

In another attempt, Maddox et al. (2003) had carried out a study to assess the agricultural information sources and channels preference of North Carolina farmers. The findings of the study brought to light that the most used source for agriculture information was the North Carolina Department of Agriculture, followed by North Carolina Cooperative Extension Agents and other farmers. Further, it was also revealed that family members, friends and neighbours were some of the most used channels for agriculture information.

Dung et al. (2004) case study on diffusion of new technologies in a village in Vietnam, revealed that sources such as friends, community lives, university and institution specialists, extension clubs were associated with the adoption of new

technologies (new varieties of rice, IPM, organic manure etc.), expect in the case of agricultural office and technician in the field of agriculture.

2.2.2 Factors responsible for adoption of agricultural innovations

A. Age

Marsh and Coleman (1955) study of the relation of farmers' characteristics with the adoption of recommended farm practices found that age was not significantly related with the adoption of improved practices. In a similar study in Holland, Ban (1957) found that progressive farmers who had adopted improved agricultural practices were young in age (Thomas et al., 1990). However, study carried out by Karim and Mehboob (1974) found that age of the farmers had no significant relationship with the adoption of innovations (Kashem and Hossain, 1992).

Miah and Halim (1994) revealed that age had significant influence upon the identification of information needed by farmers in operating various farming operations. Similarly, Saltiel et al. (1994) study in Montana noted that age of the farmers had exerted indirect influence on the adoption of sustainable agriculture practices, primarily because of their association with the information sources.

On the other hand Chizari et al. (1997) found no correlation with the rural women's age and their participation in rice production activities, through the extension programme. A study carried out by Carlson and Dillman (1988) on the

influence of farmer's mechanical skill on the development and adoption of a new agricultural practice in two County's in Washington and Idaho revealed that age of the farmers was not significant with the use of no-till machine. About the same time another study carried out in western Kenya also reported that age of the farmers did not influence the adoption of IPM technologies (Chitere, 1998).

In another pertinent study in Honduras, Neill and Lee (2001) reported that farmer's age were not found to be significant indicators with the adoption of maize-*mucuna* system. On the contrary, study carried out in the same country (Arellanes and Lee, 2003) reported that age of the farmers was significant and negatively associated with the adoption of sustainable agricultural technologies.

Mulugeta (2004) observed that age of the farmers, do not play much role in the participation in extension trainings and extension visit; however with regard to crop productivity the age of the household was found to be highly significant.

In another significant study Wekesa et al. (2004) reported that the two districts under study showed contrasting differences in age, where in Kilifi it was the younger farmers and in Kwale it was the older farmers who had adopted improved maize varieties. The study further revealed that age of the farmers was negatively significant with the adoption of fertilizers and in both the districts it was the younger farmers, who had used more fertilizers.

B. Education

Fett (1971) made an attempt to assess whether the mass media could enhance in the higher adoption of farm practices in a place where there is low education and widespread illiteracy. In this context, the author carried out personal interviews in four rural *municipios* in Rio Grande do Sul, in southernmost state of Brazil. The study found that in almost all the four *municipios*, farmers with low education who can read printed materials were the highest adopter of improved agricultural practices.

In another study in six geographical regions of Texas, Thomas et al. (1990) found that farmers who had more education, adopted more numbers of integrated pest management practices than other farmers. On the other hand, Kashem and Hossain (1992) argued that that educational status of the farmers did not influence the adoption of the recommended sugarcane practices by the sugarcane growers.

A study carried out by Miah and Halim (1994) observed that education had significant influence upon the identification of information needed by farmers in operating various farming operations (Saltiel et al., 1994). Similarly, in his study, Eboh (1994) reported that the level of education had significant relationship with women's access to farm information.

In one such study carried out in Gilan province, Iran, Chizari et al. (1997) revealed that rural women participation in rice production activities is directly

related to the level of education. Evenson and Mwabu (1998) also reported that farm productivity was highly correlated with the education of the farmers. While, studies carried out by Straquadine and Haybe (1994), Chitere (1998) and Beyene et al. (1998) reported no significant relation with the farmer's education and the adoption of innovations.

Mafuru et al. (1999) reiterated that educational level showed a positive impact on farmer's choice to allocate land to improved maize varieties. According to them a unit increase in the level of education increased the probability of adoption among adopters by 1.8 percent. However they reported that educational level of the farmers were not significant with the adoption of fertilizers.

Llewellyn et al. (2002) argued that higher level of education could result in reduced costs of information gathering and ability to process otherwise intractably complex agricultural information. Given the expected high information requirements for integrated weed management adoption, they revealed that education level of the grain growers is a significant predictor of adoption.

In another study in Honduras, Arellanes and Lee (2003) reported that formal education of the farmers was not associated with the adoption of sustainable agricultural technologies. Similar tendency is also highlighted in a study carried in northern Ethiopian highlands where education of the farmer did not play much role in attending extension training or visit by the extension

workers and in raising the crop productivity (Mulugeta, 2004).

Ekoja (2004) revealed that there was no significant difference in adoption of agricultural innovations between farmers with high and higher education and also between the illiterates and primary school level farmers. However the author found significant differences between the former and latter groups with regard to adoption to innovations.

In another related study on farmer's adoption of recommended maize technologies in Mbeya region of the southern highlands of Tanzania, Mwangi et al. (2004) revealed that adoption of improved maize seed for male-headed households were positively influenced by the level of education.

Wekesa et al. (2004) conducted a study to identify technical and socio-economic factors affecting adoption of improved maize technologies in two districts of Coastal Lowlands of Kenya. The findings of the study highlighted that education of the farmers were not significant with the adoption of improved maize varieties whereas it was found to be positively significant with the adoption of fertilizers in both the two districts.

C. Socio-economic characteristics

In Holland, Ban (1957) study on the characteristic of progressive farmers revealed that progressive farmers were those who had large farms. Various other studies

have also reported that farm size were significantly associated with adoption of improved farm practices (Rogers, 1961 and Wilkening, 1962).

Hansch (1980) found that there exists a close relationship between the size of land holdings and the adoption of agricultural innovations. According to the author the larger the size of land holdings the faster will be the adoption of improved method of cultivation.

Feder et al. (1985), while conducting a comprehensive literature survey on adoption of agricultural innovations in developing countries, revealed that factors which are influential in determining the adoption of an agricultural innovation, includes farm size, risk exposure and capacity to bear risks, human capital, labour availability, credit constraints, tenure, and access to commodity markets.

Kaniki (1991) had conducted a study to ascertain the Information Seeking Situations (ISS) and utilisation of farm information by the Zambian farmers as well as to identify the various information providers. He revealed that some types of ISSs affect all categories of farmers while other types affect one or two categories of farmers, which he attributed to several factors such as farming activities, resources availability, demographic data and spatial variations, etc. It was also found that the experience of certain ISSs also depends upon the geographical location of the farmers.

Kashem and Hossain (1992) were of the view that the land holdings and

incomes were not significant with the adoption of the recommended sugarcane practices by the sugarcane growers.

A study carried out by Miah and Halim (1994) revealed that annual income had significant influence upon the identification of information needed by farmers in operating various farming operations.

Straquadine and Haybe (1994) found that availability of formal credit to the three groups of farmer's viz.; contact, fellow and other farmers was responsible for the adoption of improved maize. However, they noted that size of family, land holdings and farm size were not associated with the adoption.

Chizari et al. (1997) study in the Gilan province, Iran, revealed that rural women participation in rice production activities is directly related to the size of rice field, annual household income and their level of education.

In another study on the effects of agricultural extension of farms yields, Evenson and Mwabu (1998) found that crop yield was positively and significantly correlated with labour, crop area and the expenditure incurred by the farmers on fertilizers and sprayers.

Beyene et al. (1998) carried out a study in Ethiopia to ascertain, farmer's seed sources and management of bread wheat. The findings of their study suggested that farm size were not significant with the adoption of maize production technologies. Further, the authors found that farm size were

significantly and positively associated with the adoption of fertilizers for maize production technologies.

In a similar study in Tanzania, Mafuru et al. (1999) found that farm size positively influence the chances that land would be allocated to improved maize varieties, where as they found no significant association between farm size and the adoption of fertilizers.

In a study on the adoption of sustainable agricultural technologies in the hillsides of Honduras, Arellanes and Lee (2003) reported that plot ownership and availability of irrigation facilities were found to be positively associated with the adoption of minimum tillage amongst the farmers. However, they noted that income level and experience of the farmers was not significant with the adoption of sustainable agricultural technologies. A similar study on the adoption and disadoption of sustainable agriculture in Northern Honduras, Neill and Lee (2001) also found that farm size is positively associated with the adoption of maize-*mucuna* system.

Mulugeta (2004) observed that exogenous income, total land holdings and credit do not show any influence on the participation in extension training. Further, it was revealed that the total land holdings and family sizes were positively significant with the extension visit. However, it was found that the exogenous income of the farmers was insignificant with the extension visit. The author also

revealed that the household characteristics (family size and sex) were found to be insignificant in relation to crop productivity. Dung et al. (2004) study however reported no significant relationship with family size, farm labour and income with the adoption of new technologies.

In another African study, Wekesa et al. (2004) reported that permanent off-farm employment, district of residence, availability of credit were some of the factors associated with the adoption of improved maize varieties. They further revealed that, farm size and off-farm income were positively and on-farm income were negatively significant with the adoption of fertilizers.

Mwangi et al. (2004) undertook a study to assess the gender disparity in the adoption of improved maize production technologies in Mbeya region of the southern highlands of Tanzania. The study found that for both male-headed and female-headed households' area under maize (acres) did not influence the adoption of improved maize seed and fertilizers.

2.2.3 Factors responsible for non-adoption of agricultural innovations

Kaniki (1991) revealed that the majority of the farmers do not use the agricultural libraries as they were found to be illiterate, ignorance of the existence of the libraries, reluctance to go to the library and time constraints.

In another study Eboh (1994) cited high illiteracy rates among the women farmers were the main reason for non-adoption of new technology (Dung et al., 2004).

In course of their study, Miah and Halim (1994) identified the following problems faced by farmers in obtaining information from various sources such as inadequate farm and home visit by the extension workers and block supervisors, inappropriate selection of contact farmers, poor and insufficient number of demonstration activities, inadequate training opportunities for the farmers, insufficient supervision by the extension workers in the field, lack of farmers' meeting, farmers' rally, field days and agricultural exhibitions and lack of awareness among the farmers regarding the mass media (especially radio) coverage on agricultural programmes.

King and Rollins (1995) survey study on the adoption of pre-sidedress nitrogen test (PSTN) found that some farmers did not adopt pre-sidedress nitrogen test (PSTN) as they were not aware of it coupled with lack of knowledge and skills to operate such test.

Colverson (1995) cited some of the constraint faced by rural women's access to agricultural information were due to government polices, cultural conflict, bias attitudes of extension workers as they focus more on the male farmers and lack of access to other resources.

Ozowa (1997) remarked that despite having agricultural universities the agricultural productivity and quality of life of the rural farmers in Nigeria have not improved. The author cited lack of proper agricultural information flow were the reason in the deprivation of the rural farmers from accessing the appropriate farming information.

Chizari et al. (1997) study in Iran found that rural women participation in extension programmes with regard to rice production activities was low. The authors cited that it was due to lesser involvement of women agriculture extension agents to carry out extension activities and the religious beliefs that forbids women talking to stranger (men).

Bisnanda et al. (1998) remarked that farmers did not adoption maize production technologies in Southern Highlands of Tanzania due to high costs and non-availability of improved maize seeds. Similarly, Kaliba et al. (1998b) argued that some of the basic problems, which had limited the adoption of maize production technologies in Eastern Tanzania, had been the high prices fertilizers, marketing problems, lack of knowledge on technologies and bureaucratic procedures in obtaining credit.

In a related study, Mafuru et al. (1999) also cited that the use of fertilizers for maize production technologies were constrained by high price and farmers' lack of knowledge about the technology and lack of access to credit facilities.

Apantaku et al. (2003) concluded that majority of the new technologies disseminated were not based on farmers' identified problems and felt needs, due to poor motivation on the part of researchers and extension officers resulting in inefficient linkages between researchers, extension agents and farmers' lack of formal education.

Munyasi et al. (2003) study in south-eastern Kenyan rangelands identified that lack of demonstration sites and field days were some of the major constraints in the adoption of pasture weed management technologies coupled with jargon used by radio broadcaster.

Mulugeta (2004) revealed that credit facilities, education of farmers and poor extension research link as the main problem in adoption of innovations.

In their study Mwangi et al. (2004) cited that some of the factors hampering the adoption of improved farm technologies were cost of technologies, lack or timely availability of technologies, low level of education, income and less access to extension services and information on the improved technology.

Similarly, Wekesa et al. (2004) study in the coastal lowlands of Kenya also revealed that poor availability, high cost, unfavourable characteristics and lack of credit facilities for improved varieties coupled with lack of knowledge and farmer's inexperience with the technology were some of the main barriers in the adoption improved varieties.

Conclusion

Agriculture is an area where use of pertinent information is a must. In other words, success of agriculture depends on how far the information is accessible and is made use of by the farmers. Information can help achieve effective acquisition of various resources that farmers need to enhance the agricultural productivity. In this context, it is considered worthwhile to sum up several conclusions that emerged from the above review of related literature which reflect the state of affairs in so far as the agricultural information communication to the farmers particularly in the rural settings is concerned as under:

- Educating and imparting trainings at the village level to farmers for adoption of agricultural innovations have been found to be very useful.
- Updating, repackaging and proper communication of information to farmers by agricultural research centres, government departments, libraries, etc., have been found very effective for adoption of agricultural innovations.
- It was also found that proper consideration on the local conditions needs to be given while planning extension services for farmers.
- Assessment of farmers' socio-economic conditions, level of education, mass media exposure and various constraints involved there in has been found to be an important factor for effective information communication.

- Proper information communication pertaining to market and credit facilities was found to be a prime motivating factor for farmers to go for agricultural innovations.

From the above literature review, it has been found that a large number of studies have focused attention on different information sources and channels and the barriers involved therein. The sources and channels reported in various studies include mass media, interpersonal, cosmopolite and localite sources and channels of information. As for example, mass media sources such as radio, TV, training, and demonstrations have some considerable mention in a number of studies (Singh and Jha, 1965; Fett, 1971; Pandey and Prasad, 1978; Sangha and Gupta, 1985; Longo, 1990; Sangha and Kalra, 1993; Evenson and Mwabu, 1998; Prakash and Srivastava, 2000; Panda, 2002; Munyasi et al., 2003; Mulugeta, 2004) which highlight its role and effectiveness as source of agricultural information for the rural masses. However, other mass media sources such as printed publications, newspapers, pamphlets and campaigning, etc., have limited mention in few studies (Khara and Singh, 1970; Rajagopalan and Singh, 1971; Thomas et al., 1990; Munyasi et al., 2003).

Similarly, a number of studies (Bose, 1965; Rajagopalan and Singh, 1971; Kalamegam and Menon, 1978; Bute et al., 1981; Thomas et al. 1990; King and

Rollins, 1995; Choudhary et al., 1998; Neill and Lee, 2001; Singh et al., 2002; Maddox et al., 2003; Dung et al., 2004) have extensively inquired into the role played by interpersonal channels such as extension workers, scientists, fellow farmers, neighbours and friends, etc., with regard to adoption of innovations. On the other hand, very few studies (Bose, 1961; Gogoi, 1990, etc.) on adoption of innovations have been devoted to the structural aspects of interpersonal communication networks at the village level.

Since no study has done any in-depth comparative assessment such as the extent of use, credibility, dependence on the sources and channels or their effectiveness in the adoption of innovation or in the communication of agricultural information, it is not possible to conclude which information channels and sources is most effective for the rural farmers as different studies have come up with different arguments. In this regard, it could be concluded that no communication sources and channels could be effective for all situations. As for instance, though influence of mass media is found dominant in developed countries, it has a very less influence in developing and under developed countries (Pandey, 1989; Kaniki, 1991; Miah and Halim, 1994; Eboh, 1994; Misra, 1999; Dung et al., 2004).

A number of studies (Dudhani and Rao, 1969; Murthy and Hanumanthappa, 1979; Sexena et al., 1990; Miah and Halim, 1994; Chizari et al., 1997; Mafuru et al., 1999; Panda, 2002; Wekesa et al., 2004) have also probed

into the association of socio-economic status of the farmers such as age, education, income, occupation, landholdings, literacy, castes, materials possessions, family size, gender, etc., with regard to adoption of agricultural innovations. The findings of these studies suggested that farmer's age, education, literacy, landholdings and income were some of the important factors, which have significant association with the adoption of innovations. Further, many studies (Sanoria, 1970; Sharma and Nair, 1974; Bute et al., 1981; Sexena et al., 1990; Kaniki, 1991; Miah and Halim, 1994; Ozoma, 1997; Naidu et al., 2000; Apantaku et al., 2003; Kaliba et al., 2004) have also identified various impediments coming on the way of adoption of agricultural innovations. However, the reviewed literature could not yield much research works related to the socio-economic factors such as occupation of the farmers (Pandey, 1989; Ahmad and Shamim, 2000; Kumar and Narayanaswamy, 2000) and the effects of geographical locations (Longo, 1990; Kaniki, 1991; Llewellyn, 2002; Mwangi, 2004) on the adoption of agricultural innovations.

Perhaps, this clearly is an indication that very few research attempts has been made specifically to assess the communication process and accessibility of generated information pertaining to agricultural innovations across geographical variations by rural farmers.

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CHAPTER – III

RESEARCH METHODOLOGY

3.0 Introduction

This chapter deals with the methods and procedures, which guided the present study. It includes sampling plan, selection of variables and their operational definitions, construction of research schedules, measuring scales, hypotheses, methods used for the collection and analysis of data and so on.

3.1 Scope of the study

The present study is focused on the flow of agricultural information from the dissemination centres to the farmers. Although there are many aspects, which can be studied in relation to communication of agricultural information, this study was confined to the information sources and channels used for the adoption of agricultural innovations, socio economic factors of the farmers and various impediments towards successful adoption of agricultural innovations.

3.2 Limitation of the study

The present study limited itself to eight villages of Dimapur district of Nagaland, i.e., four villages near to the Block Headquarters and the remaining far from the Block Headquarters. However, considerable care have been taken to make the variables as objective as possible.

3.3 Statement of the problem

The necessity for information communication on agricultural innovations needs no

emphasis. Unless the farmers have access to and acquired the latest knowledge of agricultural technologies, any attempt to improve food production is a remote possibility. In the recent past, much emphasis has been given towards the communicating and adoption of agricultural innovations---the process involved therein and how best this knowledge could be utilised in bringing about planned change in a social system. In this context, it is to be noted that communication of agricultural information from the generation point to the end-users cannot be viewed in isolation, as it constitutes an integral part of the system. In fact, the agricultural information flow through various communication sources and channels and its accessibility to the users play a very crucial role in adoption of agricultural innovations. The accuracy, the speed and the effectiveness, with which information on agricultural innovations is communicated to the end-users, to a great extent, determines the level of adoption of innovative practices. It is, therefore, imperative to give a deeper consideration on how effective agricultural information flow and access could be made possible to the rural farmers.

Nagaland is traditionally an agricultural state, where about 85% (nagaland.nic) of the total population is still engaged in agricultural activity. To keep pace with the rest of the country in food production and also to increase the level of agricultural productivity, the state government had introduced improved technology such as improved seeds (rice, maize and wheat etc.), pesticides, farm

implements, etc., during the 1960s (Directorate of Agriculture, 1988). Though these programmes had paid dividends to some extent, the level of food production is still low, as a result of which, the state have to import food from out side. This can be attributed to the alarming rate of growth of the population coupled with limited arable land, and the unwillingness of the people to do away with the traditional agricultural practices.

There are several generation and dissemination centres for agriculture in the state, such as ICAR, State Agricultural Research Station, School of Agricultural Science, Nagaland University and State Agriculture Department. However, in Nagaland, there has been no proper mechanism developed through which effective agricultural information communication could be ensured for the benefit of the farmers, particularly in the rural areas where the majority of the populace are still engaged in the same old traditional modes of agricultural practices. Thus, the low level in adoption of agricultural innovations and poor agricultural productivity in the state can be attributed to a very great extent to the poor agricultural information communication system. Against this backdrop, the present study was carried out to assess the various dimensions of agricultural information communication and its impact on adoption of agricultural innovations, with special reference to Dimapur District of Nagaland.

3.4 Objectives of the study

The present study has been carried out with the following objectives:

1. To study how the generated information on agricultural innovations is communicated to the farmers.
2. To assess the dependence of farmers on various information sources and channels with regard to adoption of agricultural innovations.
3. To study the various impediments towards adoption of agricultural innovative practices.
4. To propose necessary recommendations for better and meaningful communication of agricultural information at the village level.

3.5 Hypotheses of the study

A number of hypotheses were formulated to examine and to test the nature of relationships among the variables in the study:

H_1 Farmers depend more on interpersonal sources and channels than mass media with regard to agricultural innovations.

H_2 Adoption of agricultural innovations varies across age, educational level, occupation, income level and landholdings.

H_3 Adoption of agricultural innovations varies across geographical locations.

3.6 Operational definitions

The definitions of the terms and concepts used in the present study are given as below:

Agricultural Information Communication:

The process whereby specific information pertaining to agricultural methods, tools, practices, technologies and innovations are communicated to the targeted users through various channels and media.

Innovation:

Any practice that is new or different from the existing one is considered as innovation.

Adoption of Innovation:

It is a process whereby an improved practice is accepted over a period of time.

Agricultural Innovative Practices:

It refers to the adoption or application of modern techniques, tools and scientific knowledge to agricultural activities.

Interpersonal Communication:

It refers to two-way interactive information communication between two or more individuals.

Mass Media:

It is a means of information communication, which enables a media to reach a large audience. Generally, it is non-interactive.

Sources and Channels:

These refer to both the point of origin and link through which the information flow.

Farmers:

All those who are engaged in agriculture as a primary or secondary occupation are considered as farmers for the present study.

3.7 Research Sites

For the present study the research sites was selected based on the following criteria:

3.7.1 Selection of District

Dimapur is one of the eight districts of the state of Nagaland and is the most fertile and the only plain area in the state. The district has a total population of 308382 (Provisional Population Census, 2001). The agro-climatic condition of the area is also ideal to carry out multi-culture cropping along with cash crops like tea, coffee, sugarcane, etc. Moreover, migration of people from other districts of the

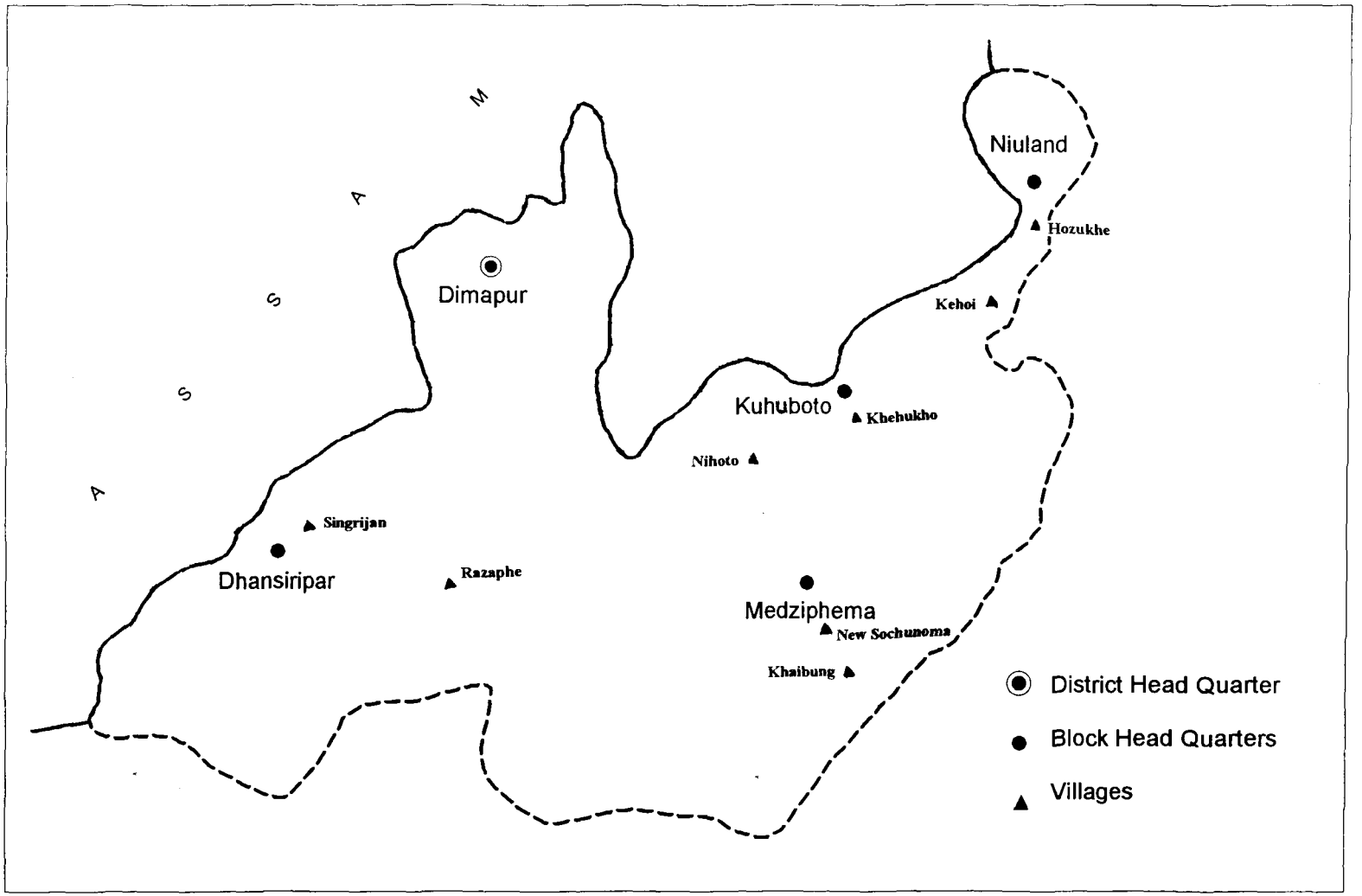
state has contributed significantly to the agricultural development in the district. Besides, the farmers have better access to agricultural information through a number of generation and dissemination centres such as ICAR, State Horticulture Research Centre, School of Agricultural Science, Nagaland University and State Integrated Extension Training Centre. Further, familiarity with the local conditions, knowledge of the culture and the language of the people, their agricultural practices and accessibility to research sites were considered essential in the selection of the research area.

3.7.2 Selection of Blocks

The present study has covered all the four administrative blocks of Dimapur district. The blocks are (a) Medziphema (b) Nuiland (c) Kuhuboto and (d) Dhansiripar.

3.7.3 Selection of the Villages

(i) Distance: Two villages each from every block were purposively selected- one village near the Block Headquarters located within 5 kilometres distance and another located at a distance of 8 kilometres and not more than 15 kilometres away from the Block Headquarters. In this way all-together eight villages, viz., New Sochunoma, Khaibung, Hozukhe, Kehoi, Khehukho, Nihoto, Singrijan and Razaphe were selected for the study(Map-3).



Map 3: Location Map of Research Sites

(ii) Number of households: Only villages having more than 70 households engaged in the agricultural activities were considered for the present study. Following this the procedure adopted for drawing a representative sample of households were on the basis of 40 percent for those villages having between 70 to 100 households and 30 percent for villages having more than 100 households.

3.8 Selection of the respondents

The head of the household or any responsible members of the family, who can provide required information were selected as the respondents.

3.9 Innovations considered for the study

Five prevailing innovative practices namely, improved seeds; chemical and organic fertilizers, plant protection measures, agricultural implements and crops management were considered for the present study. Table 3.1 below shows various innovative practices considered for the study.

Table 3.1: Innovative practices considered for the study

Sl. No.	Agricultural Innovations	Innovative practices	Examples
1	Innovation-1	Improved seeds	Paddy, wheat, maize, pulses, oilseeds, etc.
2	Innovation-2	Fertilizers	Chemical and bio-fertilizers, etc.
3	Innovation-3	Plant protection measures	Pesticides, insecticides, IPM, etc.
4	Innovation-4	Agricultural implements	Power tiller, sprayer, tools and kits, pump sets, etc.
5	Innovation-5	Crops management	Planting, harvesting, etc.

3.10 Information sources and channels considered for the study

For the present study the various information sources and channels were categorised into two groups namely, **Mass Media** and **Interpersonal.**

Mass media group consists of twelve information sources and channels while interpersonal group consists of twenty-four information sources and channels.

Table 3.2 and Table 3.3 show various information sources and channels considered for the study. The grouping and selection of various information sources and channels is made based on the findings of the Pilot Study as well as the prevailing local situations.

Table 3.2: Mass Media considered for the study

Sl. No.	Mass Media
1	Television
2	Radio
3	Newspapers
4	Printed Publications
5	Trainings
6	Demonstrations
7	Exhibitions
8	Field Visits or Farmer's Day
9	Posters
10	Wall Writings/Banners
11	Public Announcements
12	Meetings

Table 3.3: Interpersonal sources and channels considered for the study

Sl. No.	Interpersonal
1	Family Members
2	Relatives
3	Neighbours
4	Fellow Farmers
5	Friends
6	Village Council Members
7	Agriculture Extension Workers
8	Scientists (Research Centre, Institutions, etc.)
9	Input Dealers
10	Other Department Personnel
11	Health Workers
12	Village Development Board (VDB) Members
13	Self Help Group (SHG)
14	Land Tenants
15	Land Owners
16	Horticultural Personnel
17	Co-operative Personnel
18	Teachers (Academic)
19	Students
20	Wholesalers
21	Middlemen
22	Transport Owners
23	Customers
24	Bank Personnel

3.11 Socio-economic characteristics of the farmers considered for the study

To assess the adoption of agricultural innovation, five socio-economic characteristics of the farmers were considered for the present study. Further, all the five characteristics were again sub-categorised into three groups as indicated in Table 3.4. This categorisation is based upon the existing local environment.

Table 3.4: Socio-economic characteristics of the farmers considered for the study

Sl. No.	Socio-economic characteristics of the farmers
1	**Age**
	Young (upto 21 years of age)
	Middle (between 22-49 years of age)
	Old (50 years of age and above)
2	**Educational level**
	Illiterate
	Secondary (upto class X)
	Higher secondary (class XI and above)
3	**Primary occupation**
	Agriculture
	Government service
	Others (business, horticulture, animal husbandry etc.)
4	**Income (per annum)**
	Low (upto Rs. 20,000)
	Medium (Rs. 20,000 – 50,000)
	High (Rs. 50,000 and above)
5	**Landholdings**
	Small (upto 3 acres)
	Medium (3- 7 acres)
	Large (7 acres and above)

3.12 Variables considered for the study

For the purpose of analysis the variables for the present study were group into two main categories:

Dependent variables: adoption of agricultural innovations, which includes improved seeds, fertilizers, plant protection measures, agricultural implements and crops management.

Independent variables: (a) Socio-economic characteristics of the farmers, such as age, educational level, occupations, income and landholdings. (b) Information sources and channels used for the adoption of agricultural innovations, (c) Distance of the villages from the Block Headquarters.

3.13 The Population

The population consists of farmers from eight villages under study. However, farmers who were not a permanent resident of the respective village were excluded in this study. Table 3.5 shows village-wise distribution of population and households in four blocks.

Table 3.5: Village-wise distribution of population and households in four Blocks

Medziphema Block	Total population *	Number of households*
New Sochunoma Village	700	122
Khaibung Village	460	76
Nuiland Block		
Hozukhe Village	540	82
Kehoi Village	570	73
Kuhuboto Block		
Khehukho Village	525	115
Nihoto Village	924	131
Dhansiripar Block		
Singrijan Village	1900	197
Razaphe Village	750	93
Total	**6369**	**889**

*Source- Village Council

3.14 Sampling technique

For the present study eight villages from the four blocks were purposively selected. Further, the procedure adopted for drawing a representative sample of respondents were on the basis of 40 percent for those villages having between 70 to 100 households and 30 percent for villages having more than 100 households. This was done in order to give equal weightage in the sample selection, as there was disparity in the population of the selected villages.

3.15 Sample

A sample of 304 households has been drawn through random sampling method on the basis of village populations from eight villages under study. The distribution of

selected sample on the basis of village-wise households is presented in the Table 3.6 below.

Table 3.6: Village-wise distribution of households and sample selected in four Blocks

Medziphema Block	Number of households*	Sample selected
New Sochunoma Village	122	37
Khaibung Village	76	31
Nuiland Block		
Hozukhe Village	82	33
Kehoi Village	73	30
Kuhuboto Block		
Khehukho Village	115	35
Nihoto Village	131	40
Dhansiripar Block		
Singrijan Village	197	60
Razaphe Village	93	38
Total	**889**	**304**

***Source**- Village Council

3.16 Data Collection

To assess the feasibility and the relevance of the study, a pilot study was carried out using interview schedule. This was further supplemented by discussions and personal observations. The final interview schedule was thus constructed after necessary modification on the basis of information obtained from the pilot study. The data for the study was collected personally in order to cover all aspects of the study.

For the collection of data two separate interview schedules were prepared on different aspects of the study. The first interview schedule is related to profile of the studied villages and the second interview schedule for collecting data on households.

After finalising the interview schedules the data was collected in two phases; the village level information was collected from village headman, council chairman and its members. In the second phase the household's data were collected through personal interview method (with the help of an interpreter in some cases). Further, this was supplemented by personal observations and discussions with the farmers.

The interview schedule prepared for the village profile (Annexure-2) consisted of 17 items pertaining to the literacy percentage, distance from different centres, total population, number of households and their occupational nature and availability of infrastructure, etc. In the case of households (Annexure-3), the interview schedule consisted of 30 items on different aspects of the study, which includes adoption of agricultural innovations, information sources, channels and barriers, socio-economic characteristics (age, education, income, occupation and landholding), marketing and credit facilities etc. In order to capture the responses of the respondents a three point Likert-type scale were employed which are – *not at all* [1], *sometime* [2] and *always* [3].

3.17 Method of Analysis

To analyse the collected data, various statistical techniques were applied using SPSS-PC *(Ver.10.0)*. The mechanics of the statistical techniques used in this study are described below:

3.17.1 Multiple Linear Regression Analysis

Multiple regression analysis is used to find out the effect of more than one, independent variables upon the dependent variable (Asthana, 1988). According to Gupta (2002) it is a technique where two or more independent variables are used to estimate the values of a dependent variable.

In this study multiple linear regression analysis has been used to examine the utilisation of various information sources and channels for the adoption of agricultural innovations. The level of significance has been taken at 0.01 and at 0.05 percent respectively. The above statistical technique has been widely used in various studies pertaining to adoption of agricultural innovation in countries such as USA (Nowark, 1987; Carlson and Dillman, 1988; Thomas et al., 1990; Saltiel et al., 1994), in Brazil (Longo, 1990), Chitere (1998) in Kenya and Bezbaruah (1994) and Panda (2002) in India.

3.17.2 Analysis of variance (ANOVA)

Analysis of variance (ANOVA) is used to test whether the mean of more than two quantitative populations are equal (Gupta, 2002).

In this study, ANOVA has been used to analyse to find out any existing variation between farmer's socio-economic characteristics and the adoption of agricultural innovations. The level of significance has been taken at 0.01 percent. In a related study on adoption of innovations in Brazil, Longo (1990) has also applied ANOVA.

3.17.3 Correlation Analysis

Correlation analysis is a statistical technique used in determining the degree of relationship between two or more variables (Gupta, 2002).

Coefficient of correlation has been used to find out the relationship between socio-economic characteristics of the farmers and the adoption of agricultural innovations. For the correlation test the level of significance has been put to 0.01 percent and at 0.05 percent respectively. Various researchers such as, Murthy and Hanumanthappa, 1979; Nowark, 1987; Pandey, 1989; Saxena et al., 1990; Kashem and Hossain, 1992 have also applied correlation analysis in order to determine the relationship between the socio-economic factors and the adoption of agricultural innovations.

3.17.4 *z-test*

z-test is used to test two samples (independent) for mean analysis, in order to bring out the significances of the difference between the means.

In relation with the adoption of agricultural innovations, z- test has been used to find out the impact of distance differences between two villages from the Block Headquarters. For the z-test the level of significance has been taken at 0.01 percent and 0.05 percent. In a significant study, Gogoi (1990) applied z-test to assess the communication network of agricultural information in a progressive village of developed district and non-progressive village of under developed district in Punjab. The study of Arellanes and Lee (2003) in the hillsides of Honduras has also used z-test to capture the effect of distance with regard to extension workers' visit to the head of households and adoption of sustainable agriculture technologies.

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CHAPTER-IV

DATA ANALYSIS AND INTERPRETATION

4.0 Introduction

In this chapter the organised data were analysed keeping in view the objectives, the hypotheses and the overall theoretical framework guiding the present study. The interpretation and discussions thereon have been presented as follows:

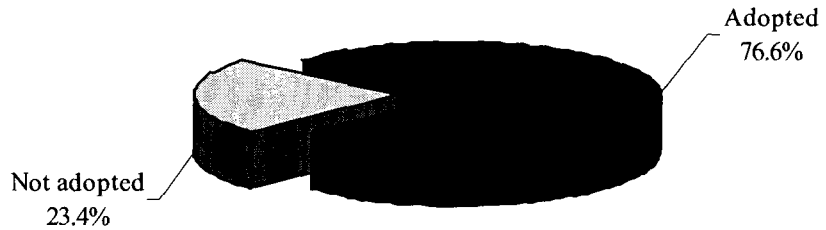
4.1 Adopters and non-adopters of agricultural innovations

In the present study, out of 304 households selected for the study, it was found that adopters consist of 233 households, while non-adopters consist of 71 households. Percentage-wise the adopters represent 76.6 percent and the non-adopters represent the rest i.e., 23.4 percent of the total households selected for the study. Table 4.1 and Figure 4.1 show the number of adopters and non-adopters of agricultural innovations in the studied area.

Table 4.1: Adopters and Non-adopters of agricultural innovations

Innovations	Frequency	Percentage
Adopted	233	76.6
Not adopted	71	23.4
Total	**304**	**100.0**

Figure 4.1: Adopters and Non-adopters of agricultural innovations



4.2 Socio-economic characteristics of the respondents

Socio-economic characteristics of the farmers are very important as it reflect their attitude towards agricultural innovations. For the present study the five socio-economic characteristics of the respondents were analysed and incorporated in the tables below:

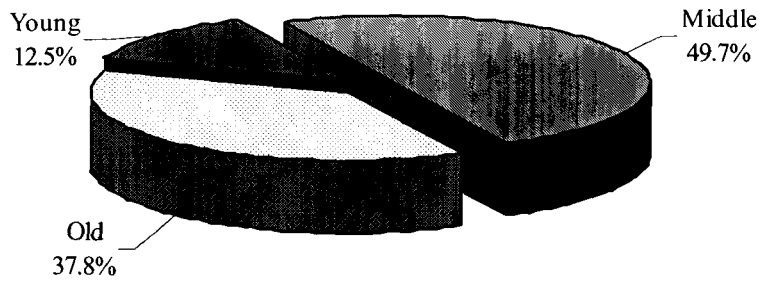
4.2.1 Age structure of the respondents

The distribution of the respondents according to the age structure is depicted in Table 4.2 and Figure 4.2.

Table 4.2: Age structure of the respondents

Age	Categories	Frequency	Percentage
Young	Upto 21 years of age	38	12.5
Middle	22-49 years of age	151	49.7
Old	50 years and above	115	37.8
Total		**304**	**100.0**

Figure 4.2: Age structure of the respondents



As evident from the Table 4.2 and Figure 4.2, majority of the respondents are in the middle age group (22-49 years) with 151 representing 49.7 percent of

the total respondents and 115 respondents representing 37.8 percent are found to be in the old age group (50 years and above), while 38 respondents representing 12.5 percent have been found to be in the young age group (upto 21 years).

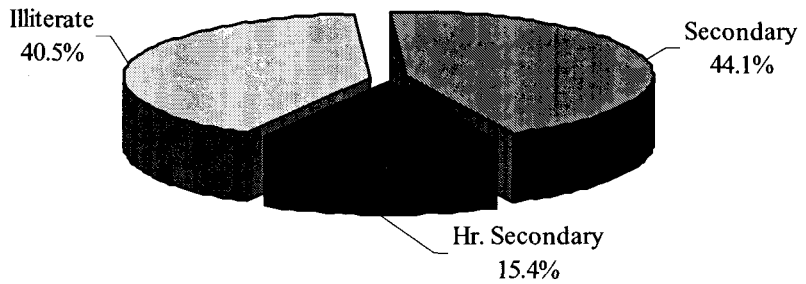
4.2.2 Educational level of the respondents

Analysis of the class frequencies indicates that 123 respondents consist of illiterates representing 40.5 percent and 134 with 44.1 percent from secondary level (upto class X). In case of respondents with higher secondary level (class XI and above) it is found that the sample consists of 47 representing 15.4 percent. The distribution of the respondents according to their educational level is presented in Table 4.3 and Figure 4.3.

Table 4.3: Educational level of the respondents

Educational level	Categories	Frequency	Percentage
Illiterate	-	123	40.5
Secondary	Upto class X	134	44.1
Higher secondary	Class XI and above	47	15.4
Total		**304**	**100.0**

Figure 4.3: Educational level of the respondents



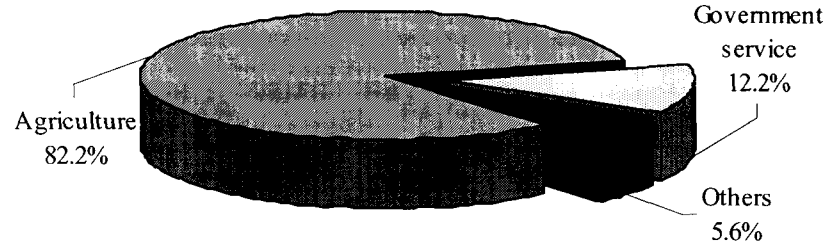
4.2.3 Occupational structure of the respondents

The number of respondents with different occupations in villages under study has been analysed and presented in Table 4.4 and Figure 4.4 as below:

Table 4.4: Occupational structure of the respondents

Occupations (primary)	Categories	Frequency	Percentage
Agriculture	-	250	82.2
Government service	-	37	12.2
Others	Business, horticulture, animal husbandry etc.	17	5.6
Total		**304**	**100.0**

Figure 4.4: Occupational structure of the respondents



In may be seen that from the Table 4.4 and Figure 4.4, of the total respondents, 250 are engaged as agriculturist representing 82.2 percent, followed by government services with 37 accounting to 12.2 percent, while 17 respondents are found to be engaged in other occupations indicating 5.6 percent of the total occupational structure.

4.2.4 Income level of the respondents

Income level of the respondents has been analysed and presented in Table 4.5 and Figure 4.5.

Table 4.5: Income level of the respondents

Income (per annum)	Categories	Frequency	Percentage
Low	Upto Rs. 20,000	131	43.1
Medium	Rs. 20,000 – 50,000	127	41.8
High	Rs. 50,000 and above	46	15.1
Total		**304**	**100.0**

Figure 4.5: Income level of the respondents

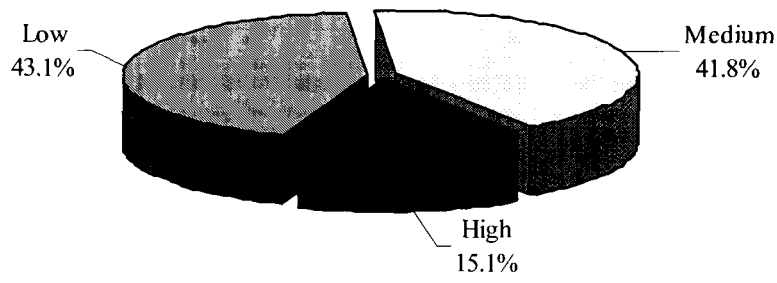


Table 4.5 and Figure 4.5 reveals that majority of the respondents (43.1%) belong to the low income group having annual income upto Rs. 20,000, and closely followed by medium income group (Rs. 20,000- 50,000) with 41.8 percent. Further, it is indicated that respondents with high income (Rs. 50,000 and above) were found to represent only 15.1 percent.

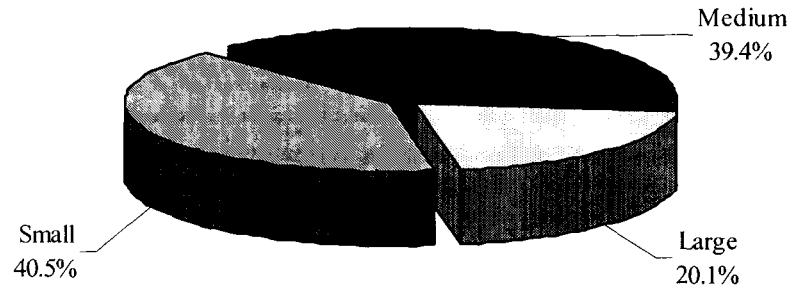
4.2.5 Landholdings of the respondents

It is observed from the analysed data that majority of the respondents (40.5%) possess small landholdings of 3 acres, while medium landholdings (3-7 acres) represent 39.4 percent. In case of respondents with large landholdings (7 acres and above), it is found to be 20.1 percent. Table 4.6 and Figure 4.6 below depict the landholdings of the respondents.

Table 4.6: Landholdings of the respondents

Landholdings	Categories	Frequency	Percentage
Small	Upto 3 acres	123	40.5
Medium	3- 7 acres	120	39.4
Large	7 acres and above	61	20.1
Total		**304**	**100.0**

Figure 4.6: Landholdings of the respondents



4.3 Socio-economic characteristics of the adopters

Adoption of agricultural innovations to a great extent depends on the socio-economic characteristics of the farmers. In this context, it is necessary to analyse

the association between the socio-economic characteristics of the adopters with the adoption of agricultural innovations.

On the basis of the collected data, it is found that out of 304 households, 233 households had adopted agricultural innovations. The socio-economic characteristics of the adopters under study are presented as below:

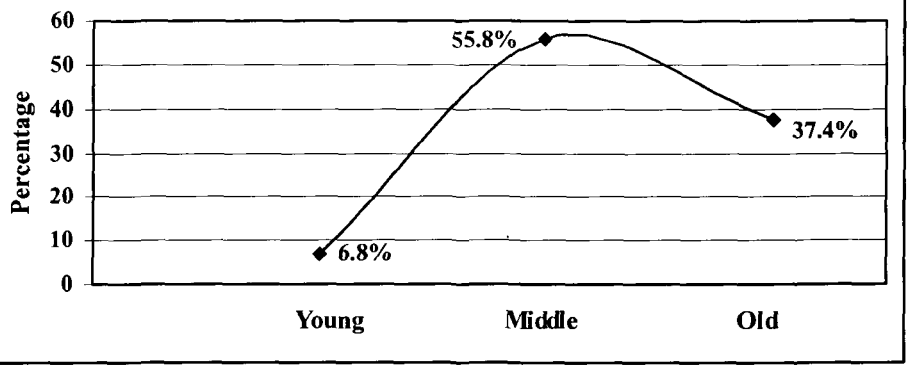
4.3.1 Age structure of the adopters

Table 4.7 and Figure 4.7 depict the age structure of the adopters with regard to adoption of agricultural innovations.

Table 4.7: Age structure of the adopters

Age	Categories	Frequency	Percentage
Young	Upto 21 years of age	16	6.8
Middle	22-49 years of age	130	55.8
Old	50 years and above	87	37.4
Total		**233**	**100.0**

Figure 4.7: Age structure of the adopters



As evident from the Table 4.7, majority of the adopters belong to middle age group (22-49 years) representing 55.8 percent. Here it can be inferred that this group were found to have favourable attitude and as a result most receptive towards adopting agricultural innovations. In case of older farmers (50 years and above) the above table indicates moderate percentage (37.4%) with 87 adopters. It is also observed from the above table that younger farmers (upto 21 years) were found to be the lowest in number when it comes to adoption of agricultural innovations indicating 6.8 percent.

4.3.2 Educational level of the adopters

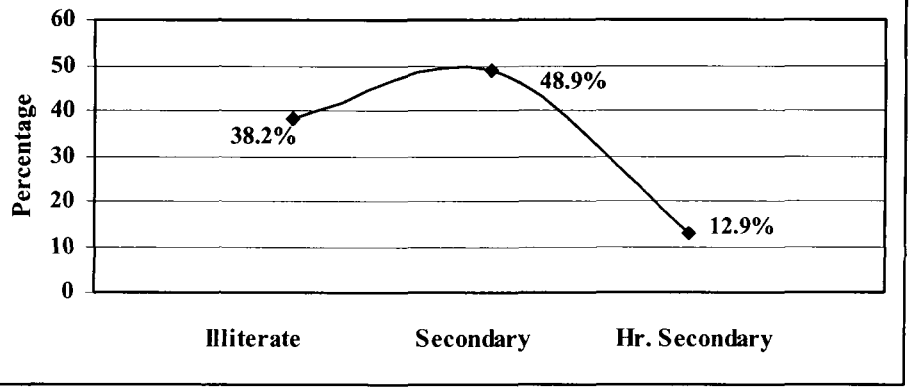
The role of education needs no emphasis. It is considered among the important factors that changes the outlook of farmers and makes them more responsive to agricultural innovations, which are communicated through various information sources and channels.

The distribution of the adopters according to their educational level is presented in Table 4.8 and Figure 4.8.

Table 4.8: Educational level of the adopters

Educational level	Categories	Frequency	Percentage
Illiterate	-	89	38.2
Secondary	Upto class X	114	48.9
Higher secondary	Class XI and above	30	12.9
Total		**233**	**100.0**

Figure 4.8: Educational level of the adopters



After analysing the data, it is found that the adopters consist of 114 secondary level (upto class X) representing 48.9 percent and illiterate group with 89 (38.2%).

Interestingly, it is found that higher secondary level (class XI and above) consisting of 12.9 percent did not show any dominance in the adoption of innovations. This has been mainly because higher and well-educated farmers were occupied more in other occupation such as white collared jobs and profitable business and as such were found to be have less inclination towards agricultural innovations.

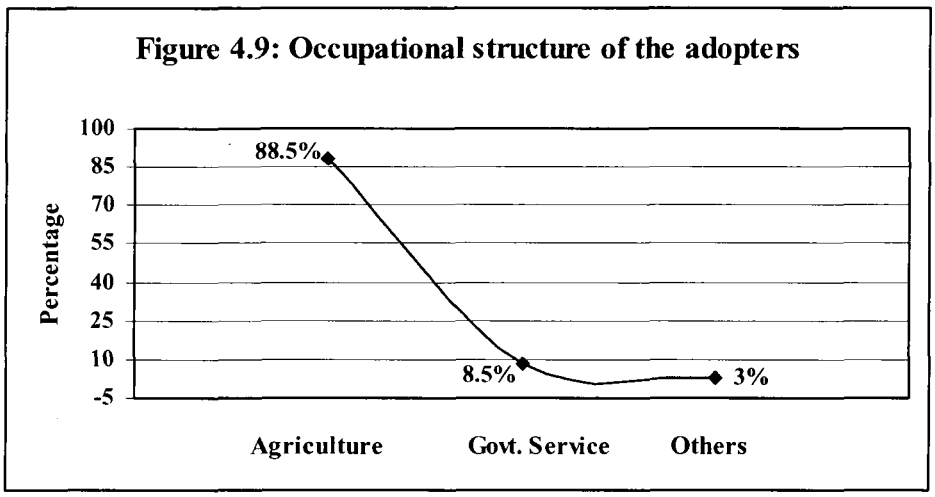
However, it may be mentioned that the role of education in adoption should not be over-emphasised in view of the fact that in the sample not many farmers have education beyond the higher secondary level and majority among the farmers under study were found to possess education upto secondary level.

4.3.3 Occupational structure of the adopters

The distribution of adopters according to occupational structure is depicted in the Table 4.9 and Figure 4.9.

Table 4.9: Occupational structure of the adopters

Occupation (primary)	Categories	Frequency	Percentage
Agriculture	-	206	88.5
Government service	-	20	8.5
Others	Business, horticulture, animal husbandry etc.	7	3.0
Total		**233**	**100.0**



As evident from Table 4.9, it is found that agriculturists were the most dominant group with 206 adopters representing 88.5 percent. The analysis further reveals that those engaged in government services and other business indicate very low adoption, with 8.5 percent and 3.0 percent respectively. The reason is due to diversion of interest towards their own occupation and hence lesser need for agricultural innovations. Therefore, it is found that the percentage representation

of the respondents in the two groups is observed to be much lower when it comes to adoption of agricultural innovations.

4.3.4 Income level of the adopters

As often seen, adopting agricultural innovations involves expenditure. Hence, incomes of the farmers play a vital role in adoption of agricultural innovations. Therefore, it is imperative to analyse the data pertaining to the income level of the adopters under study. Table 4.10 and Figure 4.10 depict the distribution of income level of the adopters under study.

Table 4.10: Income level of the adopters

Income (per annum)	Categories	Frequency	Percentage
Low	Upto Rs. 20,000	101	43.3
Medium	Rs. 20,000 – 50,000	103	44.2
High	Rs. 50,000 and above	29	12.5
Total		**233**	**100.0**

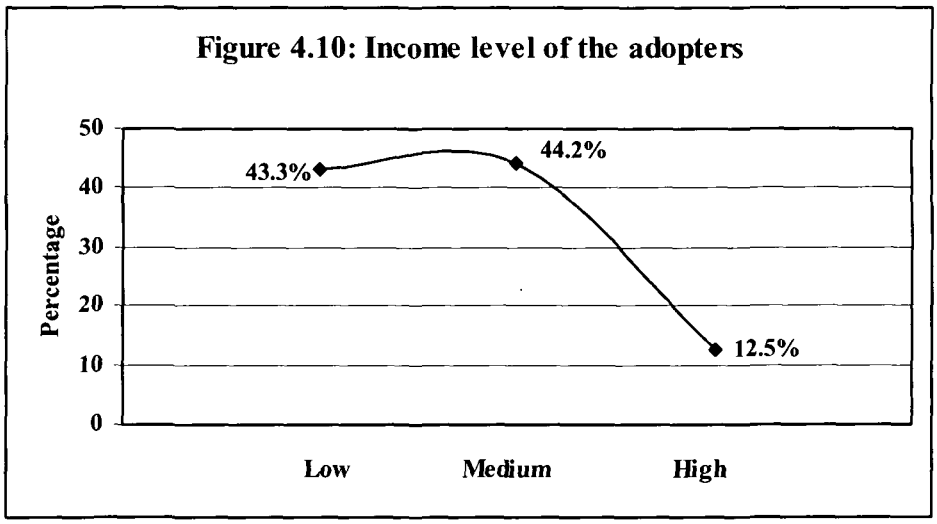


Table 4.10 elucidates that the medium level income level (Rs. 20,000-50,000) were found to be highest adopters of agricultural innovations consisting of 103 adopters, and closely followed by low-income level (upto Rs. 20,000) with 101 adopters. Percentage-wise medium level income represents 44.2 percent, while low-income level represents 43.3 percent of the total adopters. Here it can be noted that high adoption among the low and medium income level is due to the fact that most of the agricultural innovations introduced in the studied area is of recent phenomenon and as such the farmers were enthusiastic to try out anything that is new to increase the productivity and also in some instance the innovations were provided free of cost from various implementing agencies.

Most study had highlighted that higher income groups were likely to go for more innovations. However in this study, it was found that the higher income level (Rs. 50,000 and above), representing 12.5 percent had adopted fewer innovations since higher income gives the farmers liberty to invest in other occupational activities which probably reflects their lack of interest to go for agricultural innovations.

4.3.5 Landholdings of the adopters

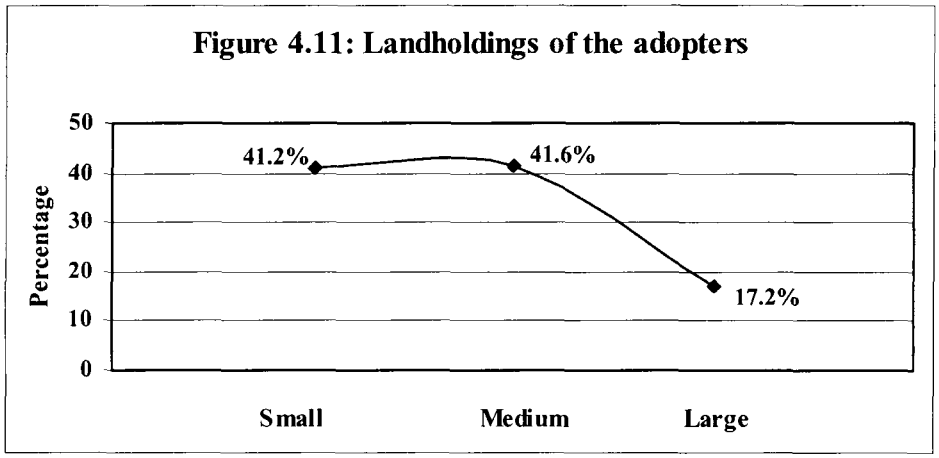
Landholdings of the farmers play an important role in the adoption of agricultural innovations. In fact farmers with large landholdings enable them to try out new

agricultural practices. The distribution of adopters on the basis of their landholdings is presented in Table 4.11 and Figure 4.11.

Table 4.11: Landholdings of the adopters

Landholdings	Categories	Frequency	Percentage
Small	Upto 3 acres	96	41.2
Medium	3- 7 acres	97	41.6
Large	7 acres and above	40	17.2
Total		**233**	**100.0**

Figure 4.11: Landholdings of the adopters



As shown on the Table 4.11, majority of the adopters falls under small (upto 3 acres) and medium landholdings (3-7 acres), accounting for 41.2 percent and 41.6 percent respectively. Here it can be inferred that in the studied villages, most of the farmers have small to medium landholdings. As a consequence, land being their main resources and agriculture the mainstay; it was quite apparent for farmers to always on the look out for innovations to enhance the agricultural productivity. In case of adopters with large landholdings (7acres and above) it is observed that 17.2 percent had adopted innovations. This confirms that farmers

with large land holdings in the studied villages prefers a more diverse farming by trying out other farming practices such as horticulture and animal husbandry, etc. Hence, it is obvious that farmers having larger land holdings had adopted lesser innovations.

4.4 Adoption of Agricultural Innovations

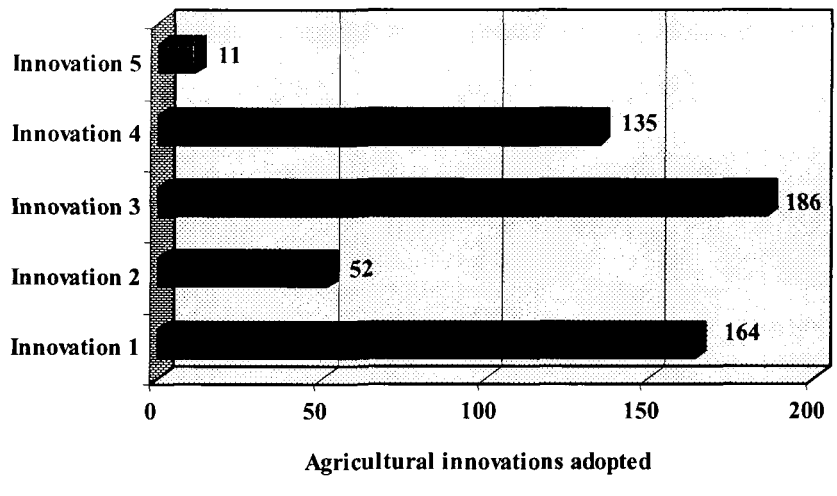
The distribution of numbers of agricultural innovations adopted is depicted in the Table 4.12 and Figure 4.12.

Table 4.12: Numbers of agricultural innovations adopted

(n=304)	Innovation 1	Innovation 2	Innovation 3	Innovation 4	Innovation 5
	164	52	186	135	11
Rank	2	4	1	3	5

Innovation-1 = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management.

Figure 4.12: Numbers of agricultural innovations adopted



Innovation-1 = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management.

It is evident from the Table 4.12 that of all the practices considered for the study, use of innovation-3 (plant protection measures) has found maximum degree of adoption i.e. out of 304 households as many as 186 (61.2%) have adopted this practice. Further, it is found that innovation-1 (improved seeds) had been adopted by 164 households (53.9%), followed by innovation-4 (agricultural implements) with 135 households (44.4%). This indicates that farmers had adopted these three innovations i.e. innovations-1, innovation-3 and innovation-4 in large numbers mainly due to simplicity of the innovations that facilitate to yield more agricultural productivity. Also one factor that had induced the farmers to go for innovation-1 (improved seeds) was that farmers under study get free-of-cost from the implementing agencies, friends, family members and relatives.

In regard to the remaining two practices it is found that innovation-2 (fertilizers) have been adopted by 52 households (17.1%) and innovation-5 (crops management) with only 11 households (3.6%). Here it can be inferred that a vast majority of the farmers under study could not afford the fertilizers and are also sceptical about its effect on the environment. Similarly, when it comes to crops management only few had adopted due to the complex processes involved therein in using such an innovation.

4.5 Information sources and channels

Farmers' accessibility to various information sources and channels is very essential with regard to adoption of agricultural innovations (Rajagopalan and Singh; 1971, Munyasi; 2004). In order to make information communication more effective, it is necessary to identify the various information sources and channels and understand how information is communicated to the farmers through these sources and channels. It is in this context, that in carrying out the present study, information sources and channels through which agricultural information is communicated to the farmers were identified and grouped into two broad categories as below:

Mass Media which include television, radio, newspapers, printed publications, trainings, demonstrations, exhibitions, field visit, meetings, posters, wall writings/banners, public announcement, and **Interpersonal Sources and Channels** which include fellow farmers, family members, relatives, neighbours, friends, village council members, extension workers, scientists, input dealers, other department personnel, landowners, land tenants, village development board (VDB) members, self help groups (SHG), health workers, transport owners, horticultural personnel, co-operative personnel, bank personnel teachers (academic), students, wholesalers, middleman and customers.

The hypothesis (H_1), ***'farmers depend more on interpersonal information sources and channels than mass media with regard to agricultural innovations'*** was tested with multiple (linear) regressions analysis at one and five percent level of significance in order to determine the use of various information sources and channels by the farmers.

Multiple (linear) Regression Analysis showing regression coefficients (constants), t-values and coefficient of determinants (R^2) for overall utilisation of mass media and interpersonal information sources and channels and multiple (linear) regression analysis showing Beta (B), Standard error and t-values for individual utilisation of mass media and interpersonal information sources and channels with adoption of innovations as dependent variables has been incorporated to highlight the adoption of agricultural innovations in the villages under study.

The analysis of information sources and channels and adoption of agricultural innovations is based on the mean value obtained for different variables.

4.5.1 Information sources and channels and adoption of Innovation-1

Table 4.13 depicts the utilisation of mass media and interpersonal information sources and channels for the adoption of improved seeds.

Table 4.13: Information sources and channels and adoption of Innovation-1 (n=304)

Overall information sources and channels (MM-1 and IP-1) and adoption of innovation-1
Innovation-1 = -26.811 + 10.774 MM-1 + 16.139 IP-1 (9.06) (35.56)
R^2 = 0.811
MM-1 and adoption of Innovation-1
Innovation-1 = -5.087 + 5.619 MM-1 (2.09)
R^2 = 0.014
IP-1 and adoption of Innovation-1
Innovation-1 = -15.508 + 15.638 IP-1 (30.82)
R^2 = 0.759

Innovation-1 = improved seeds, **MM-1** = Mass Media and **IP-1** = Interpersonal sources and channels used for the adoption of innovation-1. **Note:** Values in parenthesis shows the 't' values

It is evident from the above table that adoption of innovation-1 (improved seeds) is being indicated by both mass media-1 (MM-1) and interpersonal-1 (IP-1) sources and channels to the extent of 81 percent (R^2=0.811) of the total information sources and channels utilised by the farmers under study.

It is also observed that adoption of innovation-1 through IP-1 sources and channels of information far exceeds that of MM-1 sources and channels. This is evident from the above table that farmers' adoption of innovation-1 through IP-1 sources and channels is much higher indicating 75 percent (R^2=0.759) as compared to MM-1 sources and channels with only 1 percent (R^2=0.014) in so far as adoption of innovation-1 is concerned. This tendency indicates that the farmers under study have more access to agricultural information through interpersonal

sources and channels. It also reveals that the access of agricultural information is very low through mass media sources and channels due to non-availability and inaccessibility of mass media sources and channels of information at the reach of the farmers. It is, therefore, observed that interpersonal sources and channels among farmers play a very important role in information communication as far as agricultural innovations are concerned.

4.5.2 Information sources and channels and adoption of Innovation-2

Table 4.14 below describes the use of information sources and channels with regard to adoption of innovation-2, i.e., fertilizers.

Table 4.14: Information sources and channels and adoption of Innovation-2 (n=304)

Overall information sources and channels (MM-2 and IP-2) and adoption of innovation-2
Innovation-2 = -19.054 + 0.0 MM-2 + 19.071 IP-2 (0.0) (52.59) **R^2 = 0.902**
MM-2 and adoption of Innovation-2 Innovation-2 = 0.0 + 0.0 MM-2 (0.0) **R^2 = 0.0**
IP-2 and adoption of Innovation-2 Innovation-2 = -19.054 + 19.071 IP-2 (52.59) **R^2 = 0.902**

Innovation-2 = fertilizers, **MM-2** = Mass Media and **IP-2** = Interpersonal sources and channels used for the adoption of innovation-2. **Note:** Values in parenthesis shows the 't' values

Table 4.14 shows that both mass media-2 (MM-2) and interpersonal-2 (IP-2) information sources and channels indicate 90 percent (R^2=0.902) of the adoption of innovation-2 (fertilizers). However, interestingly only IP-2 sources and channels had been found to have contributed to the overall adoption of innovation-2 by the farmers under study.

Further it is also observed that the farmers have more access to agricultural information through IP-2 sources and channels than through MM-2 sources and channels as evident from the above table where 90 percent (R^2=0.902) of the adoption of innovation-2 is indicated by IP-2 sources and channels at one percent level of significance (t=52.59) as compared with 0.00 percent (R^2=0.0) obtained against MM-2 sources and channels.

This confirms that mass media sources and channels have not been effective in reaching the farmers with information pertaining to agricultural innovations. Further, this indicates that the farmers under study have more access to agriculture information through interpersonal sources and channels with regard to agricultural innovations.

4.5.3 Information sources and channels and adoption of Innovation-3

The use of information sources and channels with regard to adoption of innovation-3, i.e., plant protection measures have been portrayed in Table 4.15.

Table 4.15: Information sources and channels and adoption of Innovation-3 (n=304)

Overall information sources and channels (MM-3 and IP-3) and adoption of innovation-3
Innovation-3 = -22.774 + 7.337 MM-3 + 15.582 IP-3 (7.13) (30.76)
R^2 = 0.763
MM-3 and adoption of Innovation-3
Innovation-3 = -4.182 + 4.784 MM-3 (2.29)
R^2 = 0.017
IP-3 and adoption of Innovation-3
Innovation-3 = -15.121 + 15.291 IP-3 (28.06)
R^2 = 0.723

Innovation-3 = plant protection measures, **MM-3** = Mass Media and **IP-3** = Interpersonal sources and channels used for the adoption of innovation-3. **Note:** Values in parenthesis shows the 't' values

As shown on the Table 4.15 above, the R^2 value obtained against both mass media-3 (MM-3) and interpersonal-3 (IP-3) sources and channels of information indicate 76 percent (R^2=0.763) of utilisation of these two information sources and channels for the adoption of innovation-3 (plant protection measures).

It is also observed that farmers under study have more access to agricultural information for the adoption of innovation-3 through IP-3 sources and channels than through MM-3 sources and channels of information. This is obvious from the R^2 value obtained against IP-3 sources and channels falling under 72 percent (R^2=0.723) as compared to 1 percent (R^2=0.017) obtained against MM-3 sources and channels of information. This reflects that mass media sources and channels are not effective in communicating agricultural information to the framers. Hence, it can be safely said that in the studied area interpersonal sources and channels are more applicable when it comes to adoption of agricultural innovations.

4.5.4 Information sources and channels and adoption of Innovation-4

The use of information sources and channels and adoption of innovation-4 (agricultural implements) is presented on the Table 4.16 as below:

Table 4.16: Information sources and channels and adoption of Innovation-4 (n=304)

Overall information sources and channels (MM-4 and IP-4) and adoption of innovation-4
Innovation-4 = -21.133 + 3.534 MM-4 + 17.672 IP-4 (4.049) (38.49)
R^2 = 0.833
MM-4 and adoption of Innovation-4
Innovation-4 = -3.118 + 3.556 MM-4 (1.67)
R^2 = 0.009
IP-4 and adoption of Innovation-4
Innovation-4 = -17.595 + 17.673 IP-4 (37.55)
R^2 = 0.824

Innovation-4 = agricultural implements, **MM-4** = Mass Media and **IP-4** = Interpersonal sources and channels used for the adoption of innovation-4. **Note:** Values in parenthesis shows the't'

As evident from the Table 4.16, it is observed that farmers under study have utilised mass media-4 (MM-4) and interpersonal-4 (IP-4) information sources and channels to the extent of 83 percent (R^2=0.833) for the adoption of innovation-4 (agricultural implements). Further, the above table also indicates that farmers under study have very less access to agricultural information from MM-4 sources and channels with only 1 percent (R^2=0.009) as compared to IP-4 sources and channels with 82 percent (R^2=0.824) of the total sources and channels of information utilised by the farmers for the adoption of innovation-4.

The overall poor utilisation of mass media sources and channels pertaining to the adoption of agricultural innovations indicate lack of relevance of such media with local conditions. Therefore, it can be concluded that farmers under study depend more on interpersonal sources and channels than mass media sources and channels with regard to adoption of agricultural innovation- 4.

4.5.5 Information sources and channels and adoption of Innovation-5

Table 4.17 below depicts the extent of use of information sources and channels with regard to adoption of crops management i.e. innovation-5.

Table 4.17: Information sources and channels and adoption of Innovation-5 (n=304)

Overall information sources and channels (MM-5 and IP-5) and adoption of innovation-5
Innovation-5 = -27.232 + 9.300 MM-5 + 17.935 IP-5 (38.97) (35.48)
R^2 = 0.901
MM-5 and adoption of Innovation-5
Innovation-5 = -9.141 + 9.160 MM-5 (16.88)
R^2 = 0.486
IP-5 and adoption of Innovation-5
Innovation-5 = -17.588 + 17.609 IP-5 (14.19)
R^2 = 0.400

Innovation-5 = crops management, **MM-5** = Mass Media and **IP-5** = Interpersonal sources and channels used for the adoption of innovation-5. **Note:** Values in parenthesis shows the't' values
** Significant at 1% level

Table 4.17 reflects that both mass media-5 (MM-5) and interpersonal-5 (IP-5) sources and channels of information contribute to the extent of 90 percent (R^2=0.901) for adoption of innovation-5 (crops management). Interestingly, when

it comes to innovation-5 (crops management), the use of MM-5 was found to have surpassed that of IP-5 with 48 per cent (R^2=0.486) and 40 per cent (R^2=0.400) respectively. This indicates that the farmers under study have used both mass media and interpersonal information sources and channels for adoption of innovation-5.

4.5.6 Mass Media sources and channels and adoption of Innovations

Table 4.18 depicts the extent of use of various mass media information sources and channels with regard to adoption of agricultural innovations in all the eight villages under study.

Table 4.18: Multiple (linear) Regressions analysis of mass media sources and channels with regard to adoption of agricultural innovations (n=304)

Sl. No.	Mass media	Innovations	B (beta)	Standard error	t value
1	Demonstrations	1	0.910	0.106	**8.618***
		3	0.871	0.164	**5.323***
		5	0.666	0.014	**48.415***
2	Trainings	3	0.695	0.116	**5.974***
		4	0.177	0.191	0.926
		5	0.999	0.024	**41.976***
3	Field visits	1	0.910	0.209	**4.350***
4	Exhibitions	4	0.938	0.135	**6.951***
5	Radio	3	0.198	0.166	1.191
6	TV	4	0.088	0.095	0.926
7	Printed publications	4	-0.062	0.190	-0.326

Innovation-1 = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. *Significant at 1% level

Note: Among mass media information sources and channels considered for the present study, farmers did not use meetings, newspapers, posters, wall writings/ banners and public announcement for the adoption of agricultural innovations.

As evident from the above table, farmers who have participated in demonstrations could see and understand the utility of innovative practices and

consequently adopted innovation-1, innovation-3 and innovation-5, as indicated on the above table with one percent level of significance.

It was also found that farmers had made use of trainings where they could generate more knowledge and develop better skills and subsequently go for adoption of innovation-3 and innovation-5, as reflected on the above table at one percent level of significance.

As evident from the Table 4.18, field visits were utilised to a very less extent as a source of information for the adoption of innovations, especially innovation-1 with one percent level of significance. Usually such activities are held in research or demonstration farms and as such most of the farmers under study were unable to participate in such programmes.

Similarly, it is also observed that agricultural exhibitions were utilised by some farmers as source of information for the adoption of innovation-4 with one percent level of significance, as shown in Table 4.18. This has been mainly because agricultural exhibitions are held at the research stations or at the district or state level and seldom at the block or circle level where lesser income farmers and those living in the interior areas could not afford to attend the agricultural exhibitions.

Radio and TV as sources and channels of information did not indicate any significant results with regard to adoption of agricultural innovations as evident

from the above table. One major reason was that most of the farmers could not comprehend the jargon and technical terms used by radio broadcasters. At the same time, most of the farmers could not afford to own a TV set largely due to poor economic conditions. It is also obvious that printed publications were least utilised for the purpose of adoption of innovations as most of the farmers under study were illiterate or had very less formal education.

4.5.7 Interpersonal information sources and channels and adoption of Innovations

The extent of use of various interpersonal information sources and channels with regard to adoption of agricultural innovations in villages under study is presented in Table 4.19.

Communication of agricultural information by agriculture extension workers indicates a strong influence on the adoption of all the five innovations with one percent level of significance as evident from Table 4.19. This explains that farmers get access to agricultural information through agriculture extension workers, as they are the main link between farmers and the implementing agency.

Farmers' adoption of all the five innovations through scientists is highlighted in the Table 4.19 showing significance level at one percent. This indicates that scientists play a vital role in motivating the farmers to go for innovations.

Table 4.19: Multiple (linear) Regressions analysis of interpersonal sources and channels with regard to adoption of agricultural innovations (n=304)

Sl. No.	Interpersonal sources and channels	Innovations	B (beta)	Standard error	t value
1	Agriculture Extension Workers	1	0.650	0.028	**23.498***
		2	0.989	0.040	**24.901***
		3	0.673	0.038	**17.786***
		4	0.657	0.044	**15.067***
		5	0.999	0.024	**41.976***
2	Scientists	1	0.910	0.065	**13.984***
		2	0.989	0.096	**10.265***
		3	0.622	0.088	**7.072***
		4	0.938	0.135	**6.951***
		5	0.999	0.034	**29.732***
3	Relatives	1	0.607	0.050	**12.036***
		2	0.594	0.031	**19.378***
		3	0.603	0.065	**9.254***
		4	0.642	0.045	**14.388***
		5	0.499	0.017	**29.732***
4	Friends	1	0.575	0.075	**7.681***
		2	0.989	0.096	**10.265***
		3	0.871	0.084	**10.420***
		4	0.938	0.096	**9.777***
		5	0.999	0.034	**29.732***
5	Fellow Farmers	1	0.691	0.030	**22.858***
		2	0.837	0.020	**42.838***
		3	0.661	0.026	**25.746***
		4	0.761	0.023	**33.506***
6	Family Members	1	0.650	0.057	**11.403***
		2	0.594	0.043	**13.750***
		3	0.871	0.117	**7.473***
		4	0.938	0.086	**10.901***
7	Input Dealers	1	0.858	0.065	**13.159***
		2	0.873	0.024	**36.482***
		3	0.704	0.041	**17.117***
		4	0.802	0.040	**20.114***
8	Village Council Members	1	0.708	0.034	**20.990***
		2	0.989	0.056	**17.710***
		3	0.522	0.103	**5.053***
		4	0.938	0.190	**4.929***
9	Land Owners	1	0.455	0.074	**6.133***
		2	0.495	0.048	**10.265***
		3	0.434	0.070	**6.196***
		4	0.670	0.072	**9.249***
10	Neighbours	1	0.650	0.080	**8.154***
		3	0.784	0.091	**8.640***
		4	0.625	0.078	**8.012***
11	Village Development Board Members	1	0.910	0.148	**6.133***
12	Health Workers	3	0.610	0.137	**4.463***
13	Other Department personnel	1	0.910	0.209	**4.350***

Innovation-1 = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. * Significant at 1% level.

Note: Among interpersonal information sources and channels considered for the present study, farmers did not use SHG members, land tenants, horticultural personnel, co-operative personnel, teachers and students, wholesalers, middlemen, transport owners, customers and bank personnel for the adoption of agricultural innovations.

As indicated on the Table 4.19, farmers under study got access to agricultural information through relatives as the farmers had adopted all the five innovations with one percent level of significance.

Farmer's use of friends as information sources is obvious as depicted on the Table 4.19 showing adoption of all the five innovations at one percent level of significance in the studied villages.

As evident from Table 4.19, innovation-1, innovation-2, innovation-3 and innovation-4 had shown significant results with fellow farmers with one percent level of significance. This indicates that farmers having the same occupation and interest tend to communicate information faster, frequently and comfortably among themselves.

Also as shown on the Table 4.19, farmers have used family members as information sources for the adoption of innovation-1, innovation-2, innovation-3 and innovation-4 out of total five innovations with one percent level of significance in the studied area.

It is interesting to note that input dealers as information sources were used by the farmers to a very great extent for the adoption of innovation-1, innovation-2, innovation-3 and innovation-4 as reflected in the Table 4.19 showing one percent level of significance. From this it can be inferred that input dealers in

order to increase the sale and maximise the profit usually are keen to pass on information to farmers pertaining to agricultural innovations.

The role of village council members when it comes to adoption of agricultural innovations cannot be ignored as reflected in the Table 4.19, where innovation-1, innovation-2, innovation-3 and innovation-4 had been adopted with one percent level of significance. Here, it may be noted that, since the village councils form an integral part of a village and to some extent regulate the social life of the villages, they serve as useful information sources for most of the farmers.

Farmers under study have used landowners as information sources with regard to adoption of innovation-1, innovation-2, innovation-3 and innovation-4 as reflected on the above table showing one percent level of significance.

It is also evident from the Table 4.19 that most of the farmers under study had adopted innovation-1, innovation-3 and innovation-4 through neighbours showing at one percent level of significance.

In case of village development board (VDB) members, health workers and other department personnel it is found that farmers in the studied area had used to a lesser extent as has been depicted by Table 4.19, which indicates adoption of innovation-1 and innovation-3 out of five agricultural innovations, at one percent level of significant. This goes to show that since VDB members, health workers

and other department personnel are basically involved more in implementing schemes, projects and programmes (rural employments, poverty alleviation, housing, sanitations, etc.), hence farmers under study get limited access to agricultural information pertaining to agricultural innovations from these sources of information.

Conclusion

From the above analysis it is evident that mass media as a vehicle of information communication did not play much role in the adoption of agricultural innovations in the studied villages. This is mainly due to low level of education of the farmers and irrelevance of TV and radio programmes with the local situations. Further, most of the farmers could not attend trainings, demonstrations, exhibitions and field visits due to poor communication infrastructure and economic conditions. As a result mass media sources and channels remain inaccessible to majority of the farmers under study.

On the other hand, it was found that interpersonal information sources and channels were used more for adoption of agricultural innovations as compared to mass media sources and channels. This is because interpersonal sources and channels of information are readily available and easily accessible to the farmers. As for instance, most of the farmers had adopted innovations through agriculture

extension workers and scientists. Further, other interpersonal sources and channels such as fellow farmers, input dealers, friends, neighbours and village council members, etc., are easily accessible whenever the farmers required information pertaining to agriculture.

Hence, it can be concluded that, the hypothesis ***'farmers depend more on interpersonal information sources and channels than mass media with regard to agricultural innovations'*** has been proved.

4.6 Socio-Economic Characteristics

Successful adoption of agricultural innovations depends to a great extent on the socio-economic status of the farmers (Bose, 1961; Dudhani and Rao, 1969; Sanoria, 1970; Pandey, 1989; Mwangi, 2004). In this regard, to test the validity of the hypothesis **(H_2)** that ***'adoption of agricultural innovations varies across age, educational level, income level, land holdings and occupation,'*** F-test (ANOVA) has been applied to examine to find out whether any variation exist between farmers' socio-economic characteristics and adoption of agricultural innovations. The significant level for F-test was taken at one percent. Further, correlation test (Pearson Correlation Coefficient) has also been applied to find out the degree of relationship between socio-economic characteristics of the farmers and adoption of agricultural innovations. For the correlation test the level of significance has been put to one and five percent.

4.6.1 Farmers' age and adoption of innovations

Farmers' age and adoption of five agricultural innovations are presented in Table 4.20 as below:

Table 4.20: Farmers age and adoption of innovations (ANOVA)

Socio-economic characteristics	I	F-value (Computed)	F-value (Tabulated)	Mean square		df.	Remarks
				Between groups	Within groups		
Age	1	**3.685***	4.68	0.902	0.245	2/301	Accepted
	2	**2.535***	4.68	0.375	0.141	2/301	Accepted
	3	21.485	4.68	4.510	0.210	2/301	Rejected
	4	10.803	4.68	2.513	0.233	2/301	Rejected
	5	**1.153***	4.68	0.040	0.034	2/301	Accepted

I = Innovations. **Innovation-1** = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. **df.**=degrees of freedom * Significant at 1 % level

Table 4.20 indicates that there is significant association between the farmer's age with the adoption of innovation-1, innovation-2 and innovation-5. This explains that there is variation in the adoption of agricultural innovations according to the age of the farmers. However, the remaining two innovations, i.e., 3 and 4 indicate no significant association with the adoption of innovations.

4.6.2 Farmers' education and adoption of innovations

Table 4.21 below highlight, the ANOVA test between farmer's education and adoption of five agricultural innovations.

Table 4.21: Farmers education and adoption of innovations (ANOVA)

Socio-economic characteristics	I	F-value (Computed)	F-value (Tabulated)	Mean square		df.	Remarks
				Between groups	Within groups		
Education	1	3.785*	4.68	0.926	0.245	2/301	Accepted
	2	1.254*	4.68	0.178	0.142	2/301	Accepted
	3	5.669	4.68	1.310	0.231	2/301	Rejected
	4	2.328*	4.68	0.572	0.246	2/301	Accepted
	5	1.918*	4.68	0.066	0.034	2/301	Accepted

I = Innovations. **Innovation-1** = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. **df**.=degrees of freedom * Significant at 1 % level

It is also observed from the above table, that there is significant association at one percent level between farmer's education and adoption of innovation-1, innovation-2, innovation-4 and innovation-5 as evident from the computed F values. This indicates that the extent of adoption of agricultural innovations amongst the farmers vary according to their educational level. Further, it is also indicated that there is no association between farmer's education and adoption of innovation-3.

4.6.3 Farmers' occupation and adoption of innovations

Table 4.22: Farmers occupation and adoption of innovations (ANOVA)

Socio-economic characteristics	I	F-value (Computed)	F-value (Tabulated)	Mean square		df.	Remarks
				Between groups	Within groups		
Occupation	1	**2.974***	4.68	0.732	0.246	2/301	Accepted
	2	**0.832***	4.68	0.119	0.142	2/301	Accepted
	3	8.476	4.68	1.925	0.227	2/301	Rejected
	4	**3.220***	4.68	0.786	0.244	2/301	Accepted
	5	**0.413***	4.68	0.014	0.035	2/301	Accepted

I = Innovations. **Innovation-1** = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. **df**.=degrees of freedom * Significant at 1 % level

With regard to farmer's occupation and adoption of agricultural innovations, Table 4.22 shows that, there is significant association between the occupation and the four innovations viz.; 1, 2, 4 and 5, as evident from computed F values, whereas it is also observed that there is no association between farmer's occupation and adoption of innovation-3. This explains that farmers engaged in different occupational activities tend to adopt agricultural innovations to a varying level.

4.6.4 Farmers' income and adoption of innovations

Table 4.23 depicts the farmers' income and adoption of agricultural innovations in the villages under study.

Table 4.23: Farmers income and adoption of innovations (ANOVA)

Socio-economic characteristics	I	F-value (Computed)	F-value (Tabulated)	Mean square		df.	Remarks
				Between groups	Within groups		
Income	1	6.851	4.68	1.644	0.240	2/301	Rejected
	2	**0.919***	4.68	0.131	0.142	2/301	Accepted
	3	**4.188***	4.68	0.977	0.233	2/301	Accepted
	4	**2.512***	4.68	0.616	0.245	2/301	Accepted
	5	**0.902***	4.68	0.031	0.035	2/301	Accepted

I = Innovations. **Innovation-1** = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. **df**.=degrees of freedom * Significant at 1 % level

As evident from the Table 4.23, it is clear that computed F values show significant association between the income and the adoption of innovation-2, innovation-3, innovation-4 and with innovation-5 respectively. This indicates that

there is variation in the adoption of agricultural innovations among the farmers with different income level. It is also observed from the above table that there is no association between farmer's income and the adoption of innovation-1.

4.6.5 Farmers' landholdings and adoption of innovations

Table 4.24 shows the landholdings of the farmers and the adoption of agricultural innovations.

Table 4.24: Farmers landholdings and adoption of innovations (ANOVA)

Socio-economic characteristics	I	F-value (Computed)	F-value (Tabulated)	Mean square		df.	Remarks
				Between groups	Within groups		
Landholdings	1	**2.614***	4.68	0.645	0.247	2/301	Accepted
	2	**1.621***	4.68	0.230	0.142	2/301	Accepted
	3	**2.681***	4.68	0.632	0.236	2/301	Accepted
	4	**0.446***	4.68	0.111	0.249	2/301	Accepted
	5	**2.383***	4.68	0.082	0.034	2/301	Accepted

I = Innovations. **Innovation-1** = improved seeds, **Innovation-2** = fertilizers, **Innovation-3** = plant protection measures, **Innovation-4** = agricultural implements, **Innovation-5** = crops management. **df.**=degrees of freedom * Significant at 1 % level

The F values, as shown in the above table, indicate that there is significant association between the landholdings of the farmers and the adoption of all the five agricultural innovations. This reflects that landholdings of the farmers are an important factor when it comes to adoption of agricultural innovations as farmers under study had adopted agricultural innovations to a varying level.

4.6.6 Correlation of age with adoption of agricultural innovations

Table 4.25 have been incorporated to reflect whether there exist association between age and adoption of five agricultural innovations.

Table 4.25: Correlation of age with adoption of five agricultural innovations (n=304)

	AGE	INNO1	INNO2	INNO3	INNO4	INNO5
AGE	1					
INNO1	**0.134***	1				
INNO2	0.050	0.174**	1			
INNO3	**0.152****	0.266**	0.272**	1		
INNO4	**0.168****	0.148**	0.121*	0.712**	1	
INNO5	0.085	0.108	0.099	0.082	-0.031	1

INNO1 = improved seeds, **INNO2** = fertilizers, **INNO3** = plant protection measures, **INNO 4** = agricultural implements, **INNO5** = crops management.
* Significant at 5 % level ** Significant at 1 % level

It is evident from the above table that, age of the farmers indicates positively significant correlation at five percent level of significance with innovation-1 (r=0.134) and at one percent level of significance with innovation-3 (r=0.152) and innovation-4 (r=0.168). This indicates that age of the farmers is highly associated with the adoption of these three groups of agricultural innovations. However, no worthwhile correlation is indicated between farmer's age and the remaining two innovations i.e. 2 and 5.

4.6.7 Correlation of education with adoption of agricultural innovations

Correlation of farmers' education with adoption of five agricultural innovations has been depicted in Table 4.26.

Table 4.26: Correlation of education with adoption of five agricultural innovations (n=304)

	EDUCAT	INNO1	INNO2	INNO3	INNO4	INNO5
EDUCAT	1					
INNO1	0.066	1				
INNO2	0.012	0.174**	1			
INNO3	0.062	0.266**	0.272**	1		
INNO4	0.082	0.148**	0.121*	0.712**	1	
INNO5	0.044	0.108	0.099	0.082	-0.031	1

EDUCAT = education. **INNO-1** = improved seeds, **INNO-2** = fertilizers, **INNO-3** = plant protection measures, **INNO-4** = agricultural implements, **INNO-5** = crops management.
* Significant at 5 % level ** Significant at 1 % level

As evident from Table 4.26, education of the farmers indicates no significant correlation with adoption of agricultural innovations. Here it can be inferred that, farmer's education is not a binding factor when it comes to adoption of agricultural innovations.

4.6.8 Correlation of occupation with adoption of agricultural innovations

The table below has been incorporated to show the correlation of farmers' occupation with adoption of five agricultural innovations.

Table 4.27: Correlation of occupation with adoption of five agricultural innovations (304)

	OCCUPA	INNO1	INNO2	INNO3	INNO4	INNO5
OCCUPA	1					
INNO1	**-0.138***	1				
INNO2	-0.067	0.174**	1			
INNO3	**-0.231****	0.266**	0.272**	1		
INNO4	**-0.142***	0.148**	0.121*	0.712**	1	
INNO5	-0.051	0.108	0.099	0.082	-0.031	1

OCCUPA = occupation. **INNO-1** = improved seeds, **INNO-2** = fertilizers, **INNO-3** = plant protection measures, **INNO-4** = agricultural implements, **INNO-5** = crops management.
* Significant at 5 % level ** Significant at 1 % level

From the Table 4.27 it is obvious that occupation of the farmers reveals negatively significant correlation with innovation-1 (r=-0.138) at five percent level, innovation-3 (r=-0.231) at one percent level and innovation-4 (r=-0.142) at five percent level of significance. This clearly shows that the nature of occupation has to some extent exerted influence on the adoption of particular innovations as farmers engaged in different occupations tends to adopt only those innovations which are easily available and convenient to use. It is also observed that the remaining three innovations had indicated no significant correlation with the occupation of the farmers.

4.6.9 Correlation of income with adoption of agricultural innovations

Table 4.28 below reflect the relationship between farmers' income with adoption of five agricultural innovations.

Table 4.28: Correlation of income with adoption of five agricultural innovations (n=304)

	INCOME	INNO1	INNO2	INNO3	INNO4	INNO5
INCOME	1					
INNO1	-0.039	1				
INNO2	0.068	0.174**	1			
INNO3	0.105	0.266**	0.272**	1		
INNO4	0.091	0.148**	0.121*	0.712**	1	
INNO5	0.076	0.108	0.099	0.082	-0.031	1

INNO-1 = improved seeds, **INNO-2** = fertilizers, **INNO-3** = plant protection measures, **INNO-4** = agricultural implements, **INNO-5** = crops management.
* Significant at 5 % level ** Significant at 1 % level

Table 4.28 elucidates that farmer's income reveals no significant association with the adoption of agricultural innovations. From this analysis, it is

apparent that farmers' income in the studied villages indicates no significant correlation with the adoption of agricultural innovations.

4.6.10 Correlation of landholdings with adoption of agricultural innovations

The correlation of landholdings with adoption of five agricultural innovations is presented in the Table 4.29 as below

Table 4.29: Correlation of landholdings with adoption of five agricultural innovations (n=304)

	LANHOL	INNO1	INNO2	INNO3	INNO4	INNO5
LANHOL	1					
INNO1	-0.110	1				
INNO2	0.054	0.174**	1			
INNO3	0.026	0.266**	0.272**	1		
INNO4	0.031	0.148**	0.121*	0.712**	1	
INNO5	0.006	0.108	0.099	0.082	-0.031	1

LANHOL = landholdings. **INNO-1** = improved seeds, **INNO-2** = fertilizers, **INNO-3** = plant protection measures, **INNO-4** = agricultural implements, **INNO-5** = crops management.
* Significant at 5 % level ** Significant at 1 % level

As shown in the above table, landholdings of the farmers indicate no significant correlation with the adoption of agricultural innovations. This signifies that irrespective of the size of their landholdings, farmers under study have adopted the agricultural innovations.

Conclusion

From the above analysis and interpretation, it is revealed that there is variation across socio-economic variables and the adoption of agricultural innovations. The

variations are indicated against the socio-economic variables such as age, education, occupation, income and landholdings with five agricultural innovations (F-Test). This goes to show that, farmers in the studied area adopt agricultural innovations on the basis of their socio-economic characteristics.

Further, it is revealed that age of the farmers has indicated positive relationship with the adoption of agricultural innovations. Here it can be understood that since agriculture is the mainstay in the studied area, it was imperative for farmers of different age groups to go for agricultural innovations. It is also obvious that the occupation of the farmers in the study villages has indicated negative correlation with the adoption of agricultural innovations. This is because farmers who are engaged in other occupations are less keen to go for agricultural innovations, since agriculture becomes their secondary occupation. However, when it comes to education, income and landholdings of the farmers no significant relationship was indicated with the adoption of agricultural innovations (Correlation Test). Therefore, the hypothesis, ***'adoption of agricultural innovations varies across age, educational level, income level, land holdings and occupation,'*** was found to be true.

4.7 Geographical locations

Today, agriculture is an information-intensive sector where accessibility of appropriate information is vital to enhance agricultural productivity. In other words, the accessibility and gainful utilisation of the generated information by the end users- the farmers, constitutes a fundamental and integral part of the diffusion and adoption of agricultural innovations.

4.7.1 Geographical locations and adoption of agricultural innovations

In order to test the hypothesis that **(H_3)** ***'adoption of agricultural innovations varies across geographical locations'*** Table 4.30 has been incorporated. The assumption was that villages located close to the Block Headquarters are better communicated and had more access to information pertaining to agriculture leading to more adoption of innovations than those located far away. Therefore, each Block, one village located close to and the other far from the Block Headquarters were purposively selected to capture the effect of distance on the adoption of agricultural innovations. Further, to find out the statistical significance on the differences between two villages within the same block with regard to adoption of agricultural innovations, 'z' test was applied and tested at one and five percent level of significance. The analysis is based on the mean value obtained for adoption of agricultural innovations.

Table 4.30: 'z' test analysis of villages with regard to distance from Block Headquarters and adoption of agricultural innovations (n=304)

Blocks and villages	Distance (km) from the Block H.Q.	n	Mean	SD	'z' value
Medziphema Block					
New Sochunoma	3	37	0.1459	0.1804	
Khaibung	8	31	0.2645	0.2332	**2.31***
Nuiland Block					
Hozukhe	4	33	0.2909	0.2185	
Kehoi	15	30	0.3267	0.2132	0.379
Kuhuboto Block					
Khehukho	5	35	0.4343	0.2543	
Nihoto	10	40	0.3500	0.2470	0.649
Dhansiripar Block					
Singrijan	5	60	0.5700	0.2520	
Razaphe	12	38	0.3474	0.2215	**3.247****

* Significant at 5 % level** Significant at 1 % level

The above table elucidates that in Medziphema Block statistical differences (z=2.31) between New Sochunoma and Khaibung is significant at five percent. This indicates that adoption of agricultural innovations between the two villages vary across geographical locations. It was found that though New Sochunoma is located only three kilometres away from the Block Headquarters, there was lesser adoption of agricultural innovations as compared to Khaibung village, which is located eight kilometres away from the block headquarters. This has been mainly because majority of the farmers in New Sochunoma have medium (3-7 acres) and large (7 acres and above) landholdings which enthused them to go for other farming practices such as horticulture, animal husbandry, poultry and so on. Hence, there was less need for adoption of agricultural innovative practices.

However, in case of Khaibung village, it was found that most of the villagers are farmers engaged in agriculture with small landholdings (up to 3 acres). Furthermore, it was found that land was the main resource and agriculture the mainstay of the villagers. Therefore, it was imperative for farmers to be always on the look out for new avenues to enhance their agricultural productivity. Thus, there was more need for and utilisation of information relating to agriculture, which led to more adoption of agricultural innovative practices.

Further, it is also observed that, there was no significant statistical difference among the four villages under Nuiland and Kuhuboto Blocks as depicted on the above table. This indicates that geographical location did not matter much when it comes to adoption of agricultural innovations among these villages. A recent study (Llewellyn, 2002) has also indicated similar findings. This also explains that farmers under study have adopted agricultural innovations to a more or less at a similar extent.

The above Table 4.30 also indicates that, in Dhansiripar Block statistical differences (z=3.247) between Singrijan and Razaphe is highly significant at one percent. This indicates that adoption of agricultural innovations between the two villages vary across geographical locations. Here it can be inferred from the above table that there is more access to information pertaining to agriculture for village near to the Block Headquarters through both mass media and interpersonal sources

and channels of information. Thus, it is obvious that adoption of agricultural innovations was much higher in Singrijan (5 km) as compared to Razaphe (12km). This finding corroborate with the findings of earlier studies (Longo, 1990; Kaniki, 1991; Mwangi, 2004), which had indicated that farmers close to the headquarters and dissemination centres had more access to agricultural information and consequently higher level of adoption of innovations.

Conclusion

The above analysis and interpretation has revealed some interesting results whereby village located far from the Block Headquarters had adopted more agricultural innovation than the village close to the Block Headquarters. This indicates that village far from the Block Headquarters (Medziphema Block) have more access to information pertaining to agricultural innovations through various information sources and channels. Hence, there is variation with regard to adoption of agricultural innovations between the two villages. On the other hand, it is also observed that village near to the Block Headquarters had adopted more agricultural innovation than the village far from Block Headquarters in the case of Dhansiripar Block. This goes to show that for farmers living in the village near to the Block Headquarters have more access to agricultural information to a greater extent than the farmers living far from the Block Headquarters.

Further, the above analysis also reveals that for the four studied villages under Nuiland and Kuhuboto Blocks, there is no significant statistical difference, which implies that there is no variation in the adoption of agricultural innovations amongst the villages as agricultural innovations had been adopted to a similar extent.

Therefore, it can be concluded that the hypothesis ***'adoption of agricultural innovations varies across geographical locations'*** has been partially proved.

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CHAPTER – V

CONCLUSION

5.0 Introduction

The necessity for information communication on agricultural innovations needs no emphasis. In other words, the farmers need to have access to and acquired the latest knowledge on agricultural technologies. Unless this is done, any attempt to improve food production is a remote possibility. However, successful communication of agricultural information has been a huge challenge for the implementing agencies. Although, various agencies have been making great efforts to effectively and efficiently impart the knowledge of improved agricultural practices to farmers, many factors came on the way towards the successful and meaningful utilisation of modern farming technologies by the farmers. Among others, lack of local relevance in certain innovative packages, inappropriate media and technical jargon used in information communication and the poor socio-economic conditions of the farmers were found to be the major impediments towards successful diffusion and adoption of agricultural innovations. It was against this backdrop, the present study was carried out in order to ascertain how successfully information on agricultural innovations had been communicated to the farmers at the grassroots level in Dimapur District of Nagaland. The findings and recommendations of the present study have been presented as follows:

5.1 Summary of findings

The findings of the study have been described sequentially under five broad categories as below:

- Information sources and channels used for the adoption of agricultural innovations.
- Socio-economic characteristics of the farmers and adoption of agricultural innovations.
- Distances of the villages from the Blocks Headquarters and adoption of agricultural innovations.
- Factors influencing adoption of agricultural innovations.
- Impediments involved in adoption of agricultural innovations.

5.1.1 Information sources and channels used for the adoption of agricultural innovations

(i) Trainings and demonstrations as information sources and channels were found to have played a significant role in the adoption of innovations.

(ii) Farmer's field visit and agricultural exhibitions were also found to play some role in the adoption of agricultural innovations. However, radio, TV and printed publications as sources of information with regard to adoption of innovations did not indicate any significant impact.

(iii) Social networks such as relatives, friends, fellow farmers, family members and neighbours were utilised significantly as information sources and channels for the adoption of agricultural innovations.

(iv) From the study it also emerged that communication of agricultural information by agricultural extension workers, scientists and input dealers had a strong influence on the adoption of agricultural innovations.

(v) It was also found that village council members and landowners had served as useful information sources for the adoption of agricultural innovations.

(vi) Other interpersonal information sources and channels such as village development board members, health workers and other personnel have been used to some extent as sources of information with regard to adoption of agricultural innovations.

(vii) The study also found that farmers depended more on interpersonal information sources and channels than mass media when it comes to adoption of agricultural innovations.

5.1.2 Socio-economic characteristics of the farmers and adoption of agricultural innovations

(i) The findings of the study indicate that age of the farmers is found to be positively associated with the adoption of agricultural innovations.

(ii) It was also found that farmer's occupational nature had exerted negative relationship with the adoption of agricultural innovations.

(iii) Other socio-economic characteristics of the farmers such as education, income and landholdings have shown no significant relationship with the adoption of agricultural innovations.

(iv) The study also found that there is variation across farmer's socio-economic variables such as age, education, occupation, income and landholdings with the adoption of agricultural innovations.

5.1.3 Distances of the villages from the Blocks Headquarters and adoption of agricultural innovations

(i) The study found that adoption of agricultural innovations between four villages under Medziphema and Dhansiripar Blocks vary across geographical locations.

(ii) It is also revealed that there were no significant differences on the adoption of agricultural innovations among the four villages with respect to distance from the Block Headquarters in Nuiland and Kuhuboto Blocks.

5.1.4 Factors influencing adoption of agricultural innovations

(i) The present study had found that besides interpersonal communication networks, agricultural extension activities such as demonstrations, trainings and to some extent field visits and exhibitions have motivated the farmers to adopt agricultural innovations.

(ii) Further, it was also found that one major factor which had motivated the farmers to go for agricultural innovations was to yield more agricultural productivity.

(iii) Farmers who have adopted agricultural innovations opined that the existing traditional farming practices were less productive than modern farming practices.

(iv) Curiosity to try out agricultural innovations was also found to be one factor for the farmers under study to go for agricultural innovations.

(v) One factor that had induced the farmers to go for agricultural innovations was found to be free-of-cost of the inputs the farmers get from the implementing agencies, friends, family members and relatives.

5.1.5 Impediments towards adoption of agricultural innovations

(i) It has been evident from the present study that farmers had less access to agricultural information especially from mass media such as radio,

television and printed sources. This has been due to the prevailing illiteracy among the farmers under study and moreover such media lack local contents. Further, it was found that farmers had no proper knowledge as to which source of information was appropriate for the purpose of agricultural innovations.

(ii) Unsuitability of the innovations with the local farming conditions was also found to be one major factor that had discouraged the farmers to go for agricultural innovations. Fear of harmful effect on the environment and the complexity of the processes involved in using certain innovations were also found to be constraints towards adoption of agricultural innovations by the farmers under study.

(iii) Farmers' lack of interest and scepticism on the innovative packages in terms of the superiority over the age old traditional practices, etc., have been found to have discouraged farmers from adopting agricultural innovations. Further, it was also found that high cost of inputs was a major constraint towards the adoption of agricultural innovations for many farmers under study. On the other hand, non-availability of desired inputs was found to be one factor why farmers under study did not adopt innovations.

(iv) It was found that in certain cases, small land holdings with limited arable land had restrained the farmers to go for adoption of agricultural innovations. In some other cases, it was found that farmers did not go for adoption of innovations, as the need did not arise with the fertility of the land.

(v) It was also evident that among other factors, many of the farmers did not go for agricultural innovations due to the risk factor involved in adopting innovations. Further, some of the farmers had problem in adopting agricultural innovations due to time constraints. Interestingly, it was found that many farmers had restrained themselves from adopting innovative packages seen the failures of fellow farmers in yielding the expected agricultural output by adopting innovations. It has been noted here that these were the outcome of lack of proper training and education to the farmers on the part of the implementing agencies.

(vi) The study had revealed that improper distribution of inputs; lack of proper information communication and lack of proper understanding of the local situations on the part of the implementing agencies were some major factors why some farmers under study had not adopted innovations. Another major problem revealed through the present study have been relating to trainings and demonstrations. Many of the farmers

were not informed about such programmes. On the other hand, most of the farmers who had attended such programmes could not understand what the trainers and officials were demonstrating and telling them. Further, the frequency of the field visits by extension workers were found to be very less leading to non-adoption of agricultural innovations by the farmers.

(vii) Lack of knowledge on credit facilities and lack of proper marketing facilities were also some of the prominent impediments towards adoption of agricultural innovations by the farmers.

5.2 Recommendations

(i) Extension visits to the farmers indicate significant influence on the adoption of innovations, which underlines the vital role that extension workers can play in the communication of agricultural information. Hence, extension workers should make more contacts with the farmers. This will enable the extension workers to provide required guidance to the farmers and to also reach more number of farmers with agricultural information in a relatively shorter period of time.

(ii) Recognising the fundamental role played by the fellow farmers in motivating other farmers to adopt innovations, it is necessary that they

should be identified and kept as frontline in communicating agricultural information by the implementing agencies. Further, contact farmers who are considered a vital link with the agricultural field workers should be strengthened by keeping them up-to-date with latest farm information and should be provided with suitable incentives.

(iii) Imparting trainings for adoption of agricultural innovations at the village level to farmers especially the illiterate and the less educated farmers should be a major thrust. This will ensure more participation of all categories of farmers, particularly the small-scale farmers. Further, farmers should be motivated through demonstrations under real farming situations and if need be the entire method of practices should be repeated with the help of suitable media. The frequency of field visits and farmers' day should also be increased coupled with continuous follow up of the previous programmes.

(iv) The implementing agencies should seek the additional services of local institutions such as Village Council, Village Development Board (VDB) and Self Help Groups (SHGs) as these institutions were found to have been actively involved in communicating agricultural information to the farmers.

(v) The government should encourage and provide necessary funds and resources to the cooperatives, rural-based NGOs such as Farmers Association, Women Organisations, Youth Clubs, etc., that are engaged in the rural uplift especially in the field of agriculture, to enable them to help the farmers more productively.

(vi) The government, financial institutions and cooperatives must provide required information and guidance to the farmers through conducting trainings and by organising special programmes on credit schemes and facilities. Further, availability of these credit schemes should brought to the knowledge of the farmers and also simplify the procedures involved in obtaining those credit facilities should be simplified.

(vii) The farmers under study have problems when it comes to marketing of the agricultural produce. This is mainly due to farmers' lack of marketing information plus transportation problems. In view of these circumstances, continuous supply of market information through appropriate media is very essential and the government should establish proper marketing system while providing necessary transportation facilities to enable the farmers to carry their farm produce to the markets and get the required returns.

5.3 Suggestions for Future Research

In the present study, a sample of 304 farmers has been drawn with proper representation from all the villages selected for the study to assess how the generated information on agricultural innovations is communicated to the farmers. In this connection, it is suggested that further research can be conducted at the micro level in the form of controlled and impact assessment study to generate more tangible and substantial results.

ANNEXURE-1

OVERALL VILLAGE PROFILE

1. MEDZIPHEMA BLOCK

Sl. No.		New Sochunoma	Khaibung
1	Establishment of the village+	1080	1926
2	Total geographical area (Sq. Km)++	9	9
3	Altitude (meter at sea level)++	280	280
4	Dominant tribe	Angami	Kuki
5	Distance from the village to the:		
i	*State capital*	48	52
ii	*District HQ*	37	38
iii	*Block HQ*	3	8
iv	*Nearest town*	5	8
v	*Nearest main marketing center*	5	8
vi	*Nearest information center/research & extension center etc.*	5	8
6	Transport facilities:		
i	*Distance to the nearest main road*	4	8
ii	*Existence of linked road*	Kaccha	Kaccha
7	Total population+	700	460
8	Number of households+	122	76
9	Literacy percentage+	65	45
10	Educational institutions*	1GMS	1GPS
11	Health center	N	N
12	Village library	Y	N
13	Government office	N	N
14	NGOs/ co-operative society etc.	Y	Y
15	Local market	N	N
16	Electricity	Y	Y
17	Communication channels		
i	*Telephone*	Y	Y
ii	*TV*	Y	Y
iii	*Printed publications*	Y	N
iv	*Radio*	Y	Y
18	Water supply	Y	Y
19	Major river	*Jumhar*	N

***GPS-** government primary school, ***GMS-** government middle school. **+Source-**Village Council, **+Source-** Directorate of Agriculture, Government of Nagaland. **Y**= Yes, **N**= No.

2. NUILAND BLOCK

Sl. No.		Hozukhe	Kehoi
1	Establishment of the village+	1953	1922
2	Total geographical area (Sq. Km)++	11	7
3	Altitude (meter at sea level)++	195	195
4	Dominant tribe	Sumi	Sumi
5	Distance from the village to the:		
i	*State capital*	87	77
ii	*District HQ*	23	13
iii	*Block HQ*	4	15
iv	*Nearest town*	4	13
v	*Nearest main marketing center*	4	13
vi	*Nearest information center/research & extension center etc.*	4	13
6	Transport facilities:		
i	*Distance to the nearest main road*	22	1
ii	*Existence of linked road*	Kaccha	Kaccha
7	Total population+	540	570
8	Number of households+	82	73
9	Literacy percentage+	55	70
10	Educational institutions*	1GPS	1GPS
11	Health center	N	N
12	Village library	N	N
13	Government office	N	N
14	NGOs/ co-operative society etc.	Y	Y
15	Local market	Y	N
16	Electricity	Y	Y
17	Communication channels		
i	*Telephone*	Y	Y
ii	*TV*	Y	Y
iii	*Printed publications*	Y	N
iv	*Radio*	Y	Y
18	Water supply	N	N
19	Major river	*Zubza*	*Zubza*

***GPS**- government primary school. **+Source**-Village Council, **++Source**-Directorate of Agriculture, Government of Nagaland. **Y**= Yes, **N**= No.

3. KUHUBOTO BLOCK

Sl. No.		Khehukho	Nihoto
1	Establishment of the village+	1969	1968
2	Total geographical area (Sq. Km)++	8	8
3	Altitude (meter at sea level)++	190	190
4	Dominant tribe	Sumi	Sumi
5	Distance from the village to the:		
i	*State capital*	80	76
ii	*District HQ*	18	15
iii	*Block HQ*	5	10
iv	*Nearest town*	5	15
v	*Nearest main marketing center*	5	15
vi	*Nearest information center/research & extension center etc.*	5	15
6	Transport facilities:		
i	*Distance to the nearest main road*	0	2
ii	*Existence of linked road*	Kaccha	Kaccha
7	Total population+	525	924
8	Number of households+	115	131
9	Literacy percentage+	65	50
10	Educational institutions*	1GPS	1GPS, 2Pvt.S
11	Health center	Y	Y
12	Village library	N	N
13	Government office	Y	N
14	NGOs/ co-operative society etc.	Y	Y
15	Local market	Y	N
16	Electricity	Y	Y
17	Communication channels		
i	*Telephone*	Y	Y
ii	*TV*	Y	Y
iii	*Printed publications*	Y	Y
iv	*Radio*	Y	Y
18	Water supply	N	N
19	Major river	N	*Diphu*

***GPS-** government primary school, ***Pvt. S-** private school. **+Source-**Village Council, **++Source-**Directorate of Agriculture, Government of Nagaland. **Y**= Yes, **N**= No.

4. DHANSIRIPAR BLOCK

Sl. No.		Singrijan	Razaphe
1	Establishment of the village+	1947	1970
2	Total geographical area (Sq. Km)++	8	8
3	Altitude (meter at sea level)++	184	165
4	Dominant tribe	Gorkha	Angami
5	Distance from the village to the:		
i	*State capital*	82	78
ii	*District HQ*	12	27
iii	*Block HQ*	5	12
iv	*Nearest town*	12	13
v	*Nearest main marketing center*	12	13
vi	*Nearest information center/research & extension center etc.*	12	22
6	Transport facilities:		
i	*Distance to the nearest main road*	0	13
ii	*Existence of linked road*	Kaccha	Kaccha
7	Total population+	1900	750
8	Number of household+	197	93
9	Literacy percentage+	60	55
10	Educational institutions*	1GPS, 1GHS	1GPS
11	Health center	Y	Y
12	Village library	N	N
13	Government office	N	N
14	NGOs/ co-operative society etc.	Y	Y
15	Local market	N	N
16	Electricity	Y	Y
17	Communication channels		
i	*Telephone*	Y	Y
ii	*TV*	Y	Y
iii	*Printed publications*	Y	N
iv	*Radio*	Y	Y
18	Water supply	Y	N
19	Major river	*Khopanala*	*Bahe*

***GPS**- government primary school, ***GHS**- government high school. **+Source**-Village Council, **++Source**-Directorate of Agriculture, Government of Nagaland. **Y**= Yes, **N**= No.

ANNEXURE- 2

VILLAGE PROFILE SCHEDULE

Date of Interview .....

1. Name of the Village.....

2. Establishment of the Village .....

3. Total Area (approx.) of the Village (in hectares/ sq. km) .....

4. Dominant tribe of the Village .....

5. Literacy percentage of the Village .....

6. Block .....

7. District .....

8. State .....

9. Distance from the village to different centers:

	Name of the place/center	Distance (km)
a) State Capital	.....	.....
b) District HQ	.....	.....
c) Block Center	.....	.....
d) Nearest Town	.....	.....
e) Nearest Main Marketing Centre	.....	.....
f) Nearest Information Generation/Dissemination Center e.g. (Research stations/centre, extensions center/ training institute etc.)	.....	.....
g) Any other		

10. Transport facilities:
    a) Distance to the nearest main road (kms.)
    b) Existence of linked road: Yes/No
    If Yes (a) Pucca road ( ) (b) Kuccha road ( )

11. Total Population of the village .....

12. Total number of households families .....
    a) Number of families engaged in agriculture .....
    b) Number of families engaged in other occupation .....
    c) Number of Govt. employed families
    (posted and permanently residing in the village) .....

13. Educational institutions in the village:
    a) Primary School Yes/No
    b) Middle School Yes/No
    c) Secondary School Yes/No
    d) Higher Secondary Yes/No
    e) Any other .....

14. Is there a:
    a) Health Centre in the village Yes/No
    If yes, please specify .....
    b) Library in the village Yes/No
    If yes, please specify .....
    c) Govt. office in the village Yes/No
    If yes, please specify .....
    d) NGOs/Co-operatives in the village Yes/No
    If yes, please specify .....
    e) Local Market in the village Yes/No
    If yes, please specify .....
    f) Cottage/ Small Scale Industries Yes/No
    If yes, please specify .....
    g) Any other .....

15. Whether electricity is available in your village? Yes/No

16. Communication channels available in the village:
    a) Telephone Yes/No
    b) Television Yes/No
    c) Printed Publications (Newspapers, magazines, etc.) Yes/No
    d) Radio Yes/No
    e) Any other .....

17. Any other information .....

ANNEXURE- 3

INTERVIEW SCHEDULE

Date of Interview .....

1. Name (optional) .....

2. Age: (i) Upto 21 years [ ] (ii) 22-49 years [ ] (iii) 50 years and above [ ]

3. Status in the family: (i) Father [ ] (ii) Mother [ ] (iii) Son [ ] (iv) Daughter [ ] (v) Any other .....

4. Educational status: (i) Illiterate [ ] (ii) Upto Secondary level [ ] (iii) Higher Secondary and above [ ]

5. Size of the family members: .....

6. House owned: (i) Kaccha Yes/No (ii) Pucca Yes/No (iii) Mixed Yes/No.

7. Livestock owned:

	No.	Self consumption	Commercial purpose	Expected costs (Rs.)
i) Buffaloes	.....	Yes/No	Yes/No	.....
ii) Cows	.....	Yes/No	Yes/No	.....
iii) Pigs	.....	Yes/No	Yes/No	.....
iv) Chickens	.....	Yes/No	Yes/No	.....
v) Any others	.....			

8. Material possession: (i) Bicycle Yes/No (ii) Two wheeler Yes/No (iii) Three wheeler Yes/No (iv) Four wheeler Yes/No (v) Radio Yes/No (vi) TV Yes/No (vii) Tape Yes/No (viii) Telephone Yes/No (ix) Any other .....

9. If you have radio and TV, kindly let me know about the:
   i) Radio programme/s you listen to .....
   ii) TV programme/s you watch .....

10. Do you subscribe to any of the printed materials (e.g. Newspapers, magazines, professional publications, etc.)? Yes/No. If Yes, please specify .....

11. Are you a member of any organization (s) of the village or any other e.g. Village Council, VDB, NGOs, Cooperative Society, Church etc.? Yes/No If Yes, kindly specify .....

12. How long have you been engaged in agricultural activities? Please specify.....
.....

13. Distance of your field (agricultural farm) from your residence (in yards, meters, kms.)
.....

14. Which of the following agricultural practices do you follow?
i) Settled (permanent) Yes/No If Yes, please specify .....
ii) Jhum (shifting) Yes/No If Yes, please specify the crops you plant therein? .....
.....

15. Occupation:
i) Primary (main) occupation .....
ii) Secondary/ other occupation .....

16. Income generated from different sources:
i) Total annual income from agriculture (approx.) .....
ii) Total annual income from non-agriculture sources (approx.) .....

17. Size of landholdings and Tenure status:

Sl. No.	Type of Land	Total land owned (in Acres)
1.	Cultivated land i.e. (Arable land)	
	Uncultivated land	
		Total land owned on lease (in Acres)
2.	Cultivated land i.e. (Arable land)	
	Uncultivated land	

18. Marketing of the agricultural produce:
i) Own village [ ]
ii) Outside the village [ ] if outside, please specify the place .....

19. Sale of agricultural produce:
i) By self [ ]
ii) To the middle man (agent) [ ]
iii) To the wholesalers [ ]
iv) Any other .....

20. Do you collect marketing information to sale your agricultural products? Yes/No. If yes please indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

21. Have you adopted any of the following agricultural innovations? Such as:

A. Improved seeds (e.g. Paddy, wheat, maize, pulses, oilseeds, etc.) Yes/No. If yes, please specify:

(i) Name of the improved seeds .....

(ii) Year of adoption .....

(iii) Reason for adoption .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

(iv) If you have discontinued any of the improved seeds, kindly specify the reason(s).....

(v) If you have not adopted any of the improved seeds, right from the start, kindly specify the reason(s).....

B. Fertilizers: (e.g. Chemical and bio-fertilizers.) Yes/No. If yes, please specify:

(i) Name of the fertilizers .....

(ii) Year of adoption .....

(iii) Reason for adoption .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

(iv) If you have discontinued any of the fertilizers, kindly specify the reason(s).....

(v) If you have not adopted any of the fertilizers, right from the start, kindly specify the reason(s).....

C. *Plant Protection Measures*: (e.g. Pesticides, insecticides, IPM, etc.) Yes/No. If yes, please specify:

(i) Name of the plant protection measures .....

(ii) Year of adoption .....

(iii) Reason for adoption .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

(iv) If you have discontinued any of the plant protection measures, kindly specify the reason(s).....

(v) If you have not adopted any of the plant protection measures, right from the start, kindly specify the reason(s).....

D. *Agricultural implements*: (e.g. Power tiller, sprayer, tools and kits, pump sets, etc.) Yes/No. If yes, please specify:

(i) Name of the agricultural implements .....

(ii) Year of adoption .....

(iii) Reason for adoption .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

(iv) If you have discontinued any of the agricultural implements, kindly specify the reason(s).....

(v) If you have not adopted any of the agricultural implements, right from the start, kindly specify the reason(s).....

E. Crops management: (e.g. Planting, harvesting, etc.) Yes/No. If yes, please specify:

(i) Name of the crops management .....

(ii) Year of adoption .....

(iii) Reason for adoption .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				**Interpersonal information sources and channels**			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

(iv)If you have discontinued any of the crops management, kindly specify the reason(s).....

(v) If you have not adopted any of the crops management, right from the start, kindly specify the reason(s).....

22. Do you practice multiple cropping? Yes/No. If yes, please specify the type of crops ..... and kindly indicate the extent of your use of various information source(s) in the scales with regard to adoption of multiple cropping:

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				Interpersonal information sources and channels			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members'	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

23. Do you participate in any of the following agricultural extension services such as demonstrations, trainings, field visits etc. for agricultural innovations? Yes/No. If yes, kindly specify:

Sl. No.	Name of the activities	Year	Purpose	Organizers	Information source(s)

24. How often do you visit the following place(s) for the purpose of agriculture? Kindly indicate the frequency of your visit in the scales: 1 = *less than five times a year*, 2 = *less than twelve times a year* and 3 = *more than twelve times a year.*

Sl. No.	Places		Frequency		
1.	Town & Cities (Dimapur, Kohima etc.)	Yes/No	[1]	[2]	[3]
2.	Local Market	Yes/No	[1]	[2]	[3]
3.	Research Institutions (ICAR, State, etc.)	Yes/No	[1]	[2]	[3]
4.	University/ Agriculture college (SASARD etc.)	Yes/No	[1]	[2]	[3]
5.	District Agriculture Office	Yes/No	[1]	[2]	[3]
6.	Block Office	Yes/No	[1]	[2]	[3]
7.	Any others.....		[1]	[2]	[3]

25. Do you use credit, loan and subsidy facilities? Yes/No. If yes, please specify:
    (i) Source (Agent) .....
    (ii) Purpose .....

Also kindly indicate the extent of your use of various information source(s) in the scales.

(i) Not at all [1] (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media				Interpersonal information sources and channels			
(i) Newspapers	[1]	[2]	[3]	(i) Family Members	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	(ii) Relatives	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	(iii) Neighbours	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	(iv) Fellow Farmers	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	(v) Friends	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	(vi) Village Council Members	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	(viii) Scientists	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	(ix) Input dealers	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	(x) Other department personnel	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	(xi) Health Workers	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	(xii) Village Development Board	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	(xiii) Self Help Group	[1]	[2]	[3]
				(xiv) Land Owners	[1]	[2]	[3]
				(xv) Land Tenants	[1]	[2]	[3]
				(xvi) Horticultural personnel	[1]	[2]	[3]
				(xvii) Co-operative personnel	[1]	[2]	[3]
				(xviii) Teachers	[1]	[2]	[3]
				(xix) Students	[1]	[2]	[3]
				(xx) Wholesalers	[1]	[2]	[3]
				(xxi) Middleman	[1]	[2]	[3]
				(xxii) Transport owners	[1]	[2]	[3]
				(xiii) Customers	[1]	[2]	[3]
				(xxiv) Bank personnel	[1]	[2]	[3]
				(xxv) Any others.....	[1]	[2]	[3]

26. Do you go for crop insurance? Yes/No. If yes, please indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media			
(i) Newspapers	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]

Interpersonal information sources and channels			
(i) Family Members	[1]	[2]	[3]
(ii) Relatives	[1]	[2]	[3]
(iii) Neighbours	[1]	[2]	[3]
(iv) Fellow Farmers	[1]	[2]	[3]
(v) Friends	[1]	[2]	[3]
(vi) Village Council Members	[1]	[2]	[3]
(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Scientists	[1]	[2]	[3]
(ix) Input dealers	[1]	[2]	[3]
(x) Other department personnel	[1]	[2]	[3]
(xi) Health Workers	[1]	[2]	[3]
(xii) Village Development Board	[1]	[2]	[3]
(xiii) Self Help Group	[1]	[2]	[3]
(xiv) Land Owners	[1]	[2]	[3]
(xv) Land Tenants	[1]	[2]	[3]
(xvi) Horticultural personnel	[1]	[2]	[3]
(xvii) Co-operative personnel	[1]	[2]	[3]
(xviii) Teachers	[1]	[2]	[3]
(xix) Students	[1]	[2]	[3]
(xx) Wholesalers	[1]	[2]	[3]
(xxi) Middleman	[1]	[2]	[3]
(xxii) Transport owners	[1]	[2]	[3]
(xiii) Customers	[1]	[2]	[3]
(xxiv) Bank personnel	[1]	[2]	[3]
(xxv) Any others.....	[1]	[2]	[3]

27. Do you go for insurance on agricultural implements? Yes/No. If yes, please indicate the extent of your use of various information source(s) in the scales.

(i) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media			
(i) Newspapers	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]

Interpersonal information sources and channels			
(i) Family Members	[1]	[2]	[3]
(ii) Relatives	[1]	[2]	[3]
(iii) Neighbours	[1]	[2]	[3]
(iv) Fellow Farmers	[1]	[2]	[3]
(v) Friends	[1]	[2]	[3]
(vi) Village Council Members	[1]	[2]	[3]
(vii) Agricultural Extension Workers	[1]	[2]	[3]
(viii) Scientists	[1]	[2]	[3]
(ix) Input dealers	[1]	[2]	[3]
(x) Other department personnel	[1]	[2]	[3]
(xi) Health Workers	[1]	[2]	[3]
(xii) Village Development Board	[1]	[2]	[3]
(xiii) Self Help Group	[1]	[2]	[3]
(xiv) Land Owners	[1]	[2]	[3]
(xv) Land Tenants	[1]	[2]	[3]
(xvi) Horticultural personnel	[1]	[2]	[3]
(xvii) Co-operative personnel	[1]	[2]	[3]
(xviii) Teachers	[1]	[2]	[3]
(xix) Students	[1]	[2]	[3]
(xx) Wholesalers	[1]	[2]	[3]
(xxi) Middleman	[1]	[2]	[3]
(xxii) Transport owners	[1]	[2]	[3]
(xiii) Customers	[1]	[2]	[3]
(xxiv) Bank personnel	[1]	[2]	[3]
(xxv) Any others.....	[1]	[2]	[3]

28. Besides agricultural information, how much do you depend on the following source(s) of information for various purposes, such as health, education, business, employment, weather, politics, etc? Please indicate the extent of your use of various information source(s) in the scales.

(ii) *Not at all [1]* (ii) *Sometimes [2]* (iii) *Always [3]*

Mass Media	**Health**			**Education**			**Business**		
(i) Newspapers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Interpersonal information sources and channels									
(i) Family Members	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ii) Relatives	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iii) Neighbours	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iv) Fellow Farmers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(v) Friends	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vi) Village Council Members	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vii) Agricultural Extension Workers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(viii) Scientists	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ix) Input dealers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(x) Other department personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xi) Health Workers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xii) Village Development Board	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Self Help Group	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiv) Land Owners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xv) Land Tenants	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xvi) Horticultural personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xvii) Co-operative personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xviii) Teachers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xix) Students	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xx) Wholesalers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxi) Middleman	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxii) Transport owners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Customers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxiv) Bank personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxv) Any others.....	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]

Mass Media	Employment			Weather			Politics		
(i) Newspapers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ii) Radio	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iii) Printed Publications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iv) TV	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(v) Demonstrations	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vi) Trainings	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vii) Posters	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(viii) Exhibitions	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ix) Wall writings/Banners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(x) Public announcements	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xi) Meetings	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xii) Field visits	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Any others.....	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Interpersonal information sources and channels									
(i) Family Members	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ii) Relatives	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iii) Neighbours	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(iv) Fellow Farmers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(v) Friends	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vi) Village Council Members	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(vii) Agricultural Extension Workers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(viii) Scientists	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(ix) Input dealers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(x) Other department personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xi) Health Workers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xii) Village Development Board	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Self Help Group	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiv) Land Owners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xv) Land Tenants	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xvi) Horticultural personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xvii) Co-operative personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xviii) Teachers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xix) Students	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xx) Wholesalers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxi) Middleman	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxii) Transport owners	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xiii) Customers	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxiv) Bank personnel	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
(xxv) Any others.....	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]

29. Level of satisfaction on the availability of information on various agricultural innovative practices: Please indicate on the scales the level of your satisfaction on the availability of information on various agricultural innovative practices.

(i) *Disagree [1]* (ii) *Agree [2]*

Improved seeds

	Name of the Improved Seeds							
	.....		.....		.....		.....	
1. Information is adequately available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
2. Information is always available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
3. Availability of information is highly satisfactory	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
4. Information is rarely relevant	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
5. Information is not adequate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
6. Information is always late	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
7. Information is difficult to understand (jargon, technical terms etc.)	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
8. Channel/sources for the dissemination is not appropriate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Any other	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]

Fertilizers

	Name of the Fertilizers							
	.....		.....		.....		.....	
1. Information is adequately available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
2. Information is always available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
3. Availability of information is highly satisfactory	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
4. Information is rarely relevant	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
5. Information is not adequate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
6. Information is always late	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
7. Information is difficult to understand (jargon, technical terms etc.)	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
8. Channel/sources for the dissemination is not appropriate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Any other	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]

Plant protection measures

	Name of the Plant protection measures							
	.....		.....		.....		.....	
1. Information is adequately available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
2. Information is always available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
3. Availability of information is highly satisfactory	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
4. Information is rarely relevant	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
5. Information is not adequate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
6. Information is always late	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
7. Information is difficult to understand (jargon, technical terms etc.)	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
8. Channel/sources for the dissemination is not appropriate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Any other	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]

Agricultural Implements	**Name of the Agricultural Implements**							
	.....		.....		.....		.....	
1. Information is adequately available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
2. Information is always available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
3. Availability of information is highly satisfactory	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
4. Information is rarely relevant	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
5. Information is not adequate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
6. Information is always late	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
7. Information is difficult to understand (jargon, technical terms etc.)	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
8. Channel/sources for the dissemination is not appropriate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Any other	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]

Crop Management	**Name of the Crop Management**							
	.....		.....		.....		.....	
1. Information is adequately available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
2. Information is always available	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
3. Availability of information is highly satisfactory	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
4. Information is rarely relevant	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
5. Information is not adequate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
6. Information is always late	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
7. Information is difficult to understand (jargon, technical terms etc.)	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
8. Channel/sources for the dissemination is not appropriate	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Any other	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]

30. Do you feel it necessary to have an Integrated Information Centre (IIC) in your Village? Yes [ ] No [ ] If yes, kindly specify the reasons.....

CURRICULUM VITAE

Name: A. Alem W. Longchar

Father's Name: A. Longchar

Date of Birth: 05-07-72

Nationality: Indian

Category: Scheduled Tribe

Educational Qualifications:

Sl. No.	Name of Exam	Board	Year	Division/Grade
1.	HSLC	MBOSE	1990	II
2.	PU.Sc	NEHU	1992	III
3.	B.Sc	NEHU	1994	II
4.	B.Sc (Hons)	NEHU	1995	II
5.	M.L.I.Sc.	NEHU	1997	II

Other Qualifications:

1.	Certificate Course in Ecology and Environmental Science	Center for Environmental Studies	NEHU: Shillong
2.	Certificate Course in NGO Management	Center for Adult and Continuing Education	NEHU: Shillong

Work and Research Experience

Research Assistant cum Librarian
Regional Center, National Afforestation and Eco-development Board: Ministry of Environment and Forest, GOI.
Shillong, Meghalaya.

PARTICULARS OF THE CANDIDATE

NAME	: A. Alem W. Longchar
DEGREE	: Doctor of Philosophy
DEPARTMENT	: Library and Information Science: NEHU, Shillong
TITLE OF DISSERTATION	: Agricultural information communication and adoption of innovative practices in Nagaland: A case study of Dimapur District.
DATE OF PAYMENT OF ADMISSION	: 19-07-2001
APPROVAL OF RESEARCH PROPOSAL	
1. B.P.G.S.	: 20.05.2002
2. SCHOOL BOARD	: 31.05.2002
REGISTRATION NO. & DATE:	: 648 of 31-05-2002
DUE DATE OF SUBMISSION:	: 31-05-2007

(Veena Saraf)

Head

Head
Department of Library
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