INTRODUCTION

"We have many challenging tasks ahead. We have initiated economic reforms to put the country on a more sustainable and stable course of development. We have full confidence in the strength and the reliance of our system and in the capacity of our people to stand up to challenges. I am optimistic the proposed (plan) goals would be realised".

P.V. Narasimha Rao

India is predominantly an agricultural country. Nearly 76 percent of its population lives in rural areas and a majority of the villagers are engaged in agriculture, making it the backbone of the Indian economy. Out of 328.73 m. hectares of geographical area 142.24 m. hectares (about 43 percent) are under cultivation. Nearly 70 percent of the cultivated area is rainfed. It contributes 42 percent to the food grain production in the country.

The Indian population in 1991 was about 84.63 million which is likely to cross 100 million mark by the end of this decade i.e. 5 years hence. The fast growing population is putting tremendous pressure on the food grain production in the country. During the last four decades Indian Agriculture has been growing significantly with a rapid stride in food grain production which rose from 50.9 million metric tons in 1950-51 to 180 million metric tons in 1992-3. However, it is estimated that India would need to produce an additional 100 million tones of food grain by 2000 AD to feed its anticipated population in that year even at the existing low level of nutrition.
Mahatma Gandhi said that the poor of the world can not be helped by mass production but only production by the masses. The 8th plan document lays emphasis on the need to fully involve the people in nation building activities. When the plan explains the strategy for agriculture, it indicates the Green Revolution which remains confined to the North and North west has to spread to other parts of the country. The main objectives of the eighth plan with reference to Agriculture is to create self sufficiency in food; also to create surplus for export in specific agricultural commodities, to tap fully the potential of the eastern region, to give greater emphasis on dry land farming, to accelerate the efforts towards increasing oil seeds production and to strengthen agro-based rural activities like agriculture, fish farming, poultry and animal husbandry.

According to India’s eighth five year plan document, with the assumption of 27% proportionate decline in the population below poverty line, by the end of 1991, there were about 230 million people living under abject poverty. It further says that in the states like Punjab and Haryana where the per capita income is relatively high and agriculture is quite developed, it has been possible to banish poverty. But, this is not true in states like Uttar Pradesh and Maharashtra where industry and not agriculture is quite developed. Thus improved agriculture with higher production and supplies of food grains appears to be extremely important for poverty alleviation.
The research organisations namely Indian Council of Agricultural Research (ICAR) at national level State Agricultural Universities (SAUs) at state level, National Agricultural Research Projects at the regional level, have already generated viable technologies including location specific based on the agro-climatic as well as socio-economic conditions. The main task is transfer of technology. Transfer of technology in agriculture and allied areas has been a topical subject for debate and discussion in all forums. This compulsion has obviously come about owing to continued demand for additional food grains on one hand and the pressure of advancement of agricultural technologies on the other.

At the present level of advancement in agricultural technologies in India, the present rate of agricultural production could be doubled if the available technologies are brought to bear with the production processes and programmes focusing more and more on transforming new technologies away from the confines of laboratories, and research institutes to the farmers and make them more result and work oriented.

In the Indian context, there are four major organisational streams devoted to extension work for agricultural and allied production, 1) the ICAR extension system, 2) extension system of the Ministry of Agriculture/ state departments of Agriculture, 3) Extension system of the Ministry of Rural Development / State
Development Departments/ development work by the non-governmental organisations (NGOs), business house. Further, the introduction of Training and Visit (T&V) system of extension by the Ministry of Agriculture is intended to strengthen the extension system considerably the rapid transfer of technology.

At present the Indian extension system deals with 81.5 million land holdings, and about 500 million farmers including farm women, young farmers and agricultural labourers. However, it is reported that not more than 30-40 percent of the technologies have gone to the farming communities so far even though there is a strong network of extension mechanism operating in the country for accelerating agricultural production.

Realising the scope and importance of integrated working of inter relationship between research, education and extension function and to enforce the functional relationship down the line in the research institutes, agricultural universities and allied institutions the first line extension projects namely National Demonstrations (ND), Krishi Vigyan Kendras (KVKs). Operational Research Projects and Lab to Land programmes were designed by the Indian Council of Agricultural Research to serve the following specific objectives.

1. Organising first line demonstration by scientists to show the maximum genetic production potentiality of latest agricultural
technologies to farmers and extension functionaries without loss of time.

2. Organising extension programmes to select/limited areas specially around institutions and their stations/sub-stations to serve as extension laboratories for field training and teaching programme.

3. Involving large number of scientists in field work through their projects for rapid feedback for improving research and educational programmes.

4. Testing the technologies in the field conditions.

5. Developing appropriate extension approaches and methodology for field works.

6. Serving the farming community by helping them to increase production, and productivity, and generating employment and income.

The Indian Council of Agricultural Research (ICAR) Research Complex for North Eastern Hill Region was established in the year 1975 with the Head Quarter (HQ) at Shillong, Meghalaya. However, the HQ was shifted to Barapani in 1991. It is the first institute of its kind set up by the ICAR having disciplines of agriculture,
horticulture, animal science, fishery and agricultural engineering to cater the research needs of tribal areas of the North-Eastern Hill (NEH) region including Sikkim. The institute has six centers at Basar (Arunachal Pradesh), Imphal (Manipur), Kolosib (Mizoram), Tharnapani (Nagaland), Tadong (Sikkim) and Lebucherra (Tripura). The Institute has also six Krishi Vigyan Kendra (KVKs) attached to different centers. There is one Trainers’ Training center, Tharanapami (Nagaland) to cater the training needs of the entire NEH region. The research farms of the institute are located at various altitudes such as Barapani (980-1080m), Jharnapani (500-550m), Lebacherra (60-65m), Basar, Kolosib and Langol hill (750-00m) and Tadong (1200-1400m) to cater the needs of various agro-climatic zones of the region.

The 101 hectares (ha) farm area (mostly hilly terrain) of HQ lying between 25-30 degree North and 91.51 East situated near Barapani lake almost 1.5 km. from the junction of G.S. road and Uroi road. The site is about 22 km. away from Shillong town, the and has mild to steep hill topography. Bench terracing on mild slope and contour bunds and half moon terraces on steep hill have been developed for conservation of soil, water trenches and earthen ums have been made to harvest the run-off water. At present the area under cultivation is approximately 60 ha. The major objectives of the institute are:
To develop and improve the sustainable farming systems of different agro-climatic and socio-economic conditions of the region. Improvement of crops, livestock, fishes, management of resources and development of local competency through training. To maintain, analyze and project data base resource for perspective planning.

The Institute has fifteen different disciplines; Plant breeding, Agronomy, Soil Science, Plant Pathology, Entomology, Animal Health, Veterinary Parasitology, Animal Nutrition, Animal Production, Fisheries, Agricultural Economics and Statistics, Agricultural Engineering, Agricultural Extension, Agro-forestry and horticulture. The Institute is headed by a Director and has 681 staff members under his control.

The Institute has well developed library with 11000 books, 155 Indian and 91 Foreign Journals, 117 News letters and 600 back volumes of journals. The library renders most of the current awareness services. It envisages to computerize its routine works using CDS/ISIS ver 2.3 package. A well developed computer center is set up for the scientists and administrative requirements of the Institute.

Apart from the HQ, as has been stated earlier, the Institute has its campus in all the states of this NEH region of India. It will be unjustified not to mention in brief about the states as
well as the ICAR centers located in these states.

Arunachal Pradesh:

Arunachal Pradesh is one of the states in this study. Arunachal Pradesh (Land of the dawn-lit mountains) is a thinly populated hill tract on the most eastern part of India surrounded on the three sides by the international border with Bhutan to the West, China to the North and Burma to the East and Assam to the South.

Ancient Puranas have references to this region. Recorded history of Arunachal Pradesh can be traced only when Ahom Kings began to rule Assam in the 16th century. Originally known as north frontier agency (NEFA). It was placed under administration of the Union Govt. in 1948. It was declared union territory under the name of Arunachal Pradesh on January 20, 1972. It became a full fledged state on February 20, 1987. The state is divided into several hill districts, each under a Deputy commissioner viz. West Kameng, East Kameng, Lower Subansiri, Upper Subansiri, West Siang, East Siang, Dibang valley, Lohit, Tirap, Tawang and Changlang.

Arunachal is entirely mountainous except for thin strip of flat land most of which adjoin Assam. Dense forests cover more than two-thirds of the territory. The huddle potential is very high. Arunachal Pradesh is the largest state of entire NEH areas.
It has total land area of 83743 km$^2$ with the population of 8,58,392. The population density is only 10 per km$^2$ as most of the parts are not suitable for habitation. Out of the total land area only 5517 thousand hectares of land are cultivable. Dense forests cover more than two-third of the territory (Basic statistics of North-Eastern Region, 1992).

The population of Arunachal Pradesh is predominantly tribal. All the tribes belong to Scheduled Tribes. According to 1981 census, scheduled Tribes formed 79% of the population as against 7% for the whole country. There are about 20 major tribes which are divided into a number of sub-tribes. The principal tribes are Adi, Nishi, Apatani, Tagin, Mishmi, Khamti, Noct, Wancho etc. The entire population is spread over in 3257 villages in 13 districts. The state is economically backward and 1.4 lakh persons live below the poverty line. Literacy rate is 41.22 per cent, of which 51.10% of males and 29.37 per cent of females are literate.

Nearly 80 per cent of the population is engaged in agriculture. The traditional method of cultivation, i.e. 'Jhum' or 'Shifting' cultivation is still being practiced to a considerable percentage of land. A determined effort is being made to wean the people from Jhuming. The main crops grown are Rice, Maize, Wheat and Mustard.
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population of Sikkim is mainly made up of the Hepchas, the Bhutias and their allied clans and the Nepalese.

The Hepchas, who are believed to have come from Assam were the first settlers in Sikkim. The Bhutias came from Tibet in the 14th century. The Tsongs are a minority community. In the 18th and 19th centuries the Nepalese came into Sikkim and established themselves, and today, they form the majority community in the state. Sikkim is divided into four districts, viz., East, North West and South.

The state economy is basically agriculture. The principal crops are maize, Paddy, Millets, Wheat and Barley, Orange and Cardamom are the main cash crops. Sikkim has the largest area and the highest production of large cardamom in India. Other crops are Potatoes, apples and buck wheat. ghalaya:

Meghalaya literary "The abode of the clouds", was inaugurated as an autonomous state on April, 1970. It was declared a state of the Indian union on January 21, 1972. Meghalaya is having 7,60,626 persons as its population which shares the land area of 2,429 km². The population is spread over 4874 villages of six districts. Meghalaya is predominantly a tribal state. More than 80 percent of the total population is tribal. The literacy
percentage is 48.26 with male literacy rate 51.57 percent and female literacy rate 44.78 percent.

Meghalaya is considered of three main tribes-khasi, Jayantia and Garo. Majority of the population of the entire state is dependent on agriculture. Like other states of north-eastern India jhum or shifting cultivation is widely practiced. The central Government, State Government and other voluntary organisations are making concrete efforts to change the shifting cultivation into the modern method of cultivation.

**Manipur:**

Manipur had been a union territory from 1956 and a full fledged state from 1972. Manipur is bounded by Nagaland in the North, Mizoram in the South, Upper Burma in the East and Cachar districts of Assam in the West. It came under British rule as princely state in 1881. The Manipur constitution Act 194 established a democratic form of Government with Maharajah as the executive head and legislature constituted by election on adult franchise. The Legislative Assembly so constituted functioned till it was dissolved on the integration of the state with dominion of India in October, 1949. At that time it was governed as if it was chief commissioner's province and afterwards as a part of state under the Indian constitution with effect from 26 January 1950. In 50-51 an advisory form of popular government was introduced and
in 1957 this was replaced by a Territorial council of 30 elected and 2 nominated members. In 1963, a legislative assembly of 30 elected and 3 nominated members was established. The status of the administration was raised from that of a Chief Commissioner to that of a Lieutenant Governor in 1969. Manipur achieved full statehood on January 21, 1972. Manipur was re-organized into 8 districts viz., Imphal, Bishnupur, Thoubal, Ukhrul, Senapati, Tamenglong, Churachandpur and Chandel.

The total land area of Manipur is 22327 km$^2$ with the population of 18,76,714. The population density is a bit higher of 92 persons per km$^2$. The entire population is spread over in 2939 villages of 8 districts. The schedule caste and Schedule Tribes population consists of 1.25 and 38.55 percent respectively. The literacy percentage is quite high at 60.96 percent of which male and female literacy percentage being 72.98 and 48.64 percent respectively.

Out of the total land area, 2211 thousand hectares come under cultivation. The main crops grown are Paddy, Maize, Mustard etc. Manipur is quite advance in agriculture. Per hectare consumption of fertilizer is highest in this state among all other north-eastern states. Moreover, a fairly large cultivable area (72%) comes under high yielding varieties of rice.
The specific objectives of these first line extension projects are given here in brief:

**National Demonstration:** To demonstrate to the extension functionaries and farmers the maximum production potential of high yielding varieties and the allied package of practices.

**Operational Research Project:** To test, adopt, and modify if necessary the research findings and make suitable for large scale adoption by farmers, to find out the constraints in adoption, and to find out the profitability of the findings through integrated village approach.

**Krishi Vigyan Kendra:** To impart need based skill oriented training programmes to farmers, farm women and farm youths through the methods of teaching by doing and learning by doing.

**Lab to Land Programme:** To study and to understand the background and resources of the
selected farmers and landless labourers and to introduce low cost relevant and allied technologies on their farms/houses for increasing their employment, production and income along with training and feedback mechanism.

While these projects have created an awareness and interest among the farmers, project also created an impact in adoption process of the technologies in the farmers' fields. Samanta (1978) while studying agro-economic characteristics and attitudes of tribal farmers of NEH region, he stated training is needed for village head men in agriculture as they play an important role in all round development of the villages.

Samanta (1980) while studying the changing pattern in adoption of Agricultural innovation at Tripura villages as a case study, he indicated that tribal farmers who were practicing Jhum since their forefather's age, today they are coming over to settled cultivation leaving their Jhum or reducing the area under Jhum.

Baldeo Singh (1984) indicated that farmers needed more informations on new varieties, cultural practices and plant protection measures. Further, in his another study on communication patterns, he stated that farmers had very low
extension contacts, socio-economic status and mass media exposure.

Venugopalan (1992) indicated in a case study through rapid rural survey in Meghalaya that less contact with extension personnel, less reading materials, less training facilities retard the adoption of the technologies.

The ICAR Research complex for NEH region started in the year 1975 which comprises Arunachal Pradesh, Sikkim, Meghalaya, Manipur, Tripura, Mizoram and Nagaland forms a strong research base for these regions in order to utilize the potentials of these regions namely rich flora and fauna for shifting out suitable farming system in order to replace the shifting cultivation which is causing deforestation, degradation of the soil and deterioration of the ecosystem with adequate viable technologies not only in Agriculture but also in allied areas. It has its centers at Basar in Arunachal Pradesh, Jharnapani in Nagaland, Kolasib in Mizoram, Tadong in Sikkim, Agartla in Tripura, Imphal in Manipur, Tura in Meghalaya along with its headquarters at Barapani, Meghalaya. These centers have Krishi Vigyan Kendras for implementing the first line extension activities.

Constant efforts made by this research complex resulted in producing suitable viable technologies in the field of crop production, land use, animal science and fisheries for these regions. Further, these technologies are being transferred through
first line extension projects of this complex namely Krishi Vigyan Kendra, National Demonstrations. However, there were a few studies in agricultural extension at ICAR Research complex for NEH region.

So far no study has been taken up to assess the impact of the first line extension activities of these complexes. With a view to assess the impact of first line extension activities, the study on impact of first line extension activities of ICAR Research Complex for NEH region is taken with the following specific objectives:

1. To examine the adoption behavior of the farmers of NEH region in relation of their socio-ethnic, economic, cultural and educational characteristics profile.

2. To analyse the level of awareness, knowledge and adoption of the technologies advocated by the ICAR Research complex for NEH region among the farmers through the first line extension education.

3. To study the first line extension activities in detail including feedback mechanism.

4. To identify the constraints in implementing the first line extension activities at scientists and farmers level and seek suggestions for improvement.
SCOPE AND IMPORTANCE:

It has been an often stated fact that programme of development need to be evaluated from time to time. Periodical evaluations at various levels viz., national, state, district, village have been much stressed. The questions placed evaluation led to some serious implications for the success of future first line extension activities. This creates a need to do some serious evaluation of the first line extension activities introduced by the ICAR research complex for NEH region. Till date a study of similar nature was not carried out in this North East Hill region on the impact of first line extension activities of ICAR research complex for NEH region. Hence, it is a first attempt to work in this direction. The contribution of this study could be in the following terms.

- degree of awareness, knowledge and adoption of selected technologies advocated by the ICAR research complex for NEH region.
- among the farmers, through first line extension activities.
- identification of constraints while accepting the technologies.
- feedback mechanism existing between the scientists and the farmers.
- suggestions for improvement in implementing first line extension activities.

Insights provided by this study will be a diagnosis of the
problems and on rational approaches towards their solution would be used to persons involved in planning and implementing the first line extension activities.

LIMITATIONS:

The field investigation of this nature is by no means an easy proposition. Moreover, all such field studies suffer from problems of recall, exaggeration and other distortions. The limitations of time, resources and conveyance were also encountered during the course of inquiry. Yet sincere and thoughtful attention was given to bring out several distinguishing features of this study in a systematic way. Further, this study excludes operational research project of this research complex as this project needs much more time for evaluation. The findings and suggestions would be applicable in similar tracts and environment in our country.

GANISATION OF THESIS:

In addition to introductory chapter four more chapters have been organised in logical sequence. The second chapter deals with the theoretical orientation and the third chapter is about research methodology. The fourth chapter deals with findings and discussion and conclusion is presented in the fifth chapter. The references and appendix is also included in the end of this thesis.