CHAPTER 1

1 RESEARCH DESIGN

1.1.1 Definition:

The Word "Agriculture" comes from the Latin words 'ager' (field) and culture ('cultivation'). It, therefore, means cultivation of the field (Anonymous, 1980).

Dictionaries usually describe agriculture as the science or art of cultivating the soil, producing crops and raising livestock (Anonymous, 1971). It is also the science of producing and rearing of plants and animals (Rainu, 1987). Thus, agriculture or farming or husbandry as it is often called is a fundamental human activity that plays a vital role in the progress of human wealth and well being (Anonymous, 1970). It constitutes the foundation of all social, cultural and economic structure of mankind.

1.2 SCOPE OF AGRICULTURE:

It is very difficult to draw a line in the strict sense about the boundaries of agriculture. All sources which have direct bearing on agriculture, have to be taken into account. Thus, plants, animals, soils, forestry, etc. have to play a greater role in agriculture besides biosciences, earth sciences, engineering and environmental pollution that will provide a substructure (Banakpur, 1977).

Agriculture is a crucial source of income, employment and foreign exchange. It is vitally linked with the production of the basic constituents of man's food, shelter and clothing, which is derived from plants and animals. More broadly, agriculture is also concerned with the protection, conservation and improvement of plants and animals, their uses and with the natural environment in which they grow (Devaraj and Anuradha, 1977).

The present day agriculture is much broad based covering land farming, apiculture etc. as compared to just a decade ago, when the
concentration had on high yielding varieties, intensive use of inputs (Maurya, 1992). However, agriculture involves the use of natural resources including soil, water, air, forest, crop, fish, genetic resources, eco-systems for the production of various agricultural commodities in the terrestrial and aquatic environments (Singh, 1990).

1.3 **FIELD OF STUDY:**

The field of study covers the entire North Eastern Region viz., Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. In addition, the study is extended not only to administrators, scientists but also to research scholars, research associates working in the agricultural universities, research institutions, etc. of the entire region. These include Assam Agricultural University, Jorhat; Botanical Survey of India, Shillong; Central Potato Research Station, Shillong; Gauhati University, Department of Botany, Assam; Indian Council of Agricultural Research Complex for North Eastern Hill Region, Umiam, and its research centres in different states of the region; Manipur Agricultural College, Imphal; Nagaland Agricultural University, Medziphema, Nagaland; North Eastern Hill University; School of Life Sciences, Shillong and Zoological Survey of India, Shillong.

1.4 **HYPOTHESIS OF THE STUDY:**

Agriculture is one of the major sources of livelihood for the people of North Eastern Region. About 80% of the people lived in villages or rural areas. The entire region is endowed with rich biological diversity, fertile soil, favourable climate, etc., have tremendous scope for enhancing food production. But this region is lagging behind the other states of India due to non-utilisation of resources accordingly. But crop productivity in other states are quite satisfactory due to the application of modern technology, for instance, biotechnological researches, tissue culture, etc., My contention is that because the agricultural workers in this region do not have access to the information, new development researches published in literature, besides other disadvantageous factors, they could not utilise the agricultural infrastructure.
properly e.g., Crops, soils, animal husbandry, etc.; thus, yielding of agricultural crops are inadequate. This has been proved by different surveys made in this thesis on the growth of agricultural literary output and its uses by the agricultural scientists. In order to achieve sustainable food production, there is a need to have a bibliographical control over the recorded information in this field in order to disseminate agricultural information to the concerned research scholars immediately. Besides analysis of the existing agricultural literature from different viewpoints, the information needs of the agricultural scientists which is essential in the fields of research is also examined in order to solve the problem faced by them in their research works.

1.5 OBJECTIVE OF THE STUDY:

This study is made to establish the fact that in order to bring about an all round development in agriculture and allied fields in NE Region, it is necessary to present the following:

1. To identify the various agricultural literature in different disciplines pertaining to this region.

2. To ascertain the trend in the growth of agricultural literature pertaining to N.E. Region.

3. To achieve this purpose successfully the wide range of agriculture literature can be identified by scanning all the agriculture literature both current and retrospective from different micro periodical literature, seminars, conferences proceedings in order to get a comprehensive feedback. The mass of agricultural literature are scattering in a variety of sources. Therefore, selection only of the most productive agricultural literature for users which are most relevant in their specific research works is necessary.

4. The literature pertaining to the agricultural aspects of N.E. Region is complex in nature. This put a barrier to the working scientists for specific and pinpointed information in their research works, which involve time
and energy. Therefore, further research, investigation to the nature and growth of agricultural literature on N.E. Region is imperative to avoid wastage of resources.

5. To identify the disciplines developed and fields not yet developed so that suitable solution can be apprehended.

6. To identify gaps in research so that measurable steps can be taken to rectify the drawbacks for further improvement with alternative solutions.

7. To identify the various information needs and information seeking behaviour of agricultural scientists of N.E. Region by conducting comprehensive survey through structured questionaries to find out the different aspects of their actual needs and requirements.

8. To provide appropriate comprehensive library and information services pertaining to the activities of the agricultural scientists of N.E. Region.

9. To find out the causes that the existing communication system is not successful extensively to meet the present situation which is of practical value to the scientists in their scientific research and to find out ways and means to rectify the drawbacks for further improvement.

10. However, this study is intended to provide and integral picture of the trend of growth of agricultural literature on N.E. Region so that realistic, purposeful results on the research activities conducted by the agricultural scientists of this region can be further accelerated through comprehensive communication system in future. This can be attained through networking for further interpretation of the results and findings in the field of agricultural sciences.

With these objectives in mind, therefore, an attempt is being made to study the trend of growth of agricultural literature on North Eastern Region from 1976 to 1996 and its impact upon higher studies on the research
activities conducted by the agricultural scientists for generating relevant information and its feedback so that researchers, scientists can exchange their findings, conduct further research, etc. It is hoped that this study will bridge the gaps in research, infiltrate the information barrier and cater to the needs of the researchers' interest in their fields of specialisation.

1.6 IMPORTANCE OF THE STUDY:

In North Eastern Region, majority of the people depend on agriculture and other primary production activities as their principal means of occupation. A large quantity of foodstuff is being imported from other neighbouring Indian states into this region every year. This has caused serious financial constraints, affecting its growth and development in the field of agriculture. In order to improve agricultural production, yield of crops, etc., in this region, it is necessary to disseminate relevant information, knowledge and other essential expertises through research publications to the research workers in the fields exhaustively. Therefore, a bibliometric study on the growth of agricultural literature on different aspects in this field is necessary. To achieve successful and realistic results in this venture, a bibliographical control of agricultural literature through proper communication system has become indispensability in the entire region.

Keeping the above-cited importance in mind, I felt it is necessary to take up the present study in this region. Further a study may be made in the existing communication system, for further improvement of the system, so that pertinent agricultural information which is of practical value can be disseminated to the users in their research activities.

1.7 METHODOLOGY:

The methodology applied in the present study are bibliometric analysis, literature survey, structured questionnaire and interview method respectively.
1.7.1 **BIBLIOMETRIC ANALYSIS**: Bibliometric is an application of statistical and mathematical methods for the study of various aspects of micro literature with the objective of getting an insight into the dynamics of the growth of knowledge in the area under study. The total agricultural literature published from 1976 to 1996 comes to 5370. Each individual literature were checked, scanned and examined in term of number of citations, self-citations, types of documents cited etc. However, 3130 citations were appended so far which had been cited by the agricultural scientists in different channels. Periodicals are ranked by the numbers of citations and the high rank periodicals are arranged in decreasing order. Finally, all the collected data are compiled, analysed and tabulated as per the procedure suggested by Biradar and Vijayalaxmi (1997) and Biradar and Premalatha (1993). The study on the trend of growth of agricultural literature in the North Eastern Region is basically based on bibliometric study, since no work has been done earlier so far.

1.7.2 **INTERVIEW METHOD**: The questionnaire method used extensively in the study is supplemented by personal interview method. This method is used through personal approach explaining the purpose of the survey.

1.7.3 **STRUCTURED QUESTIONNAIRE**: In order to know the information needs and information seeking behaviour of agricultural scientists working in the North Eastern Region, a structured questionnaire has been designed based on the model given by Sethi (1990) with slight modification with the help of suggestions, discussion and consultation with the experts, information scientists, and supervisors. The questionnaire developed for the present study contained multiple items. It consists of four parts, viz. 1. Information Needs, 2. Information Channels, 3. Information Sources / Services and 4. Information Barriers / Constraints.

A total of thirty-six questions are asked. Finally, respondents have been asked to provide suitable solution and suggestions with a view to improve the existing communication systems. The questionnaires have been distributed
to all the 180 scientists / research scholars working in the whole region. Respondents have been asked to complete the questionnaire within the speculative schedule. Not all the individuals have participated in the survey due to many reasons. However, the total number of respondents is 168. Only 134 (80 % approximately) usable questionnaires were collected from the researchers.

1.8 LITERATURE SURVEY:

The rapid development of scientific discoveries stimulates research activities in various fields of agriculture. However, a large portion of research output is being generated, ultimately led to the tremendous growth of agricultural literature. A great amount of studies is done in different parts of the globe either directly or indirectly which is presented in two sections namely (I) World literature and (ii) Indian literature.

1.8.1 World Literature:


Patents are also heavily used in the field of Industrial Technology (Heparin and Chakraborty (1988)).

Of the grey literature, reports, conference proceedings, bulletins etc. are the most prominent sources of information. Alberani and Pietragali (1995). Fang (1989) also find similar results in Health science librarianship.
Hanner (1988) reported that Government documents are the reliable sources of information in Solar Energy Research.

However, in most of the Humanities subject, macro documents i.e. books and monographs are found to be mostly used than any other form of documents (Gupta, 1994). This confirmed earlier reports of Baugham (1994). Kikuchi (1996), Gupta (1994) and Culler (1996) respectively.

Garficed (1984, 1990) pointed out that micro periodical literature occupied a permanent position in agriculture. This has confirmed earlier reports on Veterinary Medicine by Deo Liveira (1984). On the other hand, agriculturists also referred to grey literature such as annual reports, seminar papers etc. (Aina, 1987). This is in close agreement with the finding of Adeniga (1982) in Horticulture.

1.8.2 **Indian Literature:**

Micro periodical literature are the most relied documents as reported by Mete and Deshmukh (1996) and Mishra and Panda (1997) for Library and Information scientists. These findings are also supported by Kumar (1986); Kapoor (1984); Mishra (1997); Begum and Shalaja (1985); Balasubramaniam and Bhaskar (1984); Sangam and Biradar (1990) in their respective fields of researches. Various workers Mubeen (1996); Barooah, Begum and Sharma (1999) Sharma and Garg (1993); Gopinath (1985); Shukla (1996); Maheshwarappa and Prakash (1982) also found similar results. The importance of these literature as one of the sources of information has been systematically presented by Maheshwarappa, Nagappa and Onkaraway (1986); Raiha (1983); Lal (1994) in Geology. Mathur (1985); Deo (1991); Begum and Rajendra (1996) in Zoology. Sengupta (1973,1988,1988a) on Biochemistry, Physiology and Pharmacology and Microbiology. Ramakrishna and Pangannaya (1999) also noted the high use of micro literature in Animal Cell Culture Technology. This is in close affinity with the findings of Maheshwarappa (1983) in Phyto morphology; Birendra and Premalatha (1998) in Psychiatry; Kundra and Gard (1987) in Alcohol Fuel literature;
Gupta (1996) in Vitamin Therapy; Ijari and Kannappanavar (1990) in Clinical Physiology. This has been further elucidated by Bhat and Elisharaju (1977) in Astronautics and Aeronautics. Similar results are also confirmed to the findings of Maheshwarappa and Rao (1982); Nagappa and Maheshwarappa (1981; Sinha and Bhatnagar (1980); Burman (2000) respectively.

Among the grey literature, conference and proceedings, seminar papers, these and dissertations, unpublished papers, reprints, mimeographed, etc. are heavily used in Library Science Kundu (1980). This is in close agreement with findings of Kanungo (1995); Nag (1984); Elisha and karitha (1986).

The high use of macro documents i.e. books has been further elucidated by Sahai (1979); Rana (1982); Aravinda and Reddy (1989); Das Purkayastha (1993); Begum and Sharada (1984) in Social Sciences.

Macro literature i.e. books are not much used in the field of agriculture (Begum and Sami, 1986). Similar study was also made by Barooah (1993) in Entomology.

Previous workers; Subbaiah (1983); Humayoon (1990); Hadagali (1983); Kumar (1986); Lal (1993) also reported the high use of micro periodical literature in the field of Agriculture. Similar results were also documented earlier in Horticulture (Asundi and Humayoon, 1996); Sivasubramanian (2000); Maheswarappa and Prakash (1982); Jose and Korah (1997) and in Soil Sciences Patil (1985); Lal (1990, 1993); Deshmukh and Kumar (1982).

1.9 PRESENT CONTEXT:

The survey of the few literature has pointed out that workers abroad relied heavily on micro periodical literature as the main source of communication of research findings in different fields of specialization. The use of other publications such as patents, reports, conference proceedings.
bulletions, government publication, thesis, dissertations, unpublished papers. reprints, preprints are also used by different workers to some extent.

In India, scientists communicate their research findings in micro periodical literature extensively. While other useful documents, viz., seminar papers, mimeographed, newsletters, etc. are also used to some extent. Government documents, books are rarely used in their research works.

Although the above mentioned publications have covered fields related to agricultural literature, no publication or work has been done so far comprehensively on agricultural literature related to N.E. Region. This has encouraged me to take up the present study in the North Eastern Region. The survey is confined entirely on micro literature, conference proceedings, seminars, symposia etc. in the field of agriculture sciences.

1.10 CHAPTERISATION:

To begin with, the 1st chapter on Research Design comprises definition and scope of agriculture. The field of study includes scholars, scientists working in different agricultural research institutes of the entire region. It also includes the hypothesis of the study, objective of the study, importance of the study in order to bring about an all round development in the field of agriculture and allied aspects. A broad aspect of methodology such as bibliometric analysis, interview method, structured questionnaire, literature survey, presented in two parts namely world literature and Indian literature/are also encapsulated to achieve a comprehensive feedback for further improvement so as to cater to needs of the researchers interest in their field of specialisation in Chapter 1.

In Chapter 2, the historical background of agriculture in India which is being further interpreted in detail as agriculture in ancient India, agriculture in mediaeval India and agriculture in modern India, followed by the agriculture in North Eastern Region with emphasis on preindependence agriculture emphasizing the factors responsible for its backwardness and post
independence agriculture elucidating its problems and potentialities which ultimately leads to the development of agriculture in the region.

In chapter 3, different types of literature sources in agriculture which are appearing in a variety of format, their usefulness in the field of agriculture sciences as they provide comprehensive information and disseminate the results of scientific research to the researchers specifically designed to stimulate future line of research which are productive to this region are explained. It also deals with the vast array of agricultural literature on North Eastern Region generated from various agricultural research institutions through multi-disciplinary research in different fields of activities which are reliable sources of information, potential to users and interest to agriculturists. These agricultural literature which serve as the major force in research on agricultural aspects, encourage advanced research and provide additional information in a variety of areas is also included. The literature survey on North Eastern Region contributed by the agricultural scientists towards agricultural development in the region is also presented. These agricultural literature which are the outcome of scientific results of research activities provide exhaustive views of information and interest to researchers working towards the same objectives. At the same time, these literature which provide a wealth of information reflecting their works in progress which will be of great value to the users is also elucidated.

In chapter 4, the growth of the agricultural literature, development of the subjects contributed by the agricultural scientists of this region, citation patterns, channels used to communicate scientific research, etc., evaluated by using bibliometric analysis is explained. The published literature in the field of agriculture which provide a base for new research, new experiment to be conducted in various fields of specialisation, the rank list of cited agricultural periodicals in this region are further elucidated with the intention of measuring the scholarliness of the periodicals, productivity of the periodicals cited and scattering of the literature caused by increase in research are also presented in detail.
In chapter 5, the term knowledge and its definition, genesis of knowledge, data and its characteristics, information and its definition, information needs of the agricultural scientists of this region, their potential needs, search strategies, use-pattern, information gathering processes, information seeking behaviour, mode of collecting of information, usage of library are discussed in detail so that the crucial factors can be identified and analysed. Paths employed in the various library services in the North Eastern Region, with a view to provide the scholars access to diverse information resources to meet the present and future needs of the users is also presented. Factors that affect the process of communication of information and the constraints experienced by the researchers are also evaluated so that effective measures can be properly planned to promote and maximise the use of information sources efficiently so that suitable solutions to the existing problems can be rectified.

In chapter 6, analysis of the impact of agricultural literature of North Eastern Region upon scientific community is interpreted to determine the pace of agricultural development. It further points out to the fields in which research works are contributing maximum and the weaknesses on the specific disciplines in agriculture science of this region. The distributional characteristics of citation, its subject wise break up of citations are also presented. This leaves the scope to extend further investigation to find out the various parameters for meaningful, useful results and understanding the nature of the subjects on agricultural literature of North Eastern Region.

In the last chapter, i.e. in conclusion part, the agricultural scientists has put forward their views aiming at developing an over all library and information infrastructure to support the research activities of the agricultural scientific community of this region. These constructive implications such as analysis of the findings with detailed interpretations, suggestions, recommendations and future projections which are crucial for this region are highlighted. Therefore, they offer alternative means to meet wider requirements and serving the workers in a better way.