CHAPTER IX SUMMARY AND CONCLUSION
The study aims at depicting the dispersion of knowledge of horticulture by collecting various documents of core interest and of penumbral interest to substantiate the growth of the subject horticulture. A large quantity of literature from vedic period upto 20th century were surveyed but it is suspected that there may be many more which were not available because they may be:

1) too recent;
2) buried in journals/magazines which were not possible to be screened;
3) hidden under obscure or misleading titles; or
4) appearing in foreign languages other than english.

This study is part of a continuing efforts to understand and improve the process of dissemination and utilization of knowledge in the field of horticultural sciences. The chapters covered indicate the detailed exploration, analysis and synthesis of:

1) a number of innovations in the research world of horticulture;
2) an impact of literature in the practical world of information and extension agencies;

3) various types of adoptions and rejection trials at the customer world;

4) the world of constraints in the process of diffusion;

5) the integration process of diffusion problems, user resources, system resources and its relation; and

6) finally the technological revolutions of less developed countries and developed countries and the limitation of its adoption at local level. This will be a guideline for scientists, information specialists at large.

It is pointed out that the four important constituents of this entire system namely;

1) scientist;

2) information specialist;

3) extension agency; and

4) customer are inter-dependent and interact like permutation and combination model in the process of information transfer as shown under as models.
It is further depicted that it is the onerous responsibility of the information specialist to understand the needs of scientists - their methodology of information search pattern, usage and the service they expect and in addition to this, they must come forward to assist the extension and the customer in general. This has been indicated in the four-tire system suggested under chapter 4.

The appropriate technological information in horticulture is available in abundance, but now the problem at hand is how best and how often it should be transferred. In other words, the mechanism and the modalities for transferring it to the illiterate and small farmers in an effective way is the need of the hour. There is a global
communication network which makes the latest findings in the horticultural science available almost immediately to the research workers in any corner of the world; but what is urgently needed is such a communication network at the service of the poor farmer. It is not only the knowledge that is needed, but an approach which will be able to supply the right knowledge and tools to the right people at the right time and place. The worker on the spot, whether he is an extension officer, a gram sevak, a social worker or a teacher, must be able to identify the local problem or need which will act as a catalyst for promoting cooperative effort. In this network and endeavour the mass communication media, particularly radio, television, demonstrations, and language press have a vital and crucial role to play; so have the research and extension worker, the education system and the drive for technical literacy. The basic elements of horticulture/ agriculture should be conveyed to the farmer so that he can understand with least difficulty. The future of our agri-horticulture depends on the success with which we can help the small and illiterate farmers to take up many steps which can place him in good stead in this endeavour.
21 diffusion problems under various aspects have been elucidated in chapter 5 and these problems need review. Suitable suggestions in this regard have been indicated. This is to assess the current and retrospect state of knowledge in horticultural sciences with respect to the process of information technology. This is achieved by two means;

1) by search and analysis of literature as they have been scattered in different fields of practice;

2) secondly by review of existing models, surveys, inferences and reports to derive implication for the guidance of researchers, practitioners and policy makers.

It is also envisaged, effective knowledge utilization also requires a certain degree of division of labour, co-ordination and collaboration throughout the entire system. The set up, pointed out in the study could be worked out more efficiently if the government monitors "natural knowledge flow system" and develop means to support, facilitate and co-ordinate linkage activities so that the total system works out as a milestone in the history of information network.
The study demonstrates that information is an essential input in all stages of technology transfer. The management of information flow from one point to another in the process of the productive utilisation of technology calls for a variety of information service. The information specialist have to use every mode of communication to channel right information to right target in right manner. Ranganathan's five laws have regulatory influence in these aspects. "Knowledge is for use" is his first law and this is to be achieved through growing complexity of "Knowledge is a growing organism."
SOURCE MATERIALS IN HORTICULTURE
Introduction:

Source materials are important tools to gather reliable information in any subject field. The major sources of published materials as media for the dissemination of knowledge by and large are - government agencies, commercial publishers and institutions. A fair knowledge of the nature of material published by these numerous organisations, their distribution channels, and the latest addresses can help a great deal in building up a good collection.

The publications emanating from commercial publishing houses do not create much problem. But government publications are different and pose difficult problems. The nature of these publications is varied and sources diverse due to complicated organisation of the government set up and frequent changes in the inter-relationship of its various organisations. Particularly in the domain of agric-horticulture, innumerable documents of immense value have been published, but they have been scattered in different disciplines. This needs careful scrutiny of the sources and survey.
Sources in horticulture:

As with other disciplines, the literature available to horticultural scientists and others interested in the developments in this field comes from three main forms; viz., books; technical articles and papers usually published in scientific journals; and published bibliographies, with or without abstracts. Books and journals are described as primary literature, and abstracts and bibliographies are considered as secondary literature.

Horticultural literature has two important characteristics. The first is that horticultural literature is spread over several more distinct disciplines such as genetics, mycology, entomology, chemistry, pedology, physics, economics, climatology and engineering. The second characteristic feature is that horticultural literature covers a wide range of erudition from say, advanced plant physiology at one extreme, to gardening at the other. These blurred edges of both 'vertical' and 'horizontal' spread must dissuade the searcher from too restricted a literary purview.

However, source materials available for a comprehensive study of horticulture have been fairly surveyed of which
important tools have been provided hereunder. They include research reports, bulletins, annual reports, dictionaries and directories, monographs and treatises, handbooks and the like. These also serve as reference tools to promote intellectual intercourse among the scholars engaged in similar academic pursuits.

Subject coverage

The basic horticultural subjects are cultivar selection, propagation, planting and management, protected cropping, crop protection, reproduction, harvesting and handling, storage, quality and byproducts. It is in this area of subject rather than crop coverage that the literature of peripheral disciplines contain many items of interest to horticulturists. Relevant information, therefore, from literature in categories like agriculture, cognate sciences with occasional papers of horticultural interest and general science publications provide a wealth of information on horticulture. The groups of publications which must be considered in detail are books, primary journals; proceedings of conferences and symposia; bulletins and other publications say reports, secondary journals, reviews and bibliographies.
Primary periodicals

The total number of primary periodicals published in the world is well over 2000 in 30 languages. A list of important journals of interest to horticulturists are published in horticultural abstracts every year of these, a much smaller number would cover journals of major importance to horticultural scientists. These are called 'Core' periodicals and they are about 200 and emanate from more than 30 countries. Majority of good journals contain articles in English and the rest are in other languages but contain abstracts and summaries in English. Some such important primary periodicals are cited hereunder:

United Kingdom

Journal of Horticultural Science (1919 - )
Horticultural Research (1961 - )
Experimental Horticulture (1957 - )

United States of America

Journal of American Society of Horticultural Science (1903 - )
Hort Science (1966 - )
Combined Proceedings International Plant Propagators' Society (1950 - )

Belgium

Compte Rendu des Recherches, Station des Cultures Fruitieres et Maraicheres, G Gembloux (partly a periodical report)

Denmark

Tidsskrift for Planteavl (not wholly devoted to horticulture but contains numerous relevant papers)(1895 - )

France

France has no wholly horticultural scientific journals but majority of papers are horticultural in Annales de l' Amelioration des Plantes (1951 - )

Germany

Gartenbauwissenschaft (1955-)
Deutscher Gartenbau (1954 - )

Italy

Rivista della Ortoflorofrutticolture Italiana(1876-)
Annali dell' Istituto Sperimentali per la Frutticoltura (1970-)
Annali dell' Istituto Sperimentali per la Floricoltura (1970-)

Netherlands

Scientia Horticulturae (an international Journal)(1973 - )
Norway

Horticultural research is reported in two agricultural journals namely:
Meldinger fra Norges Landbrukshøgskole (1920-)
Forskning og Forsok Landbruket (1949-)

Sweden

Most fruit research is conducted at the research station at Balsgard, which publishes:
Berättelse for Verksamheten, avdelningen for Växthusanläggning av Frukt och Bar, Lantbruks-\shogsolan, Balsgard

Switzerland

Revue Suisse de Viticulture, Arboriculture, et d' Horticulture (1969-)

Semi-scientific and technical

There are other scientific journals which report research findings which are equally important. Similarly innumerable semi-popular technical and trade journals exist which report the scientific work well before they are published in full length. The following are some of the examples where such information found:

United Kingdom

Grower (1923-)
Horticulture Industry (1976-; continuation of Commercial Growers)
Nurseryman and Garden Centre (1894-; formerly Nurseryman and Seedman)
Scientific Horticulture (1920)
GC & HTJ (1976-) (A Gardeners' Chronicle merged with Horticultural Trade Journal)
United States of America

American Fruit Grower (1880-)
American Horticulturist (1922-)
American Nurseryman (1916-)
Compact Fruit Tree (1964-)
Goodfruit Grower (1950-)
Fruit Varieties Journal (1946-)

Denmark

Frugtavlen (1972-)

France

Arboriculture Fruitiers (1954-)
Pepinieristes Horticulteurs

Germany (GFR)

Deutsche Baumschule (1949-)

Italy

Frutticoltura (1937)

Netherlands

Fruiteelt (1910)

Sweden

SYR Information med Fruktodlaren (1958-)

Switzerland

Revue Horticole Suisse (1927-)

Secondary periodicals

Secondary periodicals provide effective access to scientific literature. Here again there are two types:
(1) Those which do not provide abstracts of the original articles but only state their titles and ancillary, bibliographic information, such as authors' name, the journals' reference, the language in which it is, number of figures and references and the authors' affiliation;

(2) Those which provide abstracts of the original paper along with the bibliographic details which would help the scientists to judge its relevance and usefulness. Thus there are many abstracting periodicals and they are grouped as follows:

Abstracting journals on horticulture in English

Horticultural Abstracts (1931-)
Ornamental Horticulture (1975-)

Abstracting journals on related sciences in English

Analytical Abstracts (1954-)
Agricultural Abstracts (1950-)
Biological Abstracts (1926-)
Chemical Abstracts (1907-)
Food Ra Abstracts (1937-) (limited circulation)
Genetics Abstracts (1968-)
International Abstracts of Biological Sciences (1956-)
Peat Abstracts (1951-)
Plant Breeding Abstracts (1930-)

Review of plant pathology (formerly Review of Applied Mycology; 1922-)

Soils and Fertilizer (1937-)

Weed Abstracts (1952-)

World Agricultural Economics and Rural Sociology Abstracts (1959-)

Specialist abstract journals in restricted subject in English

Agricultural Engineering Abstracts (1976-)

Crop Physiology Abstracts (1975-)

Irrigation and Drainage Abstracts (1975-)

Plant Growth Regulator Abstracts (1975-)

Potato Abstracts (1976-)

Seed Abstracts (1978-)

Foreign Abstract journals on horticulture

Informationsdienst Wei henstephan (1972-)

Foreign abstract journals of wider interest

Abstracts of Bulgarian Scientific Literature Series A Plant Breeding and Forest Ecology (1962-)

Abstracts on Romanian Scientific and Technical Literature (1964-)

Agricultural Literature of Czechoslovakia (1960-)

Hungarian Agricultural Review (1952-)

Key to Turkish Science: Agriculture (1968-)

Referativnyi Zhurnal: Rastenievodstvo (Biologicheskie Osnovy) (1963-)
Useful journals with abstract sections of horticultural interest:

Journal of the Sports Turn Research Institute (1952-)
Oleagineux (1946-)
Vitis (1956-)

Title-only journals

Several useful journals contain no abstracts but do provide helpful bibliographic information. The more important of these journals for the horticulturists are:

AGRINDEX, published by the Food and Agriculture Organisation of the United Nations, Rome. It is in English and translates foreign titles. Bibliographic information is very full, but certain parts of the world are sparsely covered.

Bibliography of Agriculture, published commercially from the AGRICOLA tapes of the National Agricultural Library of the USA. These tapes are in computer-readable form. The published version, issued by Oryx Press, is very well indexed and is a valuable source of bibliographic data; it is a little weak in coverage of some geographical areas.

Neither of these journals is wholly devoted to horticulture.

Proceedings of conferences and symposia

These are published quite frequently, some such as
"Acta Horticulturæ" are devoted to single topic. There are other conference proceedings such as, say proceedings of international horticultural congress and these cover the entire field of horticulture. But the publication of these are advertised well in advance in the society's Chronica Horticulturæ, a journal of great interest which contains a wealth of information on horticulture. Other conference proceedings in this field include learned societies. Annual meetings of the American Horticultural Society and Associations (Arkansas, New York, Florida, Washington, Illinois etc) also publish the proceedings of their meetings. These contain a wealth of information of horticultural interest. ASLIB's quarterly forthcoming international scientific and technical conference is another valuable source of advance information. Moreover, such proceedings are usually abstracted, in whole or in part, in relevant and comprehensive abstract journals such as those of the Commonwealth Agricultural Bureaux.

Reports

Ministries, departments, university departments, research stations and similar organizations issue reports annually. Most of the reports contain information regarding staff, finance, legislation and the like and include a section
on current research describing projects and findings during the period under review. Some major organizations, such as for instance a Department of Scientific and Industrial Research, issue information on all branches of science, and horticulture must be searched for. The majority, however, cover agricultural development, and current horticultural work is easier to find. The most valuable reports are those from horticultural departments of universities and horticultural research stations. Some of the organizations which issue reports of this sort are cited hereunder:

Comprehensive national scientific organisations

CSIRO, Canberra, Australia
DSIR, Wellington, New Zealand
National Research Council of Canada, Ottawa

National Agricultural Research bodies or departments

Agricultural Research Council, London
Department of Agriculture, Nicosia, Cyprus

National Horticultural Departments

An Foras Taluntaí (The Agricultural Institute)
Horticulture and Forestry Division,
Dublin, Eire

Provincial agricultural departments

Province of Alberta, Canada
New South Wales, Australia
Provincial horticultural departments

Hessische Lehr- und Forschungsanstalt
fur Wein-Obst- und Gartenbau, Geisenheim/
RHG, West Germany

Universities

Department of horticulture, Michigan State
University
Institut Qo^stbau and Baumschule, Technischer
Universitat, Hanover Sarstedt, West Germany

Lond Ashton Research Station, Bristol
University, U.K.

Major Experiment Stations

East malling Research Station, UK
Glasshouse Crops Research Institute, UK
National Vegetable Research Station,
Wellesbourne, UK

Prof. Station voor de Groenten-en Fruitteelt
onder Glas, Naaldwijk, Netherlands
Scottish Horticultural Research Station,
Dundee, UK

Commercial firms' research stations

Levington Research Station, Levington, UK

Reviews

Writing reviews is popular among scientists in
recent years. The commonwealth agricultural bureaus publish
numerous reviews every year on horticulture and allied
subjects. Short reviews, however, are frequently published in *Horticultural Abstracts* and *Acta Horticulturae*. Recently *Horticultural Reviews* are being published at regular intervals. The first volume has been published in 1979 with the collaboration of American Society of Horticultural Sciences and A.V.I. Publishing Company, New York. The latest volume in the series is volume 5(1983).

**Bulletins**

A good number of bulletins of horticultural interest are being issued from various organisation like Universities, Associations, Learned Societies and State Government Departments which are very useful to farmers.

These publications are mostly advisory. They are trustworthy vehicles for the dissemination of research findings to farmers and growers. A few examples are the publications of research institutes, universities and government departments published in the form of:

1. Advisory leaflets
2. Research Bulletins
3. Technical Bulletins
4. Inspection reports
5. Newsletters
6. Extension bulletins
7. Research reports
8. Marketing research reports