INTRODUCTION
CHAPTER - 1

1.1 Introduction

In view of alarming increase in India's population, there is a need to increase the food production, to meet the nutritional security of the country. The country is endowed with rich aquatic and fishery resources offering ample scope and opportunities for Fisheries and aquaculture development in the country. It has a long coastline of 8119 sq km, export economic zone of 2.02 million sq km with a continental shelf area of 0.5 million hectare (ha) fresh water area suitable for Fisheries and aquaculture production in addition to 1.2 million ha brackish water area. Information is considered as one of the most important resources for development in any field of human endeavor and the field of fisheries education and research is no exception. Fisheries sector has been recognized as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food besides being a valuable foreign exchange earner. Most importantly, Fisheries is a source of livelihood in India for a large section of the economically backward population. Effective information support system is needed to increase productivity in fisheries sector of the Indian economy.

Fisheries have been gaining importance globally. "Fish for All" program initiated by the World Fish Center under the chairmanship of Dr. M. S. Swaminathan is steadily adding further importance to Fisheries (Subbaiah and Umarani 2001). A fishery is one of the major branches of agriculture. In India, agriculture including fisheries is monitored by Indian Council of Agricultural Research (ICAR), Government of India, New Delhi. The Government of India considers Fisheries and aquaculture as one of the priority areas, for research and
development. Fisheries education and research systems will need to redefine their respective visions and goals to reflect the new expectations of the society. Access to timely and relevant information and proper recording and organization of information from the research process is key issues for the effectiveness of any research system. Information and communication technologies are powerful strategic tools whose benefit can be brought to bear on all key aspects of fisheries research and education and contribute to the growth of Indian fisheries and the national economy.

According to Kaye (1995), good information improves decision making, enhances efficiency and provides a competitive edge to the organizations which know more than the competitor. He has reported that many development plans of developing countries have not succeeded because they were not based on relevant information. Even if the information exists, it is not used or it is grossly underutilized. A variety of types of information are required to manage and develop the fisheries sector. A number of studies have also been reporting that fisheries requires multidisciplinary and transdisciplinary information for the sector management.

One of the major developments in libraries and information systems in the past two decades is the advent and spread of Electronic Information Sources (EIS), services and networks mainly as a result of developments in information and communication technologies. The change is basically of physical form where information content is increasingly being captured, processed, stored and disseminated in electronic form. The commonly available Electronic Information Sources (EIS), namely, Compact Disc Read Only Memory (CD-ROMs), online databases, Online Public Access Catalogues (OPACs), and the Internet and other networked information sources, are competing, and in some instances replacing, the print-based information sources which have been in place for centuries as the
primary media for the storage and communication of recorded information content (Cornish 1997) Fisheries institution libraries cannot be an exception to this change. The amount of aquatic and fisheries sciences information resources in electronic formats are rapidly increasing. Today’s about 70-90% of information is available digitally. Access to information is important to individual scientists, group of scientists, or the academic community and research institutions for accomplishment of their programs and research projects. The academic communities are now offered a vast array of new electronic possibilities. They can and do enable innovation in teaching, and they increase timeliness in research as well as increase discovery and creation of new fields of inquiry (Henderson and MacEwan 1997). Other reasons for the academic community to use e-resources include access to current up-to-date information and for scholarly communication with their counterparts.

The rapid growth of electronic information sources has indeed changed (and is still changing) the fisheries academic community information seeking behavior to support their teaching, research, and extension activities. Effective use of these EIS for retrieving needed information will have a profound impact especially on the quality of research output by the fisheries research scholars and scientists.

1.2 Growth of Electronic Sources

Although information in electronic format was created with the advent of the computers in the 1950’s, it was not until the early 1960’s that the electronic information was first introduced in libraries in the form of electronic bibliographic indexes (Gennaro 1973). Application of computers in retrieval of Fisheries information was started as early as 1980’s. Computer based information services had ‘traditionally’ been the preserve of mini and main frame computers.
Bibliographic records in such services were taking large amount of space on disks and tapes and these records were highly variable in length. Mainframe computers in few western countries were the repositories of computer version of the major scientific abstracting versions as well as a variety of non bibliographic databases. Access to these journals in developing countries, whether by subscription to the hard copy or online searching, had been horrendously expensive. Meanwhile, the advent of hard disks and larger random access memories (RAM) in microcomputers prompted the development of a number of commercial applications for handling bibliographic records and similar material (MacLean 1987). Commercial database services were developed that offered access to many databases to many simultaneous users worldwide. Commercial vendors such as DIALOG information service, the first and the largest of the commercial database services, has grown since its formation in 1972 into a 24 hour service offering access to 350 databases comprising more than 200 million records (Saffady 1992).

Aquatic Sciences and Fisheries Abstracts (ASFA) the premier database and the most comprehensive international information system in fisheries is the product of the co-operative efforts of a number of partners including the Food and Agriculture Organization of the United Nations (FAO). On a trial basis in late 1976 demonstration of the possibility of worldwide online use of ASFA by accessing the database at FAO from DIALOG in California (USA) was successful with the assistance of National Oceanic and Atmospheric Administration (NOAA). ASFA for the first time was publicly available on DIALOG as File 44 from October 1979 and was searched online by users in many countries (Varley 1995). Later Cambridge Scientific Abstracts (CSA) was the new owners of ASFA.
Another milestone in the history of electronic information sources was the introduction of CD-ROMs (Compact Disc Read Only Memory) in mid-80s. This storage medium has made possible the access and dissemination of a large amount of bibliographic, full text and other data. In 1985, CSA announced that the ASFA database was available on Compact Disc (CD-ROM). CD-ROM technology was developed as a single-user technology, that is, one user could use a CD-ROM workstation at a time. In order to provide access to multiple databases for multiple simultaneous users without having to purchase large numbers of stand-alone CD-ROM workstations, libraries began to provide CD-ROM networks based on LAN (Local Area Network) technology. Acceptance of CD-ROM technology by libraries had been fast and overwhelming and the fact that ASFA was one of the first databases to be distributed in the new medium was a cause of great satisfaction to the ASFA partners. By the mid-1990's many libraries had operational CD-ROM networks with many access terminals and many CD-ROM electronic publications (Boss 1992).

The real breakthrough in the growth of electronic information sources was the emergence of Internet. Though it was developed in the 1960s and 1970s by the Department of Defense, USA to support military research and linked some military, research and academic computer centers, it became popular in libraries only by the early 1990s. In its early years of development individuals at all levels in higher education had begun to have access to electronic mail. Using Telnet, librarians could search the online catalogs of many libraries and by, using FTP, electronic information could be transferred from one site to another. In addition the other internet services were Gopher and WAIS. However, it was not until the World Wide Web (WWW) in the mid-1990s that it became clear that another truly transforming information revolution had begun (Thornton 2000).
The emergence of World Wide Web (Web) in 1991 has made instantaneous access to much of the body of fisheries literature, as in many other fields. It provides several opportunities for the academic. This easy-to-use information system with hypertext and multimedia capabilities has made the Web a viable medium of information storage and retrieval. Many publishers are also making use of the capabilities of Web in proving database services. Today, a daunting array of web resources which include hundreds of databases and thousands of electronic journals are available to the users.

While the EIS prevailing several years ago was the dial-up online information sources and services, today it is the CD-ROM and the Internet. With the increase in the popularity of the Web on the Internet, especially of its support of multimedia, the use of traditional sources like Telnet and FTP is decreasing. There are a variety of fisheries electronic information sources available in CD-ROM format and also available online on the Web. Commonly available electronic information sources are:

- Bibliographic database
- Text books and reference books
- Electronic journals
- Subject specific information websites
- Research project reports and government policies/regulations
- Institutes, Organizations, Universities and Professional bodies websites

A list of EIS in Fisheries sciences is given in Appendix I. The new emerging technologies are changing the world fast and the academic community who formerly suffered from a paucity of information may soon be complaining of
Information Overload’ This can only bode well for teacher/scientist, research scholars, planners, policy makers, etc in developing countries.

1.3 Definition and Meaning of Electronic Information Sources

Library of Congress (2007) in its draft interim guidelines for cataloging electronic resources defined Electronic Information Sources as “manifestation of a work encoded for manipulation by computer. The manifestation resides in a carrier accessed either directly or remotely” Based on the physicality of accessing mode, the Library of Congress further defines “directly accessed electronic resources” as an “electronic resource whose carrier is ‘touchable’ e.g. a CD-ROM” and a remotely accessed electronic resource as an electronic resource whose carrier does not embody a direct ‘touchable’ physicality (e.g. an electronic journal, or a database accessed through the Internet, or a web-site).

AACR2 (2005) defined an electronic resource as “Material [data and/or program(s)] encoded for manipulation by a computerized device. This material may require the use of a peripheral, directly connected to a computerized device (e.g. CD-ROM drive) or a connection to a computer network (e.g. the Internet).”

Rehman and Ramzy (2004) defined EIS as “materials available in electronic forms such as CD-ROM collection of the library, electronic journals, online search and retrieval services, and other databases located within the library or accessible through networking.

Armstrong and others (2000) defined EIS as “Collections of information tools/products delivered to requesting users electronically- usually computer mediated.”
The following inferences are drawn from the above definitions

- Electronic information sources are computer-based information sources
- EIS appear mainly in two forms 1) Internet 2) CD-ROM.
- EIS covers a wide range of specific products such as E-journals, E-books, databases and Web resources
- Delivery of information in EIS is through computers

1.4 Need for the Present Study

The new World Economic Order and globalization of market calls for prompt and efficient infra-structure, better resource management and competitiveness of existing agricultural production systems. Information is vital to fulfill these dictates of time. Quick access to information at global level through electronic media thus provides the way to tackle challenges of Indian Agriculture including fisheries.

In this context a major initiative of Agricultural Research Information System (ARIS) has been taken in order to modernize and bring information culture in National Agricultural Research System (NARS). The Indian Council of Agricultural Research (ICAR) is the controlling agency for agricultural universities in India. Fisheries colleges come under the State Agricultural Universities (SAUs) and Animal Sciences Universities, and the Central Fisheries Research Institutes are directly under the administrative control of ICAR. The Agricultural Research Information System (ARIS) of ICAR established in 1995 with the assistance of World Bank development funds, under a special project is an encouraging step to strengthen the research and information base of agriculture including fisheries. This project was implemented in order to modernize the library and information systems of all agricultural universities and the ICAR institutes in the country and to provide necessary infrastructure along with improvement of their library collection under National Agricultural Technology.
Project (NATP) Also the basic infrastructure required for linking all ICAR Institutes and SAUs has been developed under Information System Development Scheme (ISD) by creating Local Area Networks (LANs) and E-Mail connectivity. A substantial support of about Rs 131 crore has been earmarked under National Agricultural Technology Project (NATP) to meet the above objective. Twenty eight of these Institutes/SAUs which include the Fisheries research institutes and the Fisheries colleges have been provided with internet services via VSAT connectivity using NICNET and ERNET services (Anwar 1998). Also the libraries subscribe to a number of CD-ROM databases in various subjects for the users to retrieve necessary scientific information. Substantial improvement in the operations and performance has been achieved with this project.

The availability and use of electronic information sources by the academic community in the Fisheries colleges/Research Institutes has created a need to study the use of these electronic information sources. Many studies have suggested that use of electronic information sources could enhance effectiveness, efficiency and the quality of education and research. It may help to improve the quality of faculty’s instructions and they may encourage their students to use these (EIS) for their assignments and projects. To provide the fisheries academic community with better, more relevant and timely access to information, it is essential to analyze the available electronic information resource facilities along with an understanding of the user behavior in the electronic environment.

The literature survey revealed that a majority of the studies on EIS are conducted in developed countries like USA and UK. Only a few studies have been conducted in India and other developing countries. However, there is no research study conducted about the use of electronic information sources based on the academic community in Fisheries Colleges and Central Fisheries Research Institutes of South India. Therefore it becomes essential to examine the availability
and use of EIS in Fisheries Colleges and Research institutes in South India which in turn would facilitate the better provision and utilization of the resources. With this objective the present study is undertaken.

1.5 Statement of the Problem

"The Use of Electronic Information Sources in Fisheries Sciences in South India"

1.5.1 Definition and meaning of concepts

The scope and context in which the terms are used in the title and the body of the thesis are defined here to avoid ambiguity in the usage of these terms.

1.5.1.1 Electronic Information Sources

Electronic Information Sources for the present study are defined as those information sources that are available through the INTERNET and the CD-ROMs. The internet-based Electronic Information Sources included are:

- E-Mail, Mailing lists and Professional Groups, Web resources, FTP (File Transfer Protocol), TELNET, and IRC (Internet Relay Chat).

1.5.1.2 Fisheries Sciences

According to Columbia Electronic Encyclopedia (2003), ‘Fisheries Sciences’ is the academic discipline of managing and understanding fisheries. It draws on the disciplines of Biology, Ecology, Oceanography, Economics and Management to attempt to provide an integrated picture of fisheries. It is typically
taught in a university setting and can be the focus of an undergraduate, masters and PhD programme.

The present study is intended to conduct a survey on the use of Electronic Information Sources in the Fisheries Colleges and Central Fisheries Research Institutes, which are involved in professional fisheries education, research, development and extension programmes. The Central Institutes are functioning under the administrative control of the Indian Council of Agricultural Research (ICAR), while Fisheries Colleges work under State Agricultural and Animal Science Universities. However, these universities follow the guidelines of ICAR for syllabus/cumculum and get most of the grants from the ICAR.

1.5.1.3 Teachers/Scientists

The present study is intended to conduct survey on the use of electronic information sources by the teachers and or scientists, research scholars, and postgraduate students in the Fisheries Colleges and the Central Fisheries Research Institutes which are functioning under the Indian Council of Agricultural Research (ICAR) setup in South India.

In the study the core user population consists of teachers and or scientists, research scholars and postgraduate students. The term ‘teachers/scientists’ represent the faculty members in Fisheries Colleges, who in addition to teaching are also engaged in research and development activities. Whereas in the Central Fisheries Research Institutes majority of them are mainly involved in full time research and other developmental activities only and hence referred as scientists. In these research institutes very few scientists are involved in regular teaching work wherever such academic degree programmes are offered.
1.5.1.4 Research Scholars

The user population of this study also includes the research scholars in Fisheries Colleges and the Central Fisheries Research Institutes in South India. In the present study the term ‘research scholars’ indicates persons who are actively involved in the research and developmental activities and working as research associates/research assistants under the externally funded research projects, for their Ph D programme and also persons who are pursuing for their Ph D degree under the universities regular programme.

1.5.1.5 Users or Respondents or Academic Community

Users are patrons of its organization i.e. teachers and scientists, research scholars, students, members of various authorities, administrative staff and other registered users from outside the institution. In this study ‘users’ are those who use information sources that are available through the CD-ROMs and the Internet (Electronic Information Sources) for research, teaching or for general purposes. The term ‘respondents’ indicate all core population of the study for whom the survey on the use of electronic information sources is conducted. The term ‘academic community’ denotes teachers or research scholars in a university or college. The academic community in this study consists of the teachers/scientists, research scholars and the postgraduate students of the institutions.

The term ‘users’ or ‘respondents’ or ‘academic community’ are used interchangeably to represent the user population.

1.6 Objectives of the Study

The main objective of the study is to investigate the use of Electronic Information Sources by the academic community (teachers/scientists, researchers...
The specific objectives of the study are

1. To study the use of different types of Electronic Information Sources by the teachers/scientists, research scholars and postgraduate students of Fisheries Colleges and Central Fisheries Research Institutes.

2. To understand the different purposes of using the EIS by the respondents.

3. To analyze the use of EIS in relation to other information sources.

4. To identify the constraints faced by the respondents in using the Electronic Information Sources.

5. To examine the factors affecting the use of EIS.

6. To identify the areas of training needed by the respondents to utilize EIS efficiently and effectively.

7. To assess the satisfaction level of users regarding the access to EIS in their institutions.

8. To discover the significant difference if any in the EIS use pattern on individual parameters according to their professional status and the basic degree of the respondents.

9. To offer suggestions to improve the respondents use of EIS.

1.7 Hypotheses

In order to achieve the desired objectives, the study formulated a set of hypotheses based on an extensive scanning of literature for further investigation. They are

1. E-Mail is the most popular EIS among the respondents.

2. ASFA (CD-ROM/online) is the most important and widely used information source among the respondents.
3 The use of EIS has changed the traditional information seeking habits of the respondents.

4 The users face various constraints in accessing the EIS.

5 The respondents are satisfied with the level of access they have to EIS in their institutions.

6 The respondents learnt to use EIS without the aid of any training programme.

7. The respondents are in need of training for handling the Electronic Information Sources.

1.8 Scope and Limitation of the Study

The present study is confined to the use of electronic information sources, access to a computer and its location; use of EIS in relation to other information source, the areas of training needed by the users to utilize electronic resources efficiently and effectively and finally to suggest measures for their improvements in the use of EIS.

There are, 14 Fisheries Colleges in India under different State and Central Agricultural Universities for fisheries education and research and 8 Central Fisheries Research Institutes located at Barrackpore, Bhimtal, Bhubaneshwar, Chennai, Kochi, Lucknow, and Mumbai. All these Central Institutes and Fisheries Colleges are involved mainly in professional fisheries education, research and developmental work in India. Each of these institutes has libraries catering to their needs.

Further keeping in view the enormity of the task, the researcher intends to limit the scope of this study to cover only those Fisheries Colleges and Central Fisheries Research Institutes, which are functioning under the Indian Council of
Agricultural Research (ICAR) and imparting professional fisheries education in South India

- College of Fisheries, Mangalore, Karnataka
- Fisheries College and Research Institute, Tuticorin, Tamil Nadu
- College of Fisheries, Cochin, Kerala
- College of Fisheries, Nellore, Andhra Pradesh

Central Fisheries Research Institutes

- Central Marine Fisheries Research Institute (CMFRI), Cochin, Kerala
- Central Institute of Fishery Technology (CIFT), Cochin, Kerala
- Central Institute of Brackish Water Aquaculture, Chennai, Tamil Nadu

The study covers only the three categories of users namely teachers/scientists, research scholars and the postgraduate students in these institutions.

The study excludes those colleges under conventional universities offering only one or two courses in fisheries sciences in their M Sc degree programmes with average admission strength of only 10-12 students annually. Moreover, these colleges do not have electronic resource facilities for users in their institutions. Also the institutes offering diploma and certificate courses are not included in the present study.

1.9 Significance of the Study

Agriculture including fisheries is the mainstay of Indian economy and is receiving due importance from the very beginning of its independence. This is evidenced by the creation of universities and research institutes throughout the country under the aegis of ICAR, to accelerate the education and research in agriculture, animal, veterinary and fishery sciences. The ICAR recognizing the
importance of electronic information in the development of the country, through its special project allocated funds for the State Agriculture Universities including their constituent Fisheries colleges and Research Institutes to achieve access to information via the Internet and the World Wide Web. In order for these libraries to select and develop appropriate electronic information resources and have a better understanding of the usefulness of these resources, analysis of these Electronic Information Sources along with information seeking behavior of users in the electronic environment must be explored.

The report of the study will assist:

- To bring out the state-of-the-art of the Fisheries colleges and Research Institute libraries in South India on the various facets of information sources and services with special reference to their Electronic Information Sources.
- The study will help the administrators of Fisheries institutions, to take necessary measures to strengthen the existing Electronic Information Sources and Services and to maximize the use of EIS among the user community.
- The study provides the library professionals with sufficient information in evaluating their electronic resources environment and to plan improvements in the total electronic information services.
- It will provide basis for the nature and type of electronic resources in Fisheries Sciences.
- This study will pave way to conduct similar studies in other disciplines and also in other geographical areas.

1.10 Methodology

Various methods such as questionnaires, interview, observation, etc. have been used by earlier studies for investigating information needs and information
seeking behavior of different user groups. For this study, a questionnaire-based survey method, was chosen along with survey of literature, personal visits, informal interviews, field observations and opinion of experts of library professionals were considered.

The study began with the literature survey. Secondary documents, such as LISA were used to study the various aspects of electronic information sources in different disciplines and universities. Primary data used for this study came from the annual reports, special publications of the institutions and annual calendar of the Fisheries Colleges and Research Institutions. Having collected the primary data from the records and reports of the Fisheries Colleges and Research Institutes, further data was collected from the users and librarians of the institutions.

1.11 Construction of the Questionnaire

Several questionnaires used by earlier studies were examined in developing a survey instrument for this study. Two questionnaires were constructed based on the research studies of Renwick (2005)\textsuperscript{17} and Pollard (1999)\textsuperscript{18}. Of these two questionnaires, one was meant for the librarian and the other for the core population of the study i.e. teachers/scientists, research scholars and postgraduate students. The questionnaires were sent to experts, senior professors in the field of library and information science and based on their suggestions improvements were made to the questionnaires.

1.11.1 Questionnaire for the librarian

Questionnaire for the librarian was designed to collect information regarding the library, its facilities, resources and services. The questionnaires used
in the study have been given in Appendix-II and III, which consists of the following sections

Section 1: This section elicits the general aspects of the library such as the name, year of establishment and other details of the library.

Section 2: It elicits details regarding the availability of books, periodicals subscribed and other information regarding the traditional sources in the library.

Section 3: This section gathers information on the provision of various traditional information services in the library such as the bibliographic services, current awareness services, content page services, indexing and abstracting services.

Section 4: This section queries the details of internet connection such as the year of implementation, internet service provider and the type of connection.

Section 5: It aims to obtain information regarding the CD-ROM facility in the library such as subscription to CD-ROM titles, Type of CD-ROM workstation, and the number of terminals with CD-ROM access.

Section 6: Collects details of the library users, library staff, annual budget of the library, number of departments/divisions attached to the institution, the opening and closing hours of the library.

Section 7: This section queries the details of library automation, the areas of automation, the software used and the year of implementation.

1.11.2 Questionnaire for the users

The questionnaire was designed to collect data from the target population of the study. The survey questionnaire consisted of 30 questions and it composed of 3 sections. To facilitate quantification and analysis, mainly close-ended questions were used along with checklists and Likert's five-point scale. To capture a response and have fewer missing responses, responses such as "no opinion" and "never use" were included.
Section 1 The 13 questions on demographics sought to create a profile of the users regarding their age, basic degree, department and professional status, etc.

Section 2 This section also contained 13 questions on use of EIS in relation to other information sources, level of computer literacy, location, purpose and frequency of use, tools/agents for EIS identification, benefits, constraints and satisfaction with the level of access to EIS use in the institutions.

Section 3. It included 6 questions which were to determine what training users have had as well as their training needs. One open-ended question asked the users to add their own comments and suggestions about the improvements in electronic information services in their institutions.

1.11.3 Pilot Study

A pilot survey was carried out with a sample of 75 teacher/scientists, research scholars and postgraduate students of the College of Fisheries, Mangalore. The data collected through this survey were analyzed and considering the feedback obtained from the respondents, the pilot project version of the questionnaire was revised to eliminate ambiguity in meaning and also open-ended questions were modified to multiple choice questions. This process provided both reliability and a validity check to ensure that the survey items reflected the research objectives of the study.

1.11.4 Sampling

The units of investigation and analysis for the study were the 4 Fisheries Colleges under the State governments and 3 Central Fisheries Research Institutes functioning under the ICAR setup, spread over the southern part of India. A preliminary investigative inquiry was sent to them to indicate if they had installed various electronic information resources into their library operations. The CD-
ROM and Internet resources were the commonly available resources and services in these libraries. The population investigated was 421 users, comprising of 242 teachers/scientists, 90 research scholars and 89 postgraduate students from the State Fisheries Colleges and Central Research Institutes selected for the study. These figures are presented in Table 1.1.
<table>
<thead>
<tr>
<th>Institution</th>
<th>Total Strength</th>
<th>Questionnaires distributed</th>
<th>Questionnaires received</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Fisheries, Mangalore, Karnataka</td>
<td>115</td>
<td>100</td>
<td>81</td>
<td>81.00</td>
</tr>
<tr>
<td>College of Fisheries, Nellore, Andhra Pradesh</td>
<td>14</td>
<td>14</td>
<td>11</td>
<td>78.57</td>
</tr>
<tr>
<td>College of Fisheries, Panangad, Kochi, Kerala</td>
<td>49</td>
<td>46</td>
<td>40</td>
<td>86.95</td>
</tr>
<tr>
<td>College of Fisheries, Tuticorn, Tamil Nadu</td>
<td>65</td>
<td>60</td>
<td>49</td>
<td>81.66</td>
</tr>
<tr>
<td>Central Institute of Brackish Water Aquaculture, Chennai</td>
<td>65</td>
<td>58</td>
<td>46</td>
<td>79.31</td>
</tr>
<tr>
<td>Central Institute of Fishery Technology, Kochi, Kerala</td>
<td>92</td>
<td>82</td>
<td>58</td>
<td>70.73</td>
</tr>
<tr>
<td>Central Marine Fisheries Research Institute, Kochi, Kerala</td>
<td>76</td>
<td>61</td>
<td>50</td>
<td>81.96</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>476</strong></td>
<td><strong>421</strong></td>
<td><strong>335</strong></td>
<td><strong>79.57</strong></td>
</tr>
</tbody>
</table>
The under graduate students were excluded from the study because of lack of exposure to the electronic information sources. This sample was chosen because it comprised of a very specialized group of academic and research community that is actively involved in teaching and research programmes comparable to those offered by similar institutions the world over. Electronic Information Sources play a vital role to cater to the needs of research and faculty in the process of productivity and national development.

Within each of the selected institutions, the users were categorized under 2 groups, namely the users with Fisheries degree and with Non Fisheries degree. The users occupying the status of teachers/scientists, research scholars and postgraduate students with Fisheries degree and Non Fisheries degree were identified. Each category of the users (teachers/scientists, research scholars and postgraduate students) were randomly drawn from both Fisheries degree and Non Fisheries degree groups.
Fig 1.1 Fisheries Colleges and Research Institutes in South India
1.11.5 Administration of the questionnaire

The researcher chose the “directly-administered” questionnaire method rather than mailed questionnaire method, which is effective when a group of people are assembled in one place (Ary and others, 1996)\(^1\) According to Ary and others, it is easy to reach a large sample of faculty or students in a variety of disciplines by administering the survey in different places like classrooms. The main advantage of direct administration of questionnaires is the high response rate, which typically reaches 100 percent Other advantages are the low cost and the fact that the researcher is present to provide assistance or answer questions Following stratified random sampling technique, 421 questionnaires were distributed by the researcher to the users at the seven institutions under study between March 2006 and May 2006. The researcher was quite familiar with these institutions and data was collected personally in individual classrooms, laboratories, libraries and administration buildings at different institutions Eighty percent of distributed questionnaires were collected by the researcher and the remaining 20% were received by the researcher’s follow-up activity through E-Mails and telephonic reminders The responses received were 335 usable ones, making a response rate of 79.57%. The professional status wise response is presented in the Table 1.2
Table – 1.2
Professional status wise distributions of respondents

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Professional Status</th>
<th>Questionnaires distributed</th>
<th>Questionnaires received</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teachers/ Scientists</td>
<td>242</td>
<td>183</td>
<td>75.62</td>
</tr>
<tr>
<td>2</td>
<td>Research Scholars</td>
<td>90</td>
<td>71</td>
<td>78.88</td>
</tr>
<tr>
<td>3</td>
<td>P G Students</td>
<td>89</td>
<td>81</td>
<td>91.01</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>421</strong></td>
<td><strong>335</strong></td>
<td><strong>79.57</strong></td>
</tr>
</tbody>
</table>

The questionnaires for collecting information regarding the libraries were distributed among the librarians of the selected institutions. All of them have responded. Also informal discussions were conducted with the teachers, scientists, researchers and the postgraduates of the Fisheries Colleges and Research Institutes. Additionally, interviews revealed deeper insights into the subjective experiences of individuals in using electronic resources. This helped to complement the quantitative information obtained by the questionnaire with more detailed qualitative information.

1.11.6 Statistical analysis of the data

The data collected from the questionnaires have been scrutinized and tables were prepared for each information which are then coded and analyzed using statistical software like Excel and Statistical Package for the Social Sciences (SPSS). Initially descriptive statistics such as weighted mean, Standard deviation and Co-efficient of variation were calculated to determine the trends and patterns of different response types. In some instances graphs were also drawn to have the visual significance of the information on some aspects. Wherever necessary Non
parametric tests like Chi-square tests, Mann-Whitney U tests and Kruskal-Wallis tests were carried out to test the significant difference among the different EIS options and to have the proper interpretation of these responses/options with reference to the related study

1.12 Chapterisation

The thesis has been organized into six chapters as detailed below:

**Chapter 1** This chapter introduces the subject matter of the study, growth and development of EIS, need for the study and makes a statement of the problem. It explains the objectives, hypotheses of the study and the concepts used in the study. The chapter covers in detail the scope and limitation of the study, significance and the methodology of the study. The chapter also deals with the designing of the questionnaire.

**Chapter 2** reviews the available literature related to the subject of the study.

**Chapter 3** deals with the Fisheries education in India and the state-of-the-art of Fisheries Colleges and Central Fisheries Research Institute libraries under study.

**Chapter 4** deals with the data collected from the teachers/scientists, research scholars and the postgraduate students with regard to their use of EIS. A detailed analysis of this data and interpretation forms the core of this chapter.

**Chapter 5** gives the major findings of the study.
Chapter 6

based on the findings on the use of EIS by the teachers/scientists, research scholars and the postgraduate students, comprehensive attempt have been made to provide some important suggestions and recommendations to enhance the use of EIS in Fisheries institutions. It also provides avenues for further research with concluding remarks.
References


