EFFECTIVENESS OF MALAYSIAN AGRICULTURAL LIBRARIES

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Copyright Declaration

Abstract

Evaluation studies can help libraries to find out their strengths and weaknesses and use this knowledge for re-orienting their collections, services and facilities to effectively meet the information needs of their users. The purpose of this study was to explore the information needs and seeking behaviour of agricultural scientists in Malaysia and how effectively their needs are satisfied by their libraries. The study investigated some major factors that were considered important in effectively meeting the information needs of these scientists.

Five major agricultural institutions in Malaysia participated in the study. Data was collected through two questionnaires and follow-up interviews with selected respondents and library staff. The *user survey* questionnaire provided data on information needs and seeking behaviour of respondents, their assessment about the adequacy of library collections, services and facilities, and their overall perceptions about library effectiveness. The *library survey* questionnaire furnished data from the participating libraries on their manpower, budget, collections, physical resources, library services, and resource sharing activities. The population of the study comprised 1,328 individuals. Proportionate stratified random sampling technique was used to generate random samples. A total of 332 questionnaires were distributed and 234 useable questionnaires were received back with an overall response rate of 70.5 percent.

The study found that research and review articles were the most preferred sources for getting up-to-date information. Interaction with professional colleagues was also considered important for information exchange. Libraries were more extensively used during two important stages of research, i.e., proposal development and report writing. Although a majority of the respondents personally visited their library they, however, sent their junior researchers and/or para-professionals for getting photocopies of articles, checking out books or getting information from the sources already known to them. The use of IT-based information sources and facilities was very low, although a majority of the respondents possessed reasonably good computing skills. Among the Internet applications, e-mail was the most popular while other Internet-based sources and facilities were used infrequently.

A positive relationship was found between perceptions about library effectiveness and assessment of participants of the adequacy of library collections, equipment and physical resources. Other factors having a positive impact on the perception about library effectiveness were: involvement in the selection of library materials; notification of current materials; adequate promotion; convenient library location; staff attitude; and participation in user education programmes.

The level of resource sharing among Malaysian libraries was quite high as nearly 74 percent of the interlibrary loan and document delivery requests of the participating libraries were met locally. However, only a minimal resource sharing was found among the participating libraries and libraries in the ASEAN

countries. Although the participating libraries agreed in principle to participate in a resource sharing scheme, they felt that it should be the prerogative of the participating library to decide its level of co-operation and with which library to share its resources. It means that these libraries were in favour of a "loose" library co-operation network.

A big difference was found between the number of document delivery requests made by these libraries to international sources and the number of such requests received by them from overseas, confirming one-way flow of information. Most of the document delivery requests were made to the BLDSC. Malaysian agricultural scientists, as compared to scientists in developed countries, made considerably less number of interlibrary loan and document delivery requests. A positive relationship was found between the availability of funds in research projects for literature procurement and the number of document delivery requests made.

The study concludes that agricultural libraries in Malaysia were to some extent meeting the information needs of their scientists, although a disparity among these libraries was quite evident. However, the financial crisis of 1997 has severely affected the performance of these libraries. Library collections, services and facilities considered reasonable at the time of this study may quickly become inadequate due to the lack of funds to sustain them. Therefore, agricultural libraries in Malaysia need to develop appropriate strategies for surviving in the rapidly changing environment. Major recommendations of the study are: development of a formal resource sharing scheme for agricultural libraries in Malaysia, putting holdings information of these libraries on the Internet to facilitate resource sharing, making subscriptions to full-text electronic journals, more library co-operation among ASEAN countries, and the conduct of intensive user education programmes.

List of Abbreviations

ASEAN	Association of Southeast Asian Nations (Cambodia, Brunei, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam)
DDS	Document Delivery Service
DLDSC	British Library Document Supply Centre
FRIM	Forest Institute of Malaysia
GDP	Gross Domestic Product
ICARDA	International Centre for Agricultural Research in Dry Areas
ILL	Interlibrary Loan
IRPA	Intensification of the Research in Priority Areas
IRRI	International Rice Research Institute
MARDI	Malaysian Agricultural Research and Development Institute
MOU	Memorandum of Understanding
NLM	National Library of Malaysia
PERPUN	Persidangan Pustakawan Universiti dan Negara (Conference of Librarians of University and the National Libraries)
PORIM	Palm Oil Research Institute of Malaysia
PRO	Principal Research Officer
RO	Research Officer
RRIM	Rubber Research Institute of Malaysia
S&T	Science and Technology
SDI	Selective Dissemination of Information
SRO	Senior Research Officer
UKM	University Kebangsaan Malaysia
UM	University of Malaya
UPM	University Putra Malaysia
USM	University Science Malaysia

Part I. PRELIMINARIES

1. Introduction

1.1 Background

Information is a resource of enormous importance that contributes significantly towards the development and progress of a nation. Similarly, the role of information in scientific and technological research cannot be over-emphasised. It is particularly important for the field of agriculture in developing countries, as economies of most of these countries are agriculture-based and their pace of national development is often linked to the performance of this sector (Frank, 1987). Sustained agricultural growth cannot be achieved without a sound, dynamic and viable research system. Just as well-equipped laboratories and field facilities are indispensable to carry out agricultural research, well-developed libraries are essential to provide information support to researchers (Wasserman, 1991).

A library is considered as the nucleus for any research activity and an essential ingredient for a viable research system. It provides an account of previous intellectual endeavours, which serves as a breeding ground for new concepts and ideas. Library resources and facilities can be used as one of the parameters for measuring the capabilities and sophistication of research at an institution. Well-stocked and efficient libraries act as eyes or pathfinders for researchers and provide them inspiration to venture into new areas of research. An ineffective library, on the other hand, may lead to low quality or duplication of research thus resulting in wastage of financial, material and human resources. Therefore, libraries need to periodically evaluate their resources and services to determine their effectiveness.

It is imperative for a library evaluation study to know the information needs of users and the extent to which they are satisfied. Nicholas (1996) felt that traditional measures of library evaluation such as number of books and serials on the shelves or titles bought per year, etc. were no more valid. He argued that

the yardstick had to be changed since the success or effectiveness of a library can be measured only through user satisfaction. Continuous interaction between scientists and information workers is essential for developing a better understanding of their information needs, acceptance and use of library collections, services and facilities, their opinions about the utility of various information sources, etc. Such a feedback is necessary for conceptualisation, planning, and implementation of information systems and services (Verhoeven, et al. 1995).

A thorough understanding of user information needs and seeking behaviour is fundamental for the provision of successful information services (Zhang, 1992). However, Nicholas (1996) pointed out that it is desirable that the concept of information needs should be properly defined first to provide a framework for such studies. According to him, "information need arises when a person recognizes a gap in his/her state of knowledge and wishes to resolve that anomaly" (p. 7). He added, "it is the information that individuals ought to have to do their job effectively, solve a problem satisfactorily or pursue a hobby or interest happily".

Studies on information needs and seeking behaviour of scientists can be traced back to the late 1940s (Reneker, 1993). It is still a popular topic as information needs and seeking behaviour of scientists are dynamic and changing (Tegler & Miller, 1986). However, our understanding about this discipline is limited as most of the previous studies were based on a system-oriented approach (Dervin & Nilan, 1986). In a system-oriented approach " ... users are mechanistic, passive recipients, and information seeking is studied in terms of a user's encounter with an information system, whereby the situation that led to this encounter and the consequences of such encounter are excluded" (Zhang, 1992, p. 5). These studies concentrated on what the systems were designed to do rather than what users wanted to do. Lately, a paradigm shift has been observed in information needs and seeking studies and the emerging approaches are user-centred, based on cognitive process rather than system centred (Cullen & Calvert, 1986). However, some of the studies using an user-oriented approach were descriptive in nature with limited exploration of the complex relationships

among various cognitive, situational, environmental, and systems factors (Hewins, 1990).

Another limitation of the information needs and seeking behaviour studies is that "most of them are done in developed countries such as the United States and Great Britain, which necessarily reflect the information seeking environment there" (Zhang, 1992, p. 1). In developing countries a different set of problems and conditions exist that may greatly influence the information needs and seeking behaviour of library users (Metcalfe, 1989). A limited number of studies on this topic in developing countries severely restricts the establishment and maintenance of appropriate information services and facilities. The available literature on this topic is highly uneven and scattered (Saracevic, 1980) and often not properly reported (Anwar, 1982). Salem (1986) noted that the lack of library statistics and descriptive data, and the non-existence of accurate and extensive surveys were the major problems faced by developing countries in establishing library services which would meet their users' information needs effectively.

Adequacy of collections is the most crucial factor that determines the changing effectiveness of any library in meeting the information needs of its users. In fact, a majority of the information services offered by libraries are collection-based. Several studies have pointed out strengths and weaknesses of different collection assessment techniques. The use-centered studies concentrated on the use of collections and as to how well they meet users' needs (Dobson et al. 1996; Carrigan, 1996). One problem with some use-centered techniques is that they may not necessarily reveal the adequacy of collections as they mainly focus on use patterns. These approaches may not point out inadequacy and under-selection of collections. Osburn (1992) observed that the concept of collection assessment was steadily shifting from a collection-centered to a client-centered interpretation.

The tremendous growth in world literature and increasing prices has made it impossible for libraries to acquire, process, and provide access to these materials. Resource sharing can help libraries to maximise the availability of materials and services at an affordable price. Resource sharing is a broad term

encompassing mainly personnel, equipment, facilities, knowledge, expertise, information resources, etc. (Rush, 1992). According to UNESCO (1985), resource sharing can be placed under two major categories, functions and activities. The *functions* include co-operative acquisition, assignment of specialisation in material acquisition, exchange of duplicate holdings, co-operative cataloguing, interlibrary loan, reciprocal borrowing privileges, and referral services. The *activities* cover union catalogue of books and periodicals, indexing and abstracting services, list of new arrivals, bibliography development, directories and inventories, joint research projects, in-service training, meetings and workshops. Two major activities under the umbrella concept of resource sharing, i.e., interlibrary loan and document delivery, have been refined over the years. Now the term interlibrary loan more often means the borrowing of original documents from a library that would be returned within a specified time period. On the other hand, the document delivery means that the lending library will provide a photocopy of the needed document that will be retained by the requesting library (Reddy, 1987). However, due to rapid increase in the number of electronic journals (Chan, 1999) and digitisation of a variety of information sources (Majid, 1999), the electronic document delivery is also gaining more popularity (Morris, et al. 1997; Rollins, 1996).

It is evident from the above discussion that the user-oriented approach was considered more suitable for measuring library effectiveness. It was also noted that for a more reliable library assessment, the full range of resources, services and activities should be examined together. No study was found on information needs and seeking behaviour, assessment about library effectiveness, adequacy of resources, and resource sharing among agricultural libraries in Malaysia. Available literature is descriptive in nature presenting personal views and perceptions on these topics.

1.2 Setting for the Study

1.2.1 Agriculture Sector in Malaysia

For decades, the agriculture sector has played a dominant role in the Malaysian economy. Natural rubber, palm oil, cocoa, spices, and tropical timber were the major commodities that contributed significantly to the GDP, provided employment to a vast majority of the population, and earned over 50 percent of the export earnings. However, a drop in the international prices of rubber, palm oil and timber during the 1970s and early 1980s gave a severe blow to the once thriving agriculture-based Malaysian economy. This led to structural economic reforms in the 1980s and beyond to diversify economy and to reduce dependence on agriculture due to uncertainties associated with this sector. Heavy emphasis was given on boosting the industrial and service sectors, resulting in tremendous increase in the annual growth rate. The manufacturing sector acted as an engine for Malaysian economic growth and contributed significantly to the GDP, export earnings and employment, superseding the contribution of the agricultural sector (Tables 1.1 to 1.3). The higher industrial growth and its impact on national economy encouraged the Malaysian government to embark on an ambitious development plan called 'Vision 2020'. The plan announced on 28 February 1991 provided a framework for Malaysia to become a fully industrialised and developed country by the year 2020 (Shahar Banun, 1993).

Table 1.1
Contribution of Various Sectors to the GDP (in percent)*

Sector	1970	1980	1990	1995	1998
Agriculture	29.0	22.9	18.7	13.9	11.6
Manufacturing	13.9	19.6	26.9	32.7	36.9
Services	36.2	40.1	42.5	44.8	44.9
Mining	13.7	10.1	9.8	7.0	6.8
Others	3.8	4.6	3.6	4.3	4.5

*** at constant 1978 prices**
Source: Malaysian Economy in Figures 1998. Kuala Lumpur: Economic Planning Unit, 1998, p. 9.

Table 1.2
Contribution of Various Sectors to Exports (in percent)

Sector	1970[a]	1980[b]	1990[c]	1995[d]	1997[a]
Agriculture	54.8	41.0	15.3	11.1	9.2
Manufacturing	11.9	21.0	58.9	79.6	80.6
Tin	19.6	9.0	1.0	0.3	0.3
Oil & Gas	3.9	24.0	16.0	4.9	6.0
Others	9.8	5.0	8.8	4.1	3.9

Sources: a= Malaysian Economy in Figures 1998. Kuala Lumpur: Economic Planning Unit, 1998, p. 21.
b= Economic Report 1980/81. Kuala Lumpur: Ministry of Finance, 1980, p. 154.
c= Economic Report 1990/91. Kuala Lumpur: Ministry of Finance, 1990, p. 148.
d= Malaysian Economy in Figures 1996. Kuala Lumpur: Economic Planning Unit, 1996, p. 26.

Table 1.3
Employment in Malaysia by Sector (in percent)

Sector	1970	1980	1990	1995	1998 (estimated)
Agriculture	39.7	35.7	26.0	17.9	14.3
Manufacturing	15.6	15.2	19.9	25.9	27.8
Services	37.4	41.1	47.2	47.2	48.3
Construction	5.6	6.9	6.3	8.4	8.8
Mining	1.7	1.1	0.6	0.6	0.8

Source: Malaysian Economy in Figures 1998. Kuala Lumpur: Economic Planning Unit, 1998, p. 5.

As the Malaysian economy focused on manufacturing and service industries, the agricultural sector was to some extent sidelined. Although the government insisted that industrial development would not be at the expense of agriculture, the actual emphasis was only limited to a few industrial crops such as palm oil and rubber (Ahmad, 1998). Out of the 5.7 million hectares of land under agriculture, only 23 percent was used for food crops, including about one-half of it for paddy cultivation (NST, 1998a). Malaysian government fixed a ceiling of 65 percent self-sufficiency in rice production, as its import from neighbouring countries was cheaper (NST, 1998b). The import of vegetables, fruits and other food products was also considered more economical. As a result, food imports steadily increased from RM 3.5 billion in 1985 to RM 7.7 billion in 1995 and RM 10.0 billion in 1997 (Ministry of Agriculture, 1998).

The financial crisis of 1997, however, exposed the inadequacies of the government policy that favoured manufacturing, property development and service sectors over agriculture. The higher food imports, which were acceptable during robust economic growth, became a heavy burden during the economic slowdown. The immediate response of the government was to revert

to boosting agricultural production. However, the agricultural sector in Malaysia faces a multitude of problems such as shortage of agricultural land, low farm productivity, high production cost, labour-oriented and land-intensive system, and low capital inflow. Prime agricultural land has been indiscriminately used for developing infrastructure, industrial parks, housing schemes, and recreational facilities.

Acute shortage of farm labour is another problem currently faced by the agricultural sector in Malaysia. The declining interest of individuals in agriculture, particularly among the younger generation, is due to the harsh climate, poor working conditions, lack of medical and civic facilities, low social respect, and income gap between rural and urban jobs (Azidin, 1997). Currently, about 167,000 foreign workers are employed by the plantation sector alone, which has its own social and security implications (NST , 1999).

The Government of Malaysia has announced its Third National Agricultural Policy: 1998-2010, focusing on enhancing food security through boosting domestic food production and reducing dependence on imports. Emphasis is also being placed on modernising agriculture by using sophisticated cultivation techniques, farm mechanisation to overcome labour shortage, efficient land utilisation, 'cluster farming' through farm co-operatives, integrated farming to rear livestock in palm oil and rubber estates, agro-forestry, hydroponics, development of high-yielding pest-resistant crop varieties by using modern techniques such as cloning and genetic engineering, etc. Continuous high quality research is needed for improving and sustaining agricultural productivity. Malaysia has several well-established research institutions to conduct research on agriculture related problems and to come-up with the latest techniques to boost agricultural production.

1.2.2 Background of Institutions Studied

Agricultural institutions, as compared to other branches of science and technology (S&T) in Malaysia, are considered the most comprehensive and well established (Szarina, 1992). Five prime agricultural institutions participated in

this study and a brief description of each institution is given to provide a background for the study.

Rubber Research Institute of Malaysia (RRIM) was established in 1925 to undertake research and development work on natural rubber, which was introduced in this part of the world in 1875. On 1 January 1998, RRIM was grouped with two other agencies dealing with rubber to constitute the Malaysian Rubber Board[1].

Forest Research Institute of Malaysia (FRIM) was established in 1929 under the then Forest Department (FRIM, 1993) to promote sustainable management and utilisation of forest resources in the country[2]. FRIM has nine research divisions and one sub-station, engaged in research on different aspects of forestry and related disciplines (FRIM, 1994).

Malaysian Agricultural Research and Development Institute (MARDI) was established in 1969. It is the prime multi-commodity and multi-discipline agricultural research institute in Malaysia with eight research centres. It has also an extensive network of 32 out-stations located in different parts of the country. Besides conducting basic research and evolving modern cultivation techniques, MARDI also provides consultancy services to agro-based industries for the commercialisation of various agriculture-related technologies[3].

University Putra Malaysia (UPM) was established in 1971 by merging the Agriculture College, Serdang and the Faculty of Agriculture, University of Malaya. Previously it was called University Pertanian [Agriculture] Malaysia, however, in 1997 it was renamed as University Putra Malaysia, as it was offering several non-agriculture related academic programmes. Currently it has thirteen faculties, three institutes and six centres of excellence. It has about 4,300 staff and 25,000 students[4].

Palm Oil Research Institute of Malaysia (PORIM) was established in 1979 to conduct research and development work on oil palm and its products. Prior to

[1] http://www.rrim.gov.my/ visited on 4 May 1999.
[2] http://161.142.143.3/ visited on 4 May 1999
[3] http://www.mardi.my/ visited on 4 May 1999.

that, MARDI was responsible for research on palm oil and other related aspects. PORIM has three research divisions and several experimental stations[5].

1.3 Statement of the Problem

Previously, Malaysian economy was heavily dependent on agriculture as a major contributor to the GDP and a foreign exchange earner. This sector also provided employment to more than 50 percent of the population. Several research and development institutions were established for boosting and sustaining agricultural productivity. Libraries attached to these institutions also received adequate resources for developing their collections, services and facilities to effectively meet the information needs of their scientists. A change in the government policy to diversify its economy resulted in a heavy emphasis on industrialisation. Tremendous increase in the annual growth rate, mainly due to export-oriented manufacturing, further encouraged this trend and resulted in the sidelining of the agricultural sector. However, the financial crisis of 1997 has revived the importance of agriculture in the national economy as well as its role in ensuring food security. However, it is not expected that this sector will again receive preferred treatment, support and funding as was available during the 1960s and 1970s. Rather, it will have to compete with other sectors for getting the needed resources.

Agricultural R&D institutions are also undergoing restructuring, attaining corporate status and expected to generate revenues. This means that the libraries of these institutions will also feel this pressure and have to justify their existence within the organisation. They might also need to reorganise their resources and facilities to survive in the rapidly changing scenario and to prove their utility and competitiveness. The first logical step in this direction would be to assess the effectiveness of these libraries in meeting the information needs of their scientists and suggest measures for enhancing their performance.

Feedback from library users can act as a reliable source in assessing the level of their satisfaction and future expectations. Besides obtaining their opinion about

[4] http://www.upm.edu.my/ visited on 4 May 1999.
[5] http://porim.gov.my/ visited on 4 May 1999.

the adequacy of library collections, services and facilities, the knowledge about their information needs and seeking behaviour is desirable for such an assessment. Most of the studies on these topics have been conducted in developed countries within different settings. Very little is known about the information needs and seeking behaviour of Malaysian agricultural scientists and their perception of library effectiveness. Available literature is purely descriptive in nature without adequate data to corroborate presented views and perceptions. Thus, there is a need to study the information needs and seeking behaviour of Malaysian agricultural scientists and how effectively those needs are satisfied by their libraries.

1.4 Research Objectives

This study aims to examine the effectiveness of Malaysian agricultural libraries in meeting the information needs of their scientists. Specific objectives of the study are to:

1. Identify the ways agricultural scientists in Malaysia use various library resources and services.
2. Identify those information sources which are preferred by the scientists and the extent to which they are adequate for meeting their information needs.
3. Investigate the relationships between the information needs and seeking behaviour of the respondents with different variables such as institutional affiliation, age, gender, highest qualification, library use skills, etc.
4. Determine the use of IT-based information sources and applications by the respondents and their relationship with computer literacy and certain other variables.
5. Seek the assessment of respondents about the adequacy and usefulness of various library services and facilities and their relationship with their perception of library effectiveness.

6. Find out the magnitude of interlibrary loan and document delivery transactions and explore the perceptions of library chiefs of the participating libraries of resource sharing.

1.5 Research Questions

The study investigated the following research questions:

Question 1. What information sources are preferred by Malaysian agricultural scientists?

Question 2. What are the library use patterns of Malaysian agricultural scientists and the way they seek needed information?

Question 3. How frequently are IT-based information sources and facilities used by Malaysian agricultural scientists?

Question 4. How adequate are the resources and facilities of Malaysian agricultural libraries?

Question 5. How effective are Malaysian agricultural libraries in meeting the information needs of their users?

Question 6. What is the status of resource sharing among Malaysian agricultural libraries?

Question 7. What are the perceptions of library chiefs of the participating libraries of resource sharing?

Question 8. What measures can be adopted to improve resource sharing among Malaysian agricultural libraries?

1.6 Assumptions

The following assumptions are made for the purpose of this study:

1. Scientists use libraries to identify, select, acquire, and use information for supporting their research and development activities.

2. Scientists have their unique information needs and seeking behaviour that are different from professionals and scholars belonging to other disciplines.

3. Libraries develop their information resources, services and facilities in anticipation to satisfy the information needs of their users.

4. Information technology provides the flexibility, speed and accuracy in finding and using the needed information.

5. Availability of IT-based sources and services has a significant impact on the information needs and seeking behaviour of scientists.

6. Resource sharing is an economical way to maximise the availability of materials and services.

7. Evaluative studies are useful in assessing and improving the effectiveness of libraries.

1.7 Delimitations

In using the findings of this study, it is desirable to keep in mind a number of ways in which the scope of the study is restricted:

1. The libraries of five major agricultural research institutions in the public sector participated in the study. Libraries of private sector institutions as well as agro-based industries were excluded.

2. Libraries of some public institutions including livestock, veterinary sciences and fisheries were excluded, primarily due to their small number of scientific staff and limited library collections and facilities.

3. External users of the participating libraries such as extension workers, farmers, entrepreneurs, general public, etc. were excluded from the study population.

4. From UPM, only the full-time academic staff working in agriculture-related departments were included in the study. Students from these departments were not included in the population.

1.8 Definition of Terms

For the purpose of this study, the following terms and concepts are defined:

Agricultural Scientist: An individual with at least a Bachelors degree in science and is involved in agricultural research, teaching, research planning and management, research-based out-reach activities, and other related jobs

Document Delivery: Malaysian libraries use this term to describe the acquisition of photocopies of materials from overseas that will be retained by the requesting library.

Interlibrary Loan: Malaysian libraries use this term to describe the borrowing of original documents from local libraries that need to be returned within a specified time period as well as the photocopy of materials that will be retained by the requesting library.

Library Effectiveness: Level or proportion of users demands that library is able to satisfy by developing adequate and appropriate collections, services and facilities.

1.9 Significance of the Study

One of the primary goals of almost every library, whether stated explicitly or not, is the satisfaction of user information needs. A thorough understanding of the information needs and seeking behaviour of scientists is fundamental for effectively supporting their research activities. Such an understanding is expected to help develop library collections and services that are more likely to

satisfy their information needs. The purpose of this study is to investigate the information needs and seeking behaviour of Malaysian agricultural scientists and how effectively these needs are being met by their libraries.

The significance of this study may be perceived from both theoretical and practical points of view. From a theoretical perspective, the findings of this study will contribute to the existing body of knowledge in the areas of information needs and seeking behaviour of agricultural scientists, the adequacy of library collections and facilities, and the perception of library effectiveness. This study is also valuable for developing countries, considering that their literature on these topics is scanty, scattered, fragmented and not well documented. The findings of this study may be compared with the results of earlier studies in other countries to reveal similarities and dissimilarities. This investigation may also encourage researchers in Malaysia and other developing countries to replicate this study in other scientific disciplines.

From a practical perspective, it is expected that the findings of this study will be useful for agricultural libraries in Malaysia to re-orient their resources, services and facilities to synchronise them with the information needs and seeking behaviour of their scientists. Agricultural libraries in ASEAN region may also benefit from this study as most of the countries in this region share several common factors such as a volatile economic situation, a somewhat similar social infrastructure, a comparable state of agricultural development, common crops, pests and diseases.

1.10 Summary

For decades, the agriculture sector has played a dominant role in the Malaysian economy. Since mid-1980s, a shift from agriculture-based to industrial-based economy has been quite evident. However, the financial crisis of 1997 has revived the importance of the agriculture sector. Continuous high quality research is required for improving and sustaining the agricultural productivity. Libraries can extend an invaluable support to the scientists in their research efforts by providing them access to the needed information. The purpose of this

study was to assess the effectiveness of Malaysian agricultural libraries in meeting the information needs of their scientists. Five major agricultural institutions participated in this study. The study investigated eight research questions covering three major areas, i.e., information needs and seeking behaviour of agricultural scientists, adequacy and effectiveness of library resources, services and facilities, and status and perceptions of resource sharing.

2. Literature Review

2.1 Introduction

This chapter examines previous studies on the major topics covered by this research for providing a theoretical framework for this study. The review focuses mainly on three areas, i.e., information needs and seeking behaviour, resource sharing, and collection assessment. As this study is conducted in a developing country, some studies discussing the flow of information in these countries have also been examined. The last section of this chapter will review different methodologies used by the previous studies.

2.1.1 Role of Information in Scientific Research

Information is considered as an important resource that contributes towards the development and progress of a nation. Highlighting the importance of information in national development, Oslen (1989, p. 120) noted that:

> Information is an unusually powerful commodity. It provides the heart of the development of knowledge, the basis for innovations, the resources for an informed citizenry and thereby, it becomes the key commodity for the progress of a society. Nations will flourish or fail depending upon the availability of leaders, professionals and citizens who have been educated to understand the power of information and have access to it for decision making and solving the problems of their society.

Wasserman (1991, p. 38) has also acknowledged the significance of information in national development, saying that "it is not an accident that the developed nations are those in which information products and services have been brought into being and are widely exploited, first in conventional forms and later through computer intervention". He emphasised that "information systems serve as an essential ingredient in fostering research and development in science and technology". He concluded that developing countries need to establish information infrastructures and systems that will bring these nations to a level where they may enjoy full parity in information access with any other region of the world.

Information is a resource of immense economic and social significance. Its role in the improvement of scientific and technological research and in the acceleration of innovation process cannot be over-emphasised. Sustained growth in agriculture cannot be achieved without strengthening the agricultural research and improving access to the needed information (Gooch, 1994). As well-equipped laboratories and field facilities are indispensable to carry out agricultural research, well-developed libraries are essential to provide information support to researchers (Wasserman, 1991). Lack of current, accurate, and relevant information could seriously hinder the agricultural research process, leading to low quality or duplicate research thus resulting in wastage of financial, material and human resources (Perera, 1995).

2.1.2 Library Evaluation

Library assessment helps understand what is working well or poorly and what are current strengths and weaknesses (Crist et al. 1994). Emphasising the need for library evaluation studies, Nicholas (1996, p. 5) argued that "recent political and economic events have dragged libraries into the value-driven environment, from which they are unlikely ever to escape". Libraries are now on the same cost-conscious footing as any other business and, as a result, they are subject to the same concern, such as customer care, customer character, economic efficiency, cost benefit, etc. (Greenaway, 1997). Different factors such as size, relevance and currentness of collections; appropriateness and efficiency of library services; adequacy of library facilities; staff attitude and performance, and others can be used for measuring the effectiveness of a library. It is obvious that, in most situations, the final success of a library in meeting the information needs of its users would depend on the optimal performance of all these factors (Bell, 1986b). That is why these factors cannot be used in isolation for measuring library effectiveness. Rather, the full range of resources, services and activities should be studied together.

New theories and approaches are emerging in the study of information needs and seeking behaviour. These approaches are user-centred, that is, based on cognitive processes rather than system-centred (Cullen & Calvert, 1996). It is, therefore, important to bring patrons into the process of library evaluation,

making them an integral part of future decision-making about the library activities and services (Crist et al. 1994). Further elaborating the importance of user-centred studies, Odini (1993, p. 35) pointed out that "this paradigm of user-centred research has led to explorations of all segments of human intelligence and human behaviour with a view to serving users better or to designing systems that can more closely emulate human intelligence and behaviour". An important factor in understanding the assessment provided by users about the effectiveness of their library is the knowledge about their information needs and seeking behaviour.

2.2 Information Needs and Seeking Behaviour

Adequate knowledge about the information needs of scientists is imperative for libraries in re-orienting their collections, services and activities to synchronise them with the information seeking behaviour of scientists. Bandara (1993, p. 19) noted that 'if the library is to provide any meaningful information service, the user [information seeking] habits should be taken into consideration". Due thought should also be given to the fact that interest, needs, and information seeking pattern of scientists are dynamic and changing. In order to be relevant to scientific research and to offer valuable services, librarians "must fully understand the organic nature of research and ways that scholars seek information" (Tegler & Miller, 1986, p. 202). Technological advancements are also expected to alter the ways information was previously identified, acquired and utilised by the scientists (Llull, 1991). As a result "models, theories, practices and standards used to organise and provide access to the world's scholarly information are blurring. Librarians will have to adopt new theories and practices for connecting scholars to information" (Oslen, 1989, p. 121).

Studies on information needs and seeking behaviour of scientists can be traced back to the late 1940s (Ellis et al. 1993; Reneker, 1993). Since that time, a large number of studies have been carried out on various aspects of information needs and seeking behaviour of scientists, engineers and technologists. Kunz and Rittel (1977, pp. 12-15) have divided analytical methods used by these studies into four categories: *dissemination studies* – dealing with the ways information

is disseminated and consumed; *user and use studies* – focusing on information needs of different user groups; *information behaviour studies* – causes and controlling factors for a certain information behaviour, and finally *information utilisation studies* – measuring the actual benefits of information services and facilities.

Hill (1987, pp. 72-73) in her review of various information need studies has divided them into nine categories: *ought-to-need* - information that client ought to need; *potential need* - potential depth and breath of user needs; *demand studies* - current information demands; *goal-oriented analyses* - information helping users to achieve their goals; *demographic studies* - correlate various demographic attributes with information needs; *user studies* - how users search for information; *lifestyle studies* - lifestyles of both users and non-users; *required output studies* - what outputs are required as inputs to other systems; and *effectiveness studies* - attempt to understand how well information needs are met. However, the author noted that often information need studies use a combination of the above methods.

2.2.1 Information Needs

Identification of the information needs is crucial for effectively meeting them through developing appropriate collections and information services (Fidzani, 1998; Eager & Oppenheim, 1996). According to Nicholas (1996, p. 7) "information need arises when a person recognizes a gap in his/her state of knowledge and wishes to resolve that anomaly". Information needs of scientists are influenced by their work environment and the particular tasks and work roles performed by them (Yang, 1998). Agricultural scientists perform different work roles such as researchers, managers, administrators, educators, planners, supervisors, etc., simultaneously or at different stages of their careers. Several studies have shown a relationship between task complexity and information needs. Leckie et al. (1996, p.167) noted that "work roles and tasks largely determine information needs, while a wide number of factors ultimately affect which sources and types of information are used in a given situation".

A qualitative study undertaken by Bystrom and Jarvelin (1995) showed a systematic and logical relationship among task complexity, type of information sought, and information channels and sources used. The data for the study was collected through diaries written during task performance and through a questionnaire. The study concluded that with the increase in task complexity, the complexity of information needs increased, as well as the needs for domain information (known scientific facts) and problem solving information, while the success of information seeking decreased, and the use of the number of sources increased.

A survey conducted by Aina (1989) on the information needs of agricultural extension workers in Nigeria showed that they basically needed information on the control of major pests, credit and co-operatives, proper handling of insecticides, and marketing systems of agricultural products. Russell (1983) also noted that agricultural advisers needed immediate access to the latest information on market prices and trends, farm input and new farm technology. Apalayine and Ehikhamenor (1996) found that the primary health care workers in Ghana needed information on socio-cultural practices of the communities, mother and childcare, current developments in the health profession, beliefs and taboos of the people in the region. Gorman (1995) in his review of literature on the information needs of physicians noted that they needed information to answer questions related to patient care and often these questions were unanswered due to their complexity and uniqueness. A questionnaire based survey by Njongmeta & Ehikhamenor (1998) showed that the health professionals in Cameroon needed information for current awareness, diagnosis, patient management, and new drugs.

Premsmit (1990) reported that academic medical scientists in Thailand needed up-to-date information on various research studies for the identification of their research topics and relevant methodologies. Norpishah and Aun (1989) studied the information needs of engineers in Malaysia. They found that engineers in public utility sector and engineering consultancy firms needed information on government policies and procedures related to the engineering sector, advances in engineering field, engineering standards, forthcoming and ongoing projects,

and engineering-related statistical data. Leckie et al. (1996) in their literature review on the information needs of different professional groups noted that the range of information that engineers required in their work varied with career stage, with junior engineers having a narrow range than those in more senior positions. They also noted that lawyers had recurring information needs related to the previous court cases and precedents, professional issues, and the conduct of cases in their particular areas of specialisation. Certain factors that influence the information needs of different professional groups are individual demographics (age, profession, specialisation, career stage, geographical location), context (situation specific need, internally or externally prompted), frequency (recurring need or new), predictability (anticipated need or unexpected), importance, degree of urgency, and complexity (Leckie et al. 1996; Verhoeven et al. 1995).

Saunders (1993), for her consultancy report, conducted interviews with one hundred MARDI scientists in Malaysia to determine their information needs for supporting their research activities. Report divided the information needs of agricultural scientists into two major categories: project identification and project implementation and monitoring. It was found that for identifying their research topics researchers needed information on ongoing and completed research projects; methodologies used by related studies; and current problems faced by farmers and plantation workers. They also needed information on five-year research plans developed by the Ministry of Agriculture and the Ministry of Science and Technology, IRPA priority research area, and institutional mission and objectives. For project implementation, in addition to published scientific literature, scientists needed information on the current financial status of their projects and policy directives issued by different government agencies. Research managers, for the purpose of project monitoring, needed up-to-date information on project status and funding, current achievements of different projects, qualification and expertise of researchers, etc. The report also identified various information sources used by agricultural scientists for satisfying their information needs.

A critical review of the literature on information needs indicated that most of the studies have failed to differentiate between 'information needs' and 'information sources' used by scientists and researchers. Actually most of the researchers have used these two terms as synonyms. Many studies on information needs have only focused on different information sources preferred and used by scientists. This situation is further complicated due to the inability of scientists to properly express their specific information needs in a meaningful manner to information providers (Bandara, 1993).

2.2.2 Information Seeking Behaviour

Bandara (1993, p. 19) noted that "if library is to provide any meaningful information service, these user [information seeking] habits should be to taken into consideration". Information seeking behaviour is a broad term encompassing the ways individuals articulate their information needs, seek, evaluate, select and finally use the needed information. Acknowledging the vagueness and problems associated with the definition of the term 'information seeking behaviour', Hart (1993) observed that this term could be operationalised in a multitude of ways. According to Hart it "generally involves a measurement of the degree of importance that the scholars place on formal vs. informal sources, books vs. journals, and personal vs. non-personal sources. Other than this, there is little agreement as to what constitutes an operational definition of the term information seeking behaviour" (p. 39).

Many studies have been conducted to investigate the information seeking behaviour of library users by their subject interest, occupation, and information environment. Most of the information needs and seeking studies have been conducted in the United States, Great Britain and other developed countries and necessarily reflect the information seeking environment there. However, conditions in developing countries are considerably different which make it relatively difficult to befittingly apply data from the developed countries. On the other hand, limited number of studies on information needs and seeking in developing countries severely restrict the development of effective library and information services. In general, the literature on this topic is "highly uneven, scattered, elusive, fragmented, and imitative in nature" (Saracevic, 1980, p.

215). Even if some studies have been conducted in the past, these remain unpublished and their findings inaccessible to researchers (Anwar, 1982). As a result, it is hard to establish how information needs of scientists and technologists in developing countries are different from those in developed countries. It is, therefore, desirable to systematically study and develop a better understanding of the information needs and information seeking patterns of scientists in developing countries.

Searching LISA Plus and other pertinent sources showed that only a few systematic studies on information needs and seeking behaviour of agricultural scientists have been undertaken in Malaysia. Saunders (1993) investigated the information needs of MARDI scientists in Malaysia. She proposed the *MARDIS* information system (MARDI Agricultural Research and Development Information System) for integrating project information with information on publications, research personnel, technological packages, etc. It was worth noting that although during the interviews some scientists pointed out problems related to deficient library collections and services, the report completely ignored this aspect and just confined its recommendations to the collection and management of information related to research projects. Apart from this report, no study on information needs and seeking behaviour of Malaysian agricultural scientists could be traced. A few descriptive articles written on this topic were found, only presenting personal opinions and perceptions.

2.2.3 Type of Materials Used by the Scientists

Knowledge about the type of materials preferred by scientists is an important factor in determining and satisfying their information needs. Many studies have investigated those factors that contribute to the selection and use of different information sources by the scientists. These include: cost, past success, accuracy, reliability, comprehensiveness, usefulness, currency, response time, accessibility, technical quality, and the format (Shanmugam, 1999; Yang, 1998; Connelly et al. 1990; Manson, 1986).

Often researchers wish to have instantaneous access to research information, even before it is published (Zakharova, 1992; Gould, 1990). It was found that in

addition to journal articles, non-traditional literature such as unpublished conference and symposia papers, research proposals, policy guidelines, and project reports were equally popular among scholars (Prasad, 1998). Nkereuwem (1984) found that among the formal channels of communication, the respondents relied more on current sources of information such as journal articles, review articles, and conference papers.

Many other studies have also shown that journal articles were the most preferred information source by the scientists and technologists (Sam, 1996; Folster, 1995; Hart, 1993; Mwila, 1993; Bozimo, 1980). Almost the same trend was observed by various studies in the field of agriculture. Studies by Sison (1977) and Frank (1987) showed that journal and review articles were the sources most preferred by agricultural scientists. Zammarano (1979) studied the information needs of 90 technical staff working at the FAO headquarters in Rome and 42 scientists working in its field projects. He found that journal articles were equally popular among both categories of scientists, followed by technical reports.

It is evident from these studies that among the formal information communication channels, the scientists and technologists considered journal articles as the most important source for getting the current information. Other information sources perceived important by them were review articles, conference proceedings and research reports.

2.2.4 Informal Communication Channels

Many studies have suggested that scientists, besides using formal information communication sources, rely heavily on informal and interpersonal information channels to exchange information with their colleagues (Njongmeta & Ehikhamenor, 1998; Omekwu, 1998; Reddy & Karisiddappa, 1997; Izah, 1996; Eager & Oppenheim, 1996; Ballantyne, 1993; Eyzaguirre, 1993; Norpishah & Aun, 1989). These studies unanimously demonstrated that scientists and technologists "rather than being remote, impersonal, and rigid, were actually communal with strong interpersonal networks" (Leckie et al. 1996, p. 161). Verhoeven et al. (1995) reviewed the literature on information seeking

behaviour of medical professionals and found that colleagues were the most preferred source for getting the needed information. Cabrajec and Dukic (1991) found that 93 percent of the Croatian scientists heavily relied upon informal contacts for getting the information crucial to their research. Like other scientific disciplines, agricultural scientists also relied heavily on their colleagues for getting the needed information (Nweke, 1995; Frank, 1987) and for the selection of their research topics and methodologies (Lacy & Busch, 1983). A survey by Izah (1996) showed that interaction with professional colleagues was the prime source of information for agricultural extension specialists in Nigeria. Grefsheim et al. (1991) noted that scientific meetings were the most frequent occasions for face-to-face contact between scientists and exchange of valuable scientific information. They also pointed out that personal communications were important as scientists could get useful information far before it was published.

Allen (1966) for the first time used the term "gatekeepers" for those colleagues who were most relied upon. Metcalfe (1989, p. 114) defined a gatekeeper as a "key individual who either knows everything him/herself or knows who could answer a particular question". Another term used by some other studies in almost the same context was the "invisible colleges" (Kretschmer, 1997; Persson & Beckmann, 1995; Grosser, 1991; Bell, 1986a). Crane (1972) explained the term invisible college as a small group of scientists in a research area who maintain contact with one another and thereby monitor the rapid changes taking place in their fields.

Colleagues were preferred over other channels as they were considered familiar, reliable, immediately accessible, inexpensive, and often provide a concise answer synthesising the available information (Dee & Blazek, 1993). In order to facilitate these informal contacts to develop, libraries should facilitate informal meetings among scientists (Cooney et al. 1988) and compile up-to-date directories of local and international scholars in specialised disciplines (Verhoeven et al. 1995).

Olaisen (1984) found that, besides contacts with on-campus colleagues, off-campus contacts were limited to the more productive faculty. The study also

found that those scholars who rely more on informal communication channels are likely to perceive their libraries as less important in meeting their information needs. Richardson (1990) noted that informal communication within the scientific community allowed an early dissemination of potentially significant research results. He also cited a study by Pelz and Andrews (1966) that reported a positive correlation between the performance level of scientists and the frequency of contact with their colleagues.

Al-Shanbari and Meadows (1995) reported that 36 percent of the academicians in Saudi universities were spending four hours per week on reading whereas almost three-quarters of the respondents were spending the same amount of time on communicating with their colleagues. The study concluded that scientists from developing countries prefer informal channels for acquiring the needed information because of inadequate and irrelevant library collections, lack of information infrastructures, ineffective library services, lack of money to use fee-based information services, inadequately trained and less co-operative library staff, etc.

2.2.5 Impact of IT on Information Seeking

The spectacular advancements in computer and telecommunication technologies have opened new horizons for information creation, duplication, storage, access, distribution, and presentation. The information technology revolution is expected to bring significant changes in information seeking behaviour of users (Kuruppu, 1999; Pelzer et al. 1998; Zhang, 1998; Adedibu & Adio, 1997; Abels et al. 1996). Modern technology is also resulting in new services, targeting at the specialised and unique information needs of users (Fidzani, 1998). The availability of electronic communication facilities such as e-mail, discussion groups, bulletin boards, electronic conferencing, chit-chat, etc. have opened new channels for communication (Krishnamurthi, 1998; Zhang, 1998; Wilkins & Leckie, 1997; Barry, 1996; Abdullah, 1995; Shade, 1995; Treloar, 1994). The information revolution brought by the Internet is also expected to some extent bridge the gap between 'information rich' and 'information poor' countries. Scientists can now communicate with co-workers around the world via their personal computers at any time of the day or night without regard to time-zone

difference (Shiels, 1996). Wasserman (1991) reported that some scientists even spend as much as nine hours a week on informal communication by using various electronic media. Richardson (1990, p. 193) noted that "electronic communication potentially combines the speed of telephony with the coherence and clarity of written communication". He observed that scientists particularly use e-mail for exchanging opinions and information, asking questions, staying in touch with the latest developments in their disciplines, and generating new ideas. Rolinson et al. (1995) found that among the Internet-based services and facilities, the electronic mail was comparatively more popular among biology researchers. Electronic bulletin boards, electronic file-transfer and other electronic services were rarely used by the scientists (Abels et al. 1996; Shiels, 1996). Many studies in developing countries have also confirmed these findings (Al-Shanbari & Meadows, 1995; Reid, 1995). Abdullah (1995) noted that most of the libraries in Malaysia have yet to utilise the full potential of the Internet although it has been available for the last several years.

Electronic journals have brought many exciting opportunities and potentials for libraries and users (Chan, 1999). Mogge (1999) reported that as of November 1998, there were over 6,000 electronic journals available. The author noted that some of these serials were electronic only, but many of them either indexed or reviewed paper publications, and others moved between electronic and more traditional formats. Many libraries have been reconsidering their serials subscription policies to benefit from the growing number of electronic journals although they have to resolve certain management and processing related issue (Ellis, 1999; Chadwell & Brownmiller, 1999; Zappen & Taxman, 1999).

Electronic journals are expected to create an impact on the information seeking behaviour of information users by "minimizing publication delays and promoting maximum flexibility in the ways that readers use the journal for teaching, research, and scholarship (Mogge, 1999, p. 20). She concluded that electronic and printed journals would co-exist for meeting flexible and multi-faceted needs of the scholarly community. Several authors have discussed the advantages and disadvantages of electronic journals. The key advantages, as perceived by publishers, authors and users, were the convenience; time saving;

wider circulation (Baldwin, 1999); speed of production and distribution; multimedia capabilities (Chan, 1999); timeliness and currency and easy accessibility (Rabine & Rich, 1998). However, the current use of electronic journals was much lower than expected (Hamershlag & Izhaki, 1998; Tommey & Burton, 1998). Some of the problems were: small number of electronic journals; lack of full recognition of their scientific value; inadequate searching options; inconvenience of reading from a computer screen; limited computer literacy among users and the inadequate number of computers in libraries (Shemberg & Grossman, 1999).

The initial excitement and expectations of the IT revolution has been somewhat disappointed by the fact that IT-based sources and facilities were under-utilised in many libraries. Some studies have suggested that the use of IT-based sources and facilities by scientists was much lower than expected (Curtis & Weller, 1997; Rollins, 1996; Folster, 1995; Verhoeven et al. 1995; Connelly, 1990). Ellis et al. (1993) observed relatively minor impact of information technology on the information seeking and communication activities of research physicists and chemists. A study by Marcella and Baxter (1999) in UK indicated that only a small proportion of the respondents expressed a preference for using computer for information seeking. Shanmugam (1999) reported that Malaysian trainee teachers were largely using computers for typing rather than for seeking and processing information. Some studies investigating the use of electronic databases by scientists have shown only a limited use of these sources and facilities (Hammond & Mitchell, 1997; Rolinson et al. 1995; Hurd et al. 1992; Wiggins, 1992; Cabrajec & Dukic, 1991). It was surprising to note that these individuals in spite of their technological background failed to take advantage of electronic information sources.

Most studies pointing to the low use of electronic information sources by scientists and technologists have failed to identify specific reasons for it and as to how library users can be stimulated to use these sources and services. However, all studies agreed that user education might help improve this situation. Gravois et al. (1995) concluded that a majority of the respondents with limited computer literacy were less frequently using the online databases

and other IT-based sources. Majid and Abazova (1999) found a relationship between computer literacy and the use of IT-based information sources and facilities by faculty members. They concluded that in order to improve the use of IT-based sources and facilities, it is desirable that the computing skills of the library users should be enhanced.

Knowledge about information needs and seeking behaviour of scientists is crucial in developing library collections, services and facilities. Developments in information technology are also expected to significantly change the information seeking behaviour of library users. The review of literature showed that no systematic study has been undertaken in Malaysia to investigate the information needs and seeking behaviour of agricultural scientists. There is a need to investigate this topic in agricultural libraries in Malaysia to rectify this deficiency.

2.3 Resource Sharing

Resource sharing is now considered as one of the pillars of modern librarianship. The main objective of resource sharing is to maximise the availability of materials and services and to minimise expenses (Mannan & Bose, 1998; Ming, 1996). Availability of a variety of electronic tools for document identification such as access to online OPACs, publisher catalogues, contents pages, and bibliographic databases (Price et al. 1996) have enhanced the awareness of library users about literature produced in their areas of interest. On the other hand, exponential growth in world literature, shrinking library budgets (Morris et al. 1997), steady increase in document prices, and depreciating currencies have made it increasingly difficult for individual libraries to acquire and retain everything their users might like to read. Hamaker (1993) reported an average increase of 65 percent in book price during the decade between 1982 to 1992. The journal subscriptions have also gone up at an average rate of 10 percent (Obserson, 1992) to 15 percent (Jaramillo & Lamborn, 1996) per annum. Increase in serial prices in the field of science and technology is estimated at more than 15 percent per year. This state of affairs has led many libraries to consider the "access" rather than "holdings" strategies

(Wood, 1988). As a result, resource sharing schemes at the local, regional, national, and international levels have flourished, and further accelerated due to rapid technological advances.

Until the end of the 1970s, the major focus in interlending activities was on the loaning of items in original format from one library to another (Greenaway, 1997). Over the years the interlibrary lending activity has undergone a gradual transformation in its concept and scope. However, the major turning point was the advent and popularity of plain paper copier and its economical maintenance. The concept of 'lending' a document for a specified period of time took a new turn by making the user the 'owner' of the document rather than a 'borrower' (Reddy, 1987).

Formal agreements could be useful in the smooth running of resource sharing activities. Legal or written agreements are particularly helpful in defining precisely the nature of co-operation to avoid or minimise future conflicts. Edoka (1991) studying the resource sharing activities among 17 Taiwanese libraries noted that most of these had written agreements. However, the study also found that several Taiwanese libraries were undertaking resource sharing activities as a "gentleman's agreement". The author noted that "this sort of arrangement is somewhat imprecise and largely depends on the ability and willingness of co-operating partners to apply the spirit of fair play" (Edoka, 1991, p. 158).

In designing and implementing library co-operation schemes, the attitude of library staff plays a crucial role in the success or failure of the activity (Ming, 1996). A study by Bozimo (1980) at five Nigerian universities revealed that over 50 percent of the respondents reported that their library staff discouraged them from making interlibrary loan requests. Siddiqui (1996) found that staff attitude and working style accounted for the low response rate and high turnaround time for ILL requests in the Arabian Gulf region. He felt that problems in resource sharing among countries in the region were not due to lack of resources but rather, the attitude of library professionals. Bozimo (1980) noted that Nigerian librarians were emphatically against a centralised acquisition and processing scheme, given the communication difficulties within the country. The study also found that librarians from some big libraries were

less favourably disposed to library co-operation as they felt that they would contribute more and gain less from such co-operative schemes.

Earlier libraries considered resource sharing as a way of co-operating on a *quid pro quo* basis with other libraries. But as this activity gained momentum, libraries started considering charging for the service (Siddiqui, 1996; Smith, 1987). This thinking was further encouraged by the appearance of commercial document delivery agencies (Wood, 1988). At the same time, several hard-pressed libraries considered fee-based inter-lending as a source of revenue for them.

Gee (1996) found that a majority of the academic law libraries in UK were bearing most of the service cost and only a nominal proportion of the fee was charged on the users. The main reason for not fully charging their users was the widespread assumption that users were not prepared to pay for reprints and other information services. Lahiri (1996) observed a similar situation in India where scientists expected free-access to information, causing problems in sustaining the service. He argued that this culture should be discouraged and all information products and services, whether generated through public funding or otherwise, should be priced to offset the costs in part or full.

Commercial fee-based document delivery services provide a variety of products and services. A criteria based on cost, turnaround time, fill rate, reliability and vendor responsiveness can be used to evaluate these services (Hyde, 1996; McFarland, 1992). However, a majority of libraries use these services only as their last resort. They rely instead more on traditional means of information supply through national resource sharing schemes or via local reciprocal arrangements between libraries (Greenaway, 1997). A study by Currie (1987) at the Cornell University showed that it was highly economical and less time consuming to acquire the needed items from libraries as compared to commercial sources. MacDougall et al. (1989) compared the cost involved in acquiring documents by five academic libraries in East Midlands through mutual co-operation and through BLDSC. They found that it was more economical to acquire documents from BLDSC, provided there would not be any price increase. However, BLDSC might only be more economical for

British libraries, as it was not recovering full cost from them. In addition, it has to charge higher mailing cost for requests emerging from overseas libraries which would make it less economical then acquiring these documents from local libraries.

2.3.1 Information Technology and Resource Sharing

Like many library operations, the advancements in information technology have given a big boost to resource sharing activities. Availability of microcomputers at an affordable price, fast, reliable and economical telecommunications and online access to a variety of document identification tools have encouraged resource sharing activities (Thoma, 1992). The needed materials can now be acquired quickly and economically with a better success rate. Technology has improved three important steps of the document delivery activity: while processing document delivery requests, making requests, and receiving documents (Thompson & Horton, 1992; Smith, 1987). Abdullah (1995) noted that the average turnaround time for requests made to BLDSC from Malaysia improved from 12 days through normal mail to 6 days through the Internet. Delivery of full-text documents in electronic format through file transfer and e-mail attachments is also gaining more popularity (Rollins, 1996). Due to technological advancements, "various forms of electronic document provision have been developed, ranging from single article delivery to complete electronic journals" (Morris et al. 1997, p.21). Mogge (1999) noted that some publishers were delivering individual articles as they became ready rather than waiting for a complete issue. Several electronic document delivery providers also support certain other value-added services and many of them were particularly focusing on the end-users (Chambers, 1999, Price et al. 1996).

Another currently debated topic in resource sharing is the comparison of 'access' vs. 'ownership'. Two factors that have encouraged libraries to seriously consider the 'access' option were tight library budgets and escalating journal prices (McFarland, 1992). Technological advancements have also made electronic access easy and affordable. With the wide acceptance of the concept of 'access', libraries, instead of buying complete volumes of less popular titles, would prefer to buy individual articles (Jaramillo & Lamborn, 1996;

Widdicombe, 1993) in electronic or print formats. However, concerns are being expressed that if most libraries started cancelling their subscriptions and adopt a "parasite" strategy, then which library will retain and provide access to these titles. It would be interesting to study the usability of electronic journals in developing countries due to lack of financial, manpower, and technical resources. Another related issue is whether users in these countries, with limited computer knowledge, would be able to fully benefit from the electronic journals.

2.3.2 Resource Sharing in Developing Countries

Many developing countries have common agricultural problems, yet very little information passes between adjacent countries even when they share a common language. Haravu (1994) noted that agricultural libraries in most developing countries lack the 'critical mass' of collections, resources, skills and information technology to effectively support research activities of their parent organisations. Logically the scarcity of materials should lead these libraries to resource sharing but unfortunately interlibrary loans and other co-operative efforts are virtually non-existent (Omekwu, 1998; Alemma, 1993; Gooch, 1987). Therefore, due consideration should be given to strengthening resource sharing within the country (Taylor, 1991) and at the regional level (Wood, 1988). Wood also quoted the recommendation of the IFLA's Universal Availability of Publications programme that 70% of the needed documents should be made available at the national level.

Several problems hindering resource sharing activities in developing countries, as reported by many studies, were: lack of document identification tools (Alemma, 1993), lack of co-ordination (Reddy, 1987) small and out-dated collections (Mwila, 1993), high document cost (Njongmeta & Ehikhamenor, 1998), unreliable postal services (Shibanda, 1995), long turnaround time (Horton, 1989; Hert, 1987), unmotivated and inadequately trained library staff (Harris, 1990), non-availability of photocopying equipment (Shibanda, 1995), and lack of support from the management (Ballantyne, 1993). Another problem obstructing resource sharing in developing countries is geographical,

intellectual and organisational isolation of library professionals (Harris, 1990) resulting in limited person to person contact.

Appreciating the importance and need for resource sharing in developing countries, several doctoral studies have focused on different aspects of this topic. A study conducted by Bozimo (1980) at five Nigerian universities showed that a major hurdle in using document delivery and interlibrary loan was long delays and recommended for better local co-operation to overcome this problem. Kim's (1990) study revealed problems associated with resource sharing among science and technology libraries in South Korea. She pointed-out that co-operation among these libraries was only minimal, even though they did not have enough information resources. None of the 24 surveyed science and technology information libraries were participating in any type of co-ordinated acquisition or cataloguing activities. However, several of these libraries were engaged in interlibrary loan, photocopying service, and construction of union catalogues.

Zhang's doctoral study (1992) identified various problems resulting in low utilisation of agricultural information resources in China. These included (1) unawareness about the existing information resources; (2) ineffective information services; and (3) lack of co-operation and resource sharing between agricultural libraries. The author proposed that agricultural libraries in China should be networked to facilitate resource sharing thus improving their effectiveness.

A study by Mannan and Bose (1998) in Bangladesh showed that about 88 percent of the respondents either rarely or never made any interlibrary loan request. The reasons identified were long response time, low success rate, and unfamiliarity with the service. Dhohayan (1981) found that library co-operation among academic libraries in Turkey and Saudi Arabia was limited to certain subjects and certain universities. He recommended the establishment of an Islamic Resource Sharing Network (IRSN) to enhance resource sharing among Islamic countries. Ashoor (1989) noted that resource sharing in the Gulf region was low, though libraries in this region were considerably rich in their collections. A study by Siddiqui (1996), covering 13 academic libraries in

Arabian Gulf region, suggested the establishment of a formal, obligatory, and regular ILL network for the Arabian Gulf region.

An UNESCO sponsored study in Malaysia (Yassin, 1981) revealed that a majority of the respondents expressed dissatisfaction with the interlibrary loan. Syed Salim (1987) pointed-out some problems associated with document delivery in the Southeast Asian region. These included fluctuation in currency exchange rates, restrictions on payment in foreign exchange, lengthy procedures and processing even for small transactions/payments, bureaucratic procedure for making document delivery requests, and non-payment by some institutions.

Although most countries in Southeast Asia have strong agricultural base and share several common factors such as climate, soil, crops, pests and diseases, etc., library co-operation among them is very limited. While there were some successful projects such as AIBA (Asian Information Bank for Asia) and APEX (ASEAN Food Post-Production Information Exchange), several projects have failed to achieve the desired results (Mohammed Khaliludin, 1988). Mariam (1994, p. 1) noted that the "problem with a number of such co-operation projects is that they seem to be good and viable during the planning stages but at the end of the day they become vulnerable to national self-interest and to the constraints of annual budgets". As a result, regional library co-operation programmes and projects have been relatively less successful. Some problems obstructing library co-operation in ASEAN region are political instability, lack of government financial support, uneven economic development in the region, language and cultural differences, and conflicting national priorities and interests (Mariam, 1994).

Due to exponential increase in world literature, resource sharing is the only logical, feasible and economical option to benefit from this huge pool of knowledge. Although libraries in developing countries acknowledge the advantages and benefits of resource sharing, practically the volume of this activity is far from satisfactory. Review of literature also revealed the lack of any systematic study on resource sharing among agricultural libraries in Malaysia. There is a need to investigate the current status of resource sharing among Malaysian agricultural libraries and how it can be enhanced further.

2.4 Adequacy of Library Collections

Collection adequacy is one of the factors that determine the effectiveness of any library in meeting the information needs of its users. Libraries develop their collections in anticipation of the current and future needs of their users but this task is becoming increasingly difficult due to enormous amount of literature produced in the field of agriculture. Oslen (1989) estimated that over 200,000 items were being produced per year in agriculture and related disciplines. Current figures should be much higher considering that "scientific literature is doubling in magnitude every 10 years" (Oslen 1989, p. 123). It is obvious that no single library can afford to acquire all these documents. Therefore libraries have to be careful and pragmatic while acquiring library materials. Periodic collection assessment is also necessary to determine as to what extent library collections are relevant and adequate in meeting the information needs of the users (Osburn 1992).

One problem common among libraries in most developing countries is their inadequate, outdated and irrelevant collections. Oslen (1989, p. 123) noted that it was "painfully obvious in the libraries of many Third World universities and research centres that almost unfailingly the state of the collections is abysmal". Womboh (1993) evaluated the collection of University of Agriculture, Makurdi, Nigeria and discovered that 95 percent of the surveyed faculty felt that the existing library resources were inadequate to effectively support new academic programmes. Mwila (1993) found that over 75 percent of the academicians from the University of Zambia have been less frequently visiting their library due to inadequacy of library materials. Nkereuwem (1984) noted that about 84 percent of the scientists and engineers visited their library only a few times a year mainly due to inadequate library collections. Bozimo's (1980) study of 209 academics from the five Nigerian universities found that around 94 percent of the respondents felt that library was unable to meet their immediate information needs.

Another problem severely hurting science and technology libraries in developing countries is their inability to subscribe to journals. The escalating journal prices and shrinking library budgets are making it increasingly difficult

for them to even continue subscriptions to a limited number of journal titles. Bozimo (1980) reported that major complaints of Nigerian scientists were that either arrival of journals was too delayed or gaps existed in the journal runs. Clouston (1995) pointed out that often during financial crises, escalating serials' prices and fluctuating currency exchange rates absorb the entire acquisitions budget.

In the light of what has been said above, it becomes desirable for libraries to periodically assess their collections to determine their adequacy and relevance to the information needs of their users. Traditional methods of collection assessment fall into two major categories: use-centred and materials-centred (Dobson et al. 1996). Use-centred studies concentrate on the use of the collection and how well it meets patrons' needs. User surveys and evaluation of library circulation and interlibrary loan statistics fall in this category. Material-centred approaches use the library collection as a base for their analyses and include methods such as citation analysis (Udofia, 1997; Loughner, 1996; Herubel, 1991), overlap studies, and projects like National Shelflist Count (Wood, 1992).

Osburn (1992) felt that the proliferation of electronic information sources might cause problems for collection evaluation activities. He observed that "our traditional methodologies of [collection] evaluations are likely to be even less satisfactory in a networked environment in which the principles of access and demand are dominant and in which we will want to analyse both in-library and extra-library activity" (p. 9). New evaluation methods need to be developed for libraries that work in both access and ownership environment (Harloe & Budd, 1994). Similarly, if access to electronic materials is involved, some other factors such as adequacy of equipment and its maintenance, and user education for equipment use may need to be part of the evaluation (Dobson et al. 1996).

Different techniques can be used for assessing collection adequacy, however, it was noted that user-centred techniques were considered more appropriate in determining as to what extent library collections were relevant and adequate to satisfy information needs of users. Irrespective of the suitability of different approaches, the significance of collection assessment studies cannot be denied.

However, the review of literature revealed the lack of any such study on Malaysian agricultural libraries. It is, therefore, desirable to study the adequacy of collections in these libraries.

2.5 Information Flow in Developing Countries

Many studies have pointed out problems hindering the free flow of information in developing countries, such as: lack of national S&T information policy (Zhang, 1991; Saracevic, 1980); bureaucratic attitude (Schutzsack, 1989); deficient library collections (Alemma, 1993; Eres et al. 1985); inefficient processing and dissemination of scientific information (Ali, 1989); lack of bibliographic control over local agricultural literature (Gregorio & Sison, 1989; Chaudhry, 1987); lack of knowledge about the users' needs (Metcalfe, 1989); ineffective library services (Zhang, 1991); lack of co-operation and resource sharing among libraries (Karaomerlioglu, 1997; Alemma, 1993); technological backwardness (Karaomerlioglu, 1997; Adedibu & Adio, 1997); language barriers (Perera, 1995; Cabrajec & Dukic, 1991); and lack of trained and motivated library staff (Taylor, 1991). Libraries in developing countries also function under continuous financial stress caused by inadequate budget allocations, frequent budget cuts, foreign exchange restrictions, depreciating currencies, increasing prices of S&T literature, high capital investment on IT-related services, etc (Ali, 1989).

The level and sophistication of information infrastructure and access to information resources is often considered an important constituent for measuring the quality of a research system. During the past few decades, developing countries, from their indigenous resources or from international donors, have made vigorous efforts in the training and development of scientific manpower, building of research infrastructure and facilities, and the provision of research materials (Oslen, 1989). However, most efforts to build libraries and national agricultural information systems in these countries have not been very successful and often unable to sustain beyond the period of donor financing (Perera, 1995; Ballantyne, 1993; Thompson, 1993; Menou, 1990; Oslen, 1989). Often policy and decision-makers in developing countries failed to fully

perceive the importance of information in S&T research and "even where there is a recognition, it is often only in lip service form when measured by the proportion of resources allocated to science and technology information activities" (Saracevic, 1980, p. 216).

A gap between information-rich and information-poor countries exists (Abid, 1992) which is further widening due to technological advancements (Karaomerlioglu, 1997) as most developing countries do not have adequate infrastructure and financial resources to keep pace with technological sophistication (Jimba, 1999). They are genuinely concerned about their information backwardness and endeavouring to establish information systems and services (Zhaodong, 1993). Often international donors recommend them to replicate information access and distribution models, successfully used in developed countries, without much consideration given to uniqueness of local conditions, information seeking behaviour of users, ability of local professionals to establish and sustain sophisticated services and systems, and the technological capabilities of the country (Ballantyne, 1993). Therefore, adequate and accurate data is a pre-requisite for developing a sustainable and viable S&T information system for a developing country.

2.6 Library Staff

Human resource is the most important ingredient in conceptualising, planning, designing, implementing and managing information systems and services. Adequately trained and motivated library staff plays the crucial role in meeting the information needs of library users (Adedibu & Adio, 1997; Hobohm, 1996). A study by Fidzani (1998) showed that users needed guidance from the library staff for effectively using library resources, services and facilities.

Regular interaction between scientists and information professionals is essential for developing a better understanding of their information needs and their acceptance and use of library collections, services and facilities. Llull (1991) emphasised that the S&T librarian should be viewed as a member of the research team and it would help him/her develop a better understanding of the

research process. Beside information handling skills, subject knowledge could be an asset for agricultural librarians to effectively communicate and meet the information needs of agricultural scientists (Majid, 1996). Mwila (1993) reported that science faculty members were less likely to get assistance as well as discuss information sources with library staff as compared to social science academics.

Folster (1995) reported that in those institutions where staff with subject expertise perform reference duties, it was more likely that users' needs would be effectively met. Woolston (1983) felt that the non-availability of subject specialists in agricultural libraries could cause communication gaps between library staff and scientists. He further argued that scientists might feel that such a librarian is the custodian of a store of relevant knowledge, but they would not trust that librarian to find the appropriate items in the store. Slutsky (1991) observed "science anxiety" among science librarians without science education. The author felt that a science anxious librarian might not be in a position to communicate with and provide efficient service to scientists. However, a science anxious librarian can overcome anxiety by improving scientific knowledge through reading basic subject books, listen carefully and by asking questions from the scientists (Woolston, 1983), attending an elementary subject course (Lucker, 1998; Durrani, 1987), visiting research laboratories, attending selective sessions of technical seminars and conferences, etc.

2.7 Methodology

This section will examine various methodologies used by earlier studies on topics covered in this study. Odini (1993, p. 35) noted that most information needs and seeking studies were exploratory in nature, employing questionnaire:

> It is clear from the literature review that new paradigms and approaches are emerging in the study of information needs and uses. The new approaches are user-centered, that is, based on cognitive processes rather than system-centered. This paradigm of user-centered research has led to explorations of all segments of human intelligence and human behaviour with a view to serving users better or to designing systems that can more closely emulate human intelligence and behaviour.

Many doctoral studies have successfully used a questionnaire for investigating information needs and seeking behaviour of scientists, engineers and other professionals (Mwila, 1993; Olaisen, 1984; Bozimo, 1980). The questionnaire-based survey method has also been used by several other studies on this topic (Njongmeta & Ehikhamenor, 1998; Pelzer et al. 1998; Prasad, 1998; Zhang, 1998; Curtis et al. 1997; Al-Shanbari & Meadows, 1995; Cabrajec & Dukic, 1991).

In addition to using a questionnaire, many studies have also used interviews for recording opinions and perceptions of respondents. Nkereuwem (1984) undertook a comprehensive exploratory doctoral study, using a questionnaire and an interview schedule, to investigate the information needs of scientists and engineers in the petroleum industry of Nigeria. Nweke (1995) used a questionnaire and follow-up interviews for investigating information seeking behaviour of Nigerian human and veterinary medical scientists. Abels et al. (1996) also combined the techniques of questionnaire-based survey and interviews to investigate the influence of electronic networks on information seeking pattern of science and engineering faculty at six small colleges and universities in south-eastern United States. Several other studies have also used a combination of questionnaire and follow-up interviews for the data collection (Fidzani, 1998; Adedibu & Adio, 1997; Ocholla, 1995).

Mannan and Bose (1998) studied the information seeking behaviour in Bangladeshi libraries. The study used two questionnaires, one for collecting data on library collections, services and facilities, and another for soliciting assessment and perception of library users.

Saunders (1993) investigated the information needs of agricultural scientists at MARDI (Malaysia) by conducting one hundred interviews. Bystrom and Jarvelin (1995) showed a systematic and logical relationship among task complexity, type of information channels and sources used. The data for the study was collected through diaries written during task performance and through a questionnaire.

Crist et al. (1994) used a combination of guided discussions with small focus groups and a telephonic survey of a random sample of library users to obtain their assessment on library collections, staff, automated system and information services provided by the University of Michigan. Crist et al. explained focus groups as "typically made up of small, homogeneous gatherings to encourage participants among peers, ... [and] encourage open-ended discussion and exchange of opinion, which can elicit helpful information and generate innovative ideas" (p. 39). Valentine (1993) noted that focus group study requires less intellectual energy on the part of interviewer and is more efficient. However, Crist et al. (1994) acknowledged that "clearly the findings from focus groups are subjective and cannot be replicated. They can, however, help in designing quantitative surveys, while surveys quantify more reliably the opinions and attitudes raised in focus groups" (p. 39).

Edoka (1991) used a combination of questionnaire, observation and activity documentation to investigate the magnitude of resource sharing transactions among the Taiwanese libraries. Dhohayan (1981) for his Ph.D. studies used two questionnaires and interviews for investigating the level of resource sharing among academic libraries in Turkey and Saudi Arabia. Survey questionnaires have also been used for collecting data about resource sharing transactions, co-ordination mechanism, opinions and perceptions (Siddiqui, 1996; Bush & Palmquist, 1992). Several studies have also used library statistics to investigate the volume of resource sharing transactions (Mannan & Bose, 1998; Reddy, 1988; Wood, 1988; Bozimo, 1980).

Various techniques have been used by the previous studies for assessing adequacy of library collections. Some studies have used collection-centred approach (Carrigan, 1996; Clouston, 1995; Wood, 1992) whereas several other studies considered user-centred approach as more appropriate and useful (Dobson et al. 1996; Mwila, 1993; Womboh, 1993; Osburn, 1992; Ribbe, 1990). However, most of the user-centred studies have used a questionnaire for data collection.

Based on the above discussion, it may be safely concluded that the survey techniques of questionnaire and interviews are more suitable for this type of study covering a large and scattered population.

2.8 Summary

The review of literature showed a paradigm shift from system-centered to user-centred library evaluation approaches. It was also suggested that for a reliable assessment, different factors contributing to library effectiveness should be studied together. Another important factor in this regard is the adequate knowledge about the information needs and seeking behaviour of scientists. The review of literature showed that scientists preferred journal articles and informal communication channels for getting the needed information. It was also noted that agricultural libraries in developing countries face a multitude of problems, particularly inadequate, outdated and irrelevant collections. Similarly, several studies reported inadequate resource sharing in the developing countries. It was noted that no systematic study has been undertaken in Malaysia to investigate the information needs and seeking behaviour of agricultural scientists and how successful were their libraries in satisfying these needs. The available literature is descriptive in nature without adequate data to substantiate the presented views. Thus, there is a need to systematically study these aspects in Malaysian agricultural libraries. The next chapter will present information on the methodology used by this study, including the population, sampling technique, survey instruments, administration of questionnaires, response rate and treatment of data.

3. Methodology

3.1 Introduction

The previous chapter presented a review of literature on the major topics covered in the study. This chapter will present information on the research method, study population, sampling technique, survey instruments, administration of questionnaires, response rate and treatment of the data.

3.2 Research Method

The purpose of this investigation was to explore the information seeking behaviour of Malaysian agricultural scientists and to assess the preparedness of agricultural libraries in the country to effectively meet the information needs of their patrons. A number of previous studies on information seeking behaviour, adequacy of library resources and facilities, effectiveness of information services, and other related aspects, reviewed in the previous chapter, have used the survey method of research for the data collection. Busha and Harter (1980, p. 54) have outlined the characteristics of survey research as follows:

> Survey research is characterized by the selection of random samples from large and small populations to obtain empirical knowledge of a contemporary nature. This knowledge allows generalizations to be made about characteristics, opinions, beliefs, attitudes, and so on, of the entire population being studied. The methods of survey research allow investigators to gather information about target populations without undertaking a complete enumeration.

Earlier studies have either used the technique of questionnaire, interview or a combination of both. Nicholas (1996) pointed out that questionnaire can be used for those information needs assessment studies where a large number of scattered users are being surveyed with limited resources. He also mentioned that questionnaires can help collect data in limited time and mostly provide quantitative data that can be easily tabulated, analysed, and interpreted. He felt that good timing for the administration of a questionnaire could improve response rate.

As this study is designed to investigate in somewhat similar areas as covered by some earlier studies, the methodology used by them was considered suitable for this research. A combination of the techniques of questionnaire and follow-up interviews was used for collecting data. The questionnaire method was preferred as it was less time consuming and affordable for a large scattered population. Another reason for using questionnaire for the *user survey* was the convenience of contacting the participants, some of whom often go out for their field experiments.

A second questionnaire was used for eliciting data from libraries participating in the study. It was desirable to use a questionnaire, as the required data was predominantly factual in nature. The participating libraries needed sufficient time to compile data for certain questions such as library staff and their qualifications, budgetary allocations for the last several years, collection size, library equipment and other physical facilities, and data for interlibrary loan and document delivery services.

Follow-up interviews with selected respondents were conducted to seek clarification for certain questions emerging as a result of data analysis. These interviews were considered useful for the proper understanding of responses as well as their meaningful interpretations. Additional information on certain pertinent aspects, not fully covered in the user questionnaire, was also obtained during these follow-up interviews.

Unstructured interviews with the chief librarian and one senior staff member were conducted at each participating library to obtain some additional information, not convenient to gather through the questionnaire, on the functioning of these libraries, co-ordination mechanism among Malaysian agricultural libraries, and suggestions for improving resource sharing activities. Some additional data on library budgets and statistics for interlibrary loan and document delivery service were also collected during these interviews. Another purpose of interviewing the library staff was to assess the impact of financial crisis of 1997 on library operations and measures taken by these libraries to cope with this situation.

3.3 Population

Five major agricultural institutions were selected to participate in the study. These institutions are considered most reputable and well-established among science and technology institutions in Malaysia (Szarina, 1992). During discussions with some agricultural scientists and senior agricultural librarians it emerged that over 90 percent of the Malaysian agricultural scientists are associated with these five institutions. Lists of library members, departmental telephone directories, and certain other sources were used to compile lists of scientists working in each institution. Sources used for various institutions are listed in Table 3.1. All agricultural scientists, with at least a bachelor's degree in science or an equivalent, and working in one of the five participating institutions were included in the population. For the UPM, only the academic staff associated with agriculture-related disciplines were included. Individuals from other public and private institutions, using these libraries as external members, were excluded from the study population.

A computer-generated list of the UPM faculty members was received from its library. This list has not been revised for the last several years. Names of some faculty members who were on study leave, retired, or even expired were still included in the list. In order to update this list, the latest university academic calendar was used to identify names, job titles, and affiliation of faculty members. It was learnt that job titles of some academic staff, printed in the university academic calendar, might have changed due to promotions. It was felt that using old job titles might offend individuals and result in low response. To solve this problem, the UPM telephone directory was used to identify current job titles of the academic staff.

Table 3.1
Sources Used for Identifying Population (Sampling Frame) of the Study

S. No.	Institution	Information Source
1.	University Putra Malaysia (UPM)	i. Computer print-out from the UPM library for academic staff ii. UPM Academic Calendar having names of academic staff iii. Current University Telephone Directory for identifying current designations of academic staff
2.	Malaysian Agricultural Research and Development Institute (MARDI)	i. Computer print-out for library members ii. Current MARDI Telephone Directory for getting mailing addresses for MARDI out-stations
3.	Palm Oil Research Institute of Malaysia (PORIM)	PORIM Telephone Directory, edited by the Personnel Office to remove names of staff on study leave or retired
4.	Rubber Research Institute of Malaysia (RRIM)	List of library members, edited by the RRIM Senior Librarian particularly for this study
5.	Forest Research Institute of Malaysia (FRIM)	Library membership list

A computer printout of library members was received from the MARDI library. Names of scientists in this list were arranged by their sections and divisions. Highest academic qualification of each staff was also available in the list. It helped exclude those individuals who did not possess at least a B.Sc. degree or an equivalent, required to participate in the study. Mailing addresses of scientists working in MARDI out-stations were collected from the MARDI telephone directory.

No up-to-date list of library members was available at the PORIM library. Moreover, it did not have information about qualifications of its members. The PORIM Personnel Department prepared an up-to-date list of PORIM scientific staff, possessing minimum required qualification, by editing its current telephone directory. Names of scientists on study leave or those recently retired were deleted.

The Senior Librarian of the Rubber Research Institute of Malaysia (RRIM) accepted the responsibility to update the library membership list with help from the Human Resource Department. The final list contained names, job titles, and

affiliations of the RRIM scientists. The library of the Forest Research Institute of Malaysia (FRIM) provided an up-to-date list of its library members who qualified for this study. This list also provided job titles of individuals and their affiliations.

3.4 Sampling

The population of the study comprised 1,328 individuals. Proportionate stratified random sampling technique was used to generate random samples. Each institution participating in the study constituted a stratum. The list of individuals for each institution was numbered sequentially for generating random sample.

The sampling table developed by Krejcie and Morgan with a 95 percent confidence interval, reproduced in Powell's book (1991, p. 75), was used for determining the sample size. According to this table, a sample size of less than 22.8 percent was prescribed for a population of 1,300 individuals. In order to enhance confidence level for the study, a sample size of 25 percent was used. The random number table reproduced by Powell (p. 67) was used to generate random samples. The sampling technique, *sampling without replacement* or *simple random sampling,* was used. According to this technique, a number appearing for the second time is passed over (Stephen and Hornby, 1997, p. 114). Table 3.2 shows population size and number of individuals for each institution included in the random sample for the *user survey.*

Table 3.2
Population and Sample Size for Each Institution

Institution	Population	Sample (25%)
University Putra Malaysia (UPM)	368	92
Malaysian Agricultural Research and Development Institute of Malaysia (MARDI)	472	118
Palm Oil Research Institute of Malaysia (PORIM)	132	33
Rubber Research Institute of Malaysia (RRIM)	192	48
Forest Research Institute of Malaysia (FRIM)	164	41
Total	**1,328**	**332**

No sampling was done for the second questionnaire as all five agricultural libraries selected for the study were expected to return the questionnaire and participate in interviews.

3.5 Survey Instruments

3.5.1 Questionnaires

Several doctoral dissertations and research articles on related topics were consulted and their survey instruments were critically examined to help develop the two questionnaires for this study. The first questionnaire was for the *user survey* and the second for the *library survey* designed to provide background information for the study.

Copies of both the questionnaires were given to faculty members of the Department of Library and Information Science, International Islamic University Malaysia, for their review and feedback. One of them had previously served as Chief Librarian of UPM. Structure, format, and presentation of some questions were revised based on their feedback. After receiving input from the co-supervisor in Malaysia, some questions were further adjusted. Finally, the Advisor from the City University, London, gave her feedback, prompting additional changes. The same procedure was repeated for the second questionnaire.

3.5.1.1 Questionnaire for Users Survey

This questionnaire was designed to collect data from scientists about their information seeking behaviour, their assessment about the adequacy of information resources and effectiveness of library services and facilities (Appendix A). This questionnaire was developed to answer the following five research questions:

Question 1. What information sources are preferred by Malaysian agricultural scientists?

Question 2. What are the library use patterns of Malaysian agricultural scientists and the way they seek needed information?

Question 3. How frequently are IT-based information sources and facilities used by Malaysian agricultural scientists?

Question 4. How adequate are the resources and facilities of Malaysian agricultural libraries?

Question 5. How effective are Malaysian agricultural libraries in meeting the information needs of their users?

The questionnaire consisted of six sections with 41 questions. An explanation about the objectives of the study was provided at the beginning of the questionnaire. The telephone number and e-mail address of the researcher were also provided, in case respondents needed any clarification.

A variety of *factual, informative* and *attitudinal* questions were asked in the questionnaire. Some questions were pre-coded by using a five-point Likert scale. The majority of the questions were structured with an open-ended option, wherever desired.

Section 1 of the questionnaire dealt with personal information about respondents such as job title, age group, gender, and highest academic qualification. Information was also sought about the number of publications produced by the respondent; average office time spent on various activities including reading and literature searching; and computing skills. Section 2 dealt with the information seeking behaviour of respondents. The third section elicited respondent perceptions of adequacy of different library resources and physical facilities. Section 4 was designed to seek overall assessment of respondents about the effectiveness of their libraries in meeting their information needs. User perceptions were also gathered of the effectiveness of various library services and promotional activities. Some aspects related to library staff were treated in the next section. Finally, through two open-ended questions, the respondents were asked to suggest measures for improving the effectiveness of Malaysian agricultural libraries.

At the end of the questionnaire, the respondent's consent was sought to be contacted to participate in a follow-up interview to be conducted by the researcher. The purpose of this interview was to develop a better understanding about the information needs of participants. It was also expected that clarification for certain responses identified during data analysis would also be sought. The respondents, who consented to the interview request, were asked to provide their contact details for making appointments for interviews.

3.5.1.2 Questionnaire for Library Survey

The second questionnaire was developed for collecting data from libraries participating in the study (Appendix B). It aimed at collecting data about library manpower, budget, library collections and physical resources, library services, and perceptions of library chiefs of resource sharing among Malaysian agricultural libraries. This data served as background information for the study. It helped developing a better understanding and proper interpretation of responses received through the *user survey*. This questionnaire was designed to answer the following three research questions:

Question 6. What is the status of resource sharing among Malaysian agricultural libraries?

Question 7. What are the perceptions of library chiefs of the participating libraries of resource sharing?

Question 8. What measures can be adopted to improve resource sharing among Malaysian agricultural libraries?

The questionnaire used for the *library survey* comprised eight sections containing 50 questions. Like the *user survey* questionnaire, the questionnaire for *library survey* also provided some basic information about the study. The telephone number and e-mail address of the researcher were also provided, in case the responding libraries needed certain clarifications. Section one of the questionnaire collected data on various aspects related to library manpower such as number of staff members, their qualifications, level of computer

literacy, and participation in continuing professional education activities. Section 2 dealt with library users and user education programmes conducted by these libraries. Section 3 sought data on fund allocations and other budget-related information. The following two sections dealt with library resources and services. Sections on interlibrary loan (ILL) and document delivery service (DDS) were designed to collect data about the magnitude of these services, methods used for communicating ILL and DDS requests, and other pertinent aspects. The last section of the questionnaire was related to perceptions of the library chiefs of the participating libraries of resource sharing activities in Malaysia. Two open-ended questions were included at the end of the questionnaire so as to invite suggestions for improving co-operation among agricultural libraries in Malaysia.

A majority of questions included in this questionnaire were either *factual* or *informative* in nature. Some questions, particularly in the section dealing with perceptions of resource sharing, were either *opinion, attitudinal* or *self-perception* type.

3.5.2 Pre-Testing of Questionnaires

Both questionnaires were pre-tested to ensure reliability and effectiveness of these instruments. The pre-testing exercise was undertaken to identify any problems that potential respondents might face in understanding questions and appropriately responding to them. Those individuals who participated in the pre-testing of the *user survey* questionnaire were not part of the random sample. Similarly, no librarian from the libraries participating in this study was selected for pre-testing the *library survey* questionnaire.

Eight UPM academic staff and five MARDI scientists participated in the pre-testing exercise for the questionnaire designed for the *user survey.* Questionnaires filled-out during the pre-testing exercise were analysed and no major problem was found. It was observed that all individuals properly understood the questions and their responses were interpretable. No further changes were considered in the questionnaire.

The second questionnaire for *library survey* was pre-tested on four senior librarians of the International Islamic University Malaysia (IIUM) and five postgraduate students of the Department of Library and Information Science, IIUM, who had adequate work experience. Comments received during the pre-testing exercise were used for improving the instrument.

3.6 Administration of Questionnaires

3.6.1 Consent for Participation in the Study

All the five agricultural institutions participated in the study are in the public sector. A general perception of Malaysian public sector organisations is that they are quite formal in their functioning. Often written permission or prior appointment is required to contact staff, acquire data, or even use library resources and services. Several visits by the researcher to the participating institutions were expected for the purpose of collecting data from the respondents as well as library professionals. Being an expatriate, it was considered desirable for the researcher to obtain approval from the participating agricultural institutions before embarking on the research. It was also expected that approval from heads of institutions would motivate participants to promptly respond to the questionnaire.

The Deputy Rector (Academic Affairs), International Islamic University Malaysia (IIUM), where the researcher is employed, was apprised about the conduct of this study. He wrote a letter to the agricultural institutions to obtain their consent for participation in the study. For agricultural research institutions, this letter was addressed to the head of institution. For UPM, the letter was addressed to the Deputy Vice-Chancellor of the University.

Letter from the Deputy Rector (Academic Affairs), IIUM, introduced the researcher and his research topic (Appendix C). It also briefly outlined the purpose of the study, procedure to be used for data collection, and anticipated contribution of the study in enhancing the effectiveness of Malaysian agricultural libraries. At the end, consent of the institution was sought for participation in the study and allowing the researcher to contact scientific and

library staff for data collection. All institutions agreed to participate in the study.

3.6.2 Administration of Questionnaire for User Survey

It was learnt that the Malaysian Agricultural Research and Development Institute (MARDI), one of the institutions participating in this study, would be undergoing an intensive restructuring exercise. A major change in its organisational structure was expected. It was anticipated that extensive transfers of scientists would also be made and for a certain time period it might be difficult to locate and contact them. Similarly, University Putra Malaysia was expected to close for December vacations. It was also felt that during the last couple of weeks of December many public sector employees would proceed on vacations to exhaust their quotas for annual leave. Based on the common observation that most individuals clear their desks before proceeding on vacations, it was decided to immediately administer the questionnaire for *user survey*. In order to cut the delivery time short, it was also decided that instead of mailing, the questionnaire would be personally delivered at the participating institutions.

Each questionnaire was coded by using the first letter from the institution's name and a sequential number from the mailing list. These codes were used for monitoring the return of questionnaires and to identify non-respondents for issuing reminders. A cover letter highlighting the importance and objectives of the study (Appendix D), a self-addressed stamped envelope, and a copy of the approval letter from the head of the respective institution were appended to the questionnaire.

Questionnaires for each institution were delivered to its library for distribution. For University Putra Malaysia, the questionnaires were handed-over to the internal mail office of the University through its library. Questionnaires for MARDI scientists working in out-stations, scattered in different parts of Malaysia, were mailed directly. The PORIM and RRIM libraries took the responsibility for mailing the questionnaires to their out-station scientists through their departmental mailing systems. The questionnaire distribution,

sending reminders and other work related to data collection was completed between December 1995 to April 1996.

3.6.2.1 Monitoring of Responses

A *Questionnaire Monitoring Sheet* was developed to record the return of questionnaires from the participating institutions. On receiving each questionnaire, the name of the respondent was marked on the mailing list for that institution. Data for the total number of questionnaires returned and response rate for each institution were tabulated on a weekly basis. Response rates, one month after the distribution of questionnaire, were 63 percent for FRIM, 62 percent for MARDI, and 58 percent for RRIM. Response rates for UPM and PORIM were 51 and 53 percent, respectively.

A reminder letter, emphasising the importance of the study, was mailed directly to the non-respondents (Appendix E). Eighteen respondents complained of not receiving the questionnaire. They were supplied with a new package. The reminder letter received a good response and consequently 45 (13.6%) additional questionnaires were returned.

3.6.3 Administration of Questionnaire for Library Survey

The questionnaire for *library survey* accompanied by the cover letter (Appendix F), a copy of the approval letter from the respective head of institution, and a self-addressed stamped envelope was sent by mail to the five participating libraries during the month of January 1996. Three libraries returned the questionnaire promptly, whereas, the other two were sent a reminder. For some incomplete responses, the concerned libraries were contacted to supply the missing data. In any case, all the participating libraries did provide the requested information.

3.7 Response Rate

A total of 332 *user survey* questionnaires were distributed out of which 236 filled-in questionnaires were received back. The overall response rate for the survey was 71.1 percent, which is considered satisfactory for this type of survey (Bright, 1991: p. 56). It is felt that the copy of the approval letter from the heads of institutions, attached with each questionnaire, might have contributed favourably in getting the good response. This endorsement from head of the institution might have encouraged individuals to return their questionnaires. Similarly, appropriate timing for the distribution of the questionnaire for the *user survey*, as also observed by Nicholas (1996), might have also resulted in better response rate.

An institution-wise breakdown of respondents is given in Table 3.3. The highest response rate (74.6%) was recorded for MARDI and the lowest for UPM (66.3%). Two questionnaires, one each from UPM and MARDI, were un-usable. Therefore, the data for 234 (70.5%) respondents is presented in the analysis.

Table 3.3
Questionnaire Distribution and Response Rate

Institution	Number of Questionnaires Distributed	Number of Questionnaires Returned	Response Rate (%)
University Putra Malaysia (UPM)	92	61	66.3
Malaysian Agricultural Research and Development Institute (MARDI)	118	88	74.6
Palm Oil Research Institute of Malaysia (PORIM)	33	24	72.7
Rubber Research Institute of Malaysia (RRIM)	48	33	68.8
Forest Research Institute of Malaysia (FRIM)	41	30	73.2
Total	**332**	**236**	**71.1**

3.8 Treatment of Data

3.8.1 User Survey

The database management package *FoxPro for Windows* was used for data entry. This package was selected due to its flexibility and good data handling capabilities. The data structure was developed in accordance with the variables used in the questionnaire for the *user survey*. A data-coding scheme was developed to encode the responses. After finishing the data entry, a printout was taken for checking the data against the original questionnaires to remove errors and ensuring data accuracy.

The Statistical Package for the Social Sciences (SPSS), version 8.0 for Windows, was used for data analysis. Data entered through *FoxPro* were exported to the SPSS package. As data for most variables were either ordinal or nominal in nature, they were subjected to descriptive statistics. The following statistical procedures were performed on the data:

1. Frequencies for all variables were calculated to determine occurrences of responses for each question.
2. Cross-tabulations between certain variables were performed to find out relationships among them.
3. Statistical test Chi-square and non-parametric tests such as Median, Mann-Whitney U, Kendall's tau-b, etc. were used where considered appropriate.

3.8.2 Library Survey

Data collected through this questionnaire was expected to provide background information for the study. No statistical procedures were considered appropriate for these data. Data collected from the five agricultural libraries were used to construct various tables.

3.9 Follow-up Interviews

3.9.1 Interviews with Respondents

Follow-up interviews were conducted with respondents who consented to the interview request made at the end of the *user survey* questionnaire. Some other respondents who did not earlier consent for the interview but were available in their offices and laboratories during the interview sessions were approached to check their willingness to now participate in these interviews. A majority of these respondents agreed to make themselves available for the interview. The purpose of these interviews was to seek clarification for certain trends emerging from the data analysis. Another objective was to seek the opinion of respondents on other pertinent aspects not fully covered in the questionnaire.

During data analysis, those areas were identified where additional input from respondents was considered useful. The interview schedule comprising un-structured open-ended questions covered the following areas: source of acquiring library use skills; reasons for using other libraries; knowledge about current awareness services; computer applications used by respondents and their familiarity with using electronic information sources. Since the Internet use is relatively a new phenomenon in Malaysia, it was considered appropriate to seek further input from users about their exposure and its actual use. Comments of interviewees were also invited on a general perception that agricultural sector was loosing its importance in the national economy. All interviews were conducted personally by the researcher, either in offices or laboratories of the interviewees during a period from April 1997 to July 1997.

Altogether, interviews with 60 respondents were conducted. An institution-wise breakdown of interviewees is presented in Table 3.4. Information collected through follow-up interviews is presented in the relevant chapters, along with initial responses received through the questionnaire.

Table 3.4
Number of Interviews Conducted at Each Institution

Institution	Number of Interviewee
University Putra Malaysia (UPM)	16
Malaysian Agricultural Research and Development Institute of Malaysia (MARDI)	15
Palm Oil Research Institute of Malaysia (PORIM)	8
Rubber Research Institute of Malaysia (RRIM)	10
Forest Research Institute of Malaysia (FRIM)	11
Total	**60**

Fifteen additional interviews (5 at MARDI, 4 at UPM and two each at PORIM, RRIM and FRIM) were conducted during November/December 1999 to collect data on the information needs of the respondents

3.9.2 Interviews with Library Staff

Interviews were conducted with the chief librarian and one senior library professional at each participating library. The purpose of these interviews was to develop a better understanding about the functioning of these libraries. Another aspect covered in these interviews was the level of co-operation among Malaysian agricultural libraries. The impact of the economic crisis of 1997 on the library budgets and measures taken by these libraries to cope with this situation were also discussed. These interviews were conducted during August-September 1998.

3.10 Summary

The purpose of this study is to investigate how effectively Malaysian agricultural libraries are meeting the information needs of their scientists. The survey method of research, comprising two questionnaires and follow-up interviews, was used for data collection. The proportionate stratified random sampling technique was used to generate a random sample for administering the *user survey* questionnaire. Two hundred thirty-four usable questionnaires were returned and the response rate ranges between 66.3 and 74.6 percent giving an average response rate of 70.5 percent. The second questionnaire was designed for collecting data from the participating libraries about their collections,

information services, physical facilities and resource sharing transactions. The data collected through the *library survey* are presented in the following two chapters.

Part II. LIBRARY RESOURCES, SERVICES AND RESOURCE SHARING

4. Library Manpower, Budget and Resources

4.1 Introduction

The main focus of this study is on eliciting data from the respondents on their information seeking behaviour and their perceptions of the adequacy and effectiveness of library collections, services, and facilities (chapters 6-11). However, a thorough understanding of the environment in which these responses were furnished is desirable. This was done through the *library survey* questionnaire and the collected data are presented in two chapters (chapters 4 and 5). This chapter presents data on library manpower, users, and library resources including collections, equipment, and other physical facilities. The next chapter will present data on library operations and services offered by the participating libraries, with emphasis on the interlibrary loan and document delivery service. The perceptions of library chiefs of the participating libraries of resource sharing activities will also be explored.

Users served by libraries at the four research institutions were quite homogenous, mainly comprising researchers and research managers, whereas users at the UPM library were heterogeneous. They comprised academic staff, researchers, undergraduate and postgraduate students, etc. The resources and facilities at the UPM library were developed for meeting the information needs of all these users whereas this study has only included the academic staff from agriculture-related departments. As a result, the UPM figures related to library collections, facilities, budget, resource sharing transactions, etc. could be misleading. Therefore, in this as well as in the following chapter, the UPM figures will be quoted without comparing them with those of research institutions.

4.2 Library Manpower

This section presents data on library professional staff and their qualifications, support staff, and other related aspects. This section also presents data on computing skills of library professionals and their participation in continuing professional development activities.

It was found that the largest number of staff was working in the UPM library. There were 35 library professionals and 117 support staff (Table 4.1). Of the 35 library professionals, 4 (11.4%) held masters degree; 22 (62.9%) possessed a postgraduate diploma, and 9 (25.7%) professionals had an undergraduate library qualification. Six of the UPM library professionals were science graduates. Most of the library professionals with subject background were functioning as *Faculty Liaison Officers*, responsible for keeping a close liaison with academic staff to know their information needs and brief them about information sources and services available to them.

The MARDI library was functioning with three library professionals, two para-professionals, and nine support staff. Two of the library professionals held master's degrees. The two para-professionals were support staff with training in librarianship. Four library professionals with different qualifications and seven support staff were working in the PORIM library. The RRIM library was functioning with two professionals and 11 support staff whereas the FRIM library had two library professionals and six support staff.

Table 4.1
Manpower Resources of Participating Libraries

Qualification	UPM	MARDI	PORIM	RRIM	FRIM
MLIS	4	2	1	1	1
Postgraduate Diploma	22	-	1	-	-
ALA	2	1	1	-	1
Undergraduate Diploma	7	-	1	1	-
Para-professional	-	2	-	-	-
Support/clerical staff	117	9	7	11	6
Total	**152**	**14**	**11**	**13**	**8**

4.2.1 Library Professional - User Ratio

Table 4.2 shows library professional-user ratio for libraries participating in this study, except UPM. The number of users served by each library professional was 250 for FRIM; 167 for MARDI; and 150 for the RRIM library. The lowest number of users served by each library professional was recorded at the PORIM library where librarian-user ratio was only 1:100.

Table 4.2
Library Professional-User Ratio

Library	Library Professional	Library Users	Professional:User Ratio
FRIM	2	500	1:250
MARDI	3	500	1:167
RRIM	2	300	1:150
PORIM	4	400	1:100

4.2.2 Adequacy of Library Staff

Libraries participating in the study were asked if they were under-staffed. Three libraries, i.e., UPM, MARDI and RRIM, felt that their existing library staff was adequate for their functioning. The PORIM and FRIM libraries considered themselves under-staffed. The PORIM library wished to have four additional positions, two each for library professionals and subject specialists. During interviews it was learnt that PORIM library needed extra staff for developing several in-house databases and starting certain new information services. The FRIM library needed three additional positions - one of library professional and two of support staff. They also needed additional staff for expanding their current library services and developing in-house databases. All libraries, except FRIM library, felt that it would be very difficult for them to get approval for new library positions.

4.2.3 Problems Related to Recruitment and Retention of Library Professionals

Only the UPM and MARDI libraries reported that they were facing problems in recruitment and retention of well-qualified library professionals. Two reasons furnished by both libraries were unattractive salary structure, and limited career development opportunities for well-qualified library professionals in public

sector libraries. The UPM library was also facing the problem of rapid turnover among well-qualified library professionals.

4.2.4 Computer Literacy of Library Professionals

The participating libraries were asked to provide information about the average level of computing skills possessed by their library professionals. The objective was to determine the preparedness of library professionals for handling the latest IT-based information sources and facilities. Three libraries, i.e., UPM, PORIM, FRIM, considered the overall computer literacy of their library professionals as 'very good'. The MARDI library rated computing knowledge of its average librarian as 'good'. Only the RRIM library assessed computer literacy of its librarians as 'fair'. None of the libraries rated computer literacy of their professional staff either as 'excellent' or 'poor'.

4.2.5 Participation in Continuing Professional Development Programmes

All libraries were sponsoring their staff to participate in some sort of continuing professional development programmes. The UPM and PORIM libraries were 'very frequently' arranging 'in-house training courses' for their professionals (Table 4.3). The UPM library was also sending its staff to participate in various courses organised by the university. The FRIM library was 'frequently' and the RRIM library 'less frequently' organising such training. The MARDI library was not organising any in-house training for its staff. All participating libraries, except PORIM library, were sponsoring their staff to participate in in-land training courses. Three libraries, i.e., UPM, PORIM and FRIM, were 'less frequently' sending their staff to participate in overseas training courses. During interviews it was learnt that these libraries would only send their staff overseas if sponsored by a donor agency. The PORIM library was sending all its newly recruited staff to CAB International (Commonwealth Agricultural Bureaux International) for a two-week visit to expose them to important information sources in the field of agriculture.

Table 4.3
Participation in Continuing Professional Development Programmes

Programme	UPM	MARDI	PORIM	RRIM	FRIM
In-house training courses	VF	-	VF	LF	F
In-land training courses	F	F	F	-	F
Overseas training courses	LF	-	LF	-	LF
In-land conferences	VF	F	F	F	F
Overseas conferences	LF	-	LF	LF	-
Staff attachment with local libraries	-	-	-	-	-
Staff attachment with overseas libraries	-	-	-	-	-
Visits to other libraries and organisations	LF	-	LF	F	-

VF=Very Frequently F= Frequently LF= Less Frequently

The UPM staff 'very frequently' attended in-land professional conferences while staff from other libraries 'frequently' did so. The UPM, PORIM and RRIM staff 'less frequently' attended the overseas conferences. During the interview with chief librarians it was learnt that library staff would only be allowed to participate in overseas conferences if they present a paper or if sponsored by an international donor. No library was sending their staff for attachment with local or overseas libraries. However, the RRIM library was 'frequently', and UPM and RORIM libraries were 'less frequently', arranging visits of their staff to other libraries to learn about their operations and facilities.

4.3 Library Users

Table 4.4 provides the number of registered library members, excluding external members, served by each participating library. The UPM library served the largest number of users. The number of library members at the remaining four libraries ranged from 300 to 500 users.

Table 4.4
Number of Library Members

Library	Library Users
UPM	23,000
MARDI	500
FRIM	500
PORIM	400
RRIM	300

4.3.1 External Library Users

All libraries, besides their own users, allowed individuals from other government departments, agriculture-based industries and general public to use their information resources and facilities (Table 4.5). However all libraries, except the UPM library, required individuals from public sector institutions to bring a reference letter from their own library. Individuals from industry and general public were required to become external library members. Five libraries in Serdang/Bangi area, including three agricultural libraries, i.e., UPM, PORIM and MARDI, have signed a Memorandum of Understanding (MOU) allowing the member of one library to use the collections and facilities of other signatory libraries without producing a reference letter. Similarly, a member of a library could also become an external member of other signatory libraries by paying a subsidised membership fee.

Table 4.5
Library Resources and Facilities Accessible to Users from Other Libraries

Facilities	UPM	MARDI	PORIM	RRIM	FRIM
In-house use of library collections	Yes	Yes	Yes	Yes	Yes
Borrowing materials*	Yes	Yes	Yes	Yes	Yes
Use of CD-ROM databases	Yes	Yes	Yes	No	No
Use of OPAC and in-house databases	Yes	Yes	Yes	No	No
Use of library equipment (photocopiers, AV and microform equipment, etc.)	Yes	Yes	Yes	Yes	Yes

* ***only through interlibrary lending***

Three libraries, i.e., UPM, MARDI and PORIM, permitted users from other libraries for in-house use of their information resources, services and equipment. The RRIM and FRIM libraries did not allow users from other libraries to use their CD-ROM databases. None of the participating libraries allowed borrowing of materials to their external users. However, these users were allowed to borrow materials by making interlibrary loan requests through their own library. All libraries allowed employees of other public organisations and general public to become external members by paying a certain

membership fee. These external library members were entitled to borrow materials.

4.3.2 User Education Programmes

All libraries were involved in arranging some sort of user education programmes. All libraries, except the PORIM library, were conducting demonstrations and library orientation programmes (Table 4.6). The UPM, PORIM and FRIM libraries were organising lectures and briefings for their users. The UPM and PORIM libraries conducted skill-oriented user education workshops. Only the FRIM library was using computer-assisted learning tools and audio-visual materials for user education. The UPM and FRIM libraries were also producing printed promotional materials to inform users about their services and facilities.

Table 4.6
User Education Methods Used by the Participating Libraries

Method	UPM	MARDI	PORIM	RRIM	FRIM
Demonstrations and library orientation programmes	Yes	Yes	No	Yes	Yes
Lectures and briefings	Yes	No	Yes	No	Yes
Skill-oriented user education workshops	Yes	No	Yes	No	No
Computer-assisted learning, audio-visual aids, etc.	No	No	No	No	Yes
Poster, pamphlets, leaflets, guidebooks, etc.	Yes	No	No	No	Yes
On-site briefings/ assistance by library staff for individual users	Yes	Yes	Yes	Yes	Yes
Displays and exhibitions	Yes	No	Yes	No	Yes

It was noted that only two libraries, i.e., UPM and FRIM, were using a variety of methods and tools for educating their users. The PORIM library was also using some of these methods whereas MARDI and RRIM libraries were only organising demonstrations and on-site briefings for their users. During interviews it was learnt that these libraries were not conducting user education activities due to shortage of library staff and lack of funds for this purpose.

4.4 Library Budget

Table 4.7 presents budgetary allocations of libraries for a period of five years, i.e., 1994 to 1998. It was observed that all libraries, as compared to their budget for the financial year 1994, either received more or the similar budgetary allocation during the financial years 1995 and 1996. However, libraries started feeling the impact of economic crisis during the financial year 1997. The Government of Malaysia imposed budget cuts on all public organisations. Actually the budget received by the MARDI, FRIM and RRIM libraries, even before the financial crisis, was just enough to continue subscription to journals. As a result of the financial crisis, these libraries were obliged to drastically reduce the number of serials subscribed by them.

Table 4.7
Library Budgetary Allocation (excluding staff salaries and allowances)

Ringgit Malaysian (RM)

Year	UPM	MARDI	PORIM	RRIM	FRIM
1994	3,197,900	250,000	500,000	300,000	202,884
1995	4,094,685	250,000	550,000	310,000	295,413
1996	4,505,022	250,000	550,000	310,000	216,137
1997	4,127,000	250,000	1,110,000	294,000	72,322
1998	4,215,000	40,000	1,120,000	200,000	253,488

Only the PORIM library reported a budget increase during the financial years 1997 and 1998. For PORIM, beside some other financial sources, the major source of income was the cess collected from the palm oil industry based on each tonne of oil produced by it. Due to depreciation of the Malaysian currency, the crude palm oil prices surged considerably in the international market resulting in a huge increase in cess collection. The PORIM library also benefited from it and received more money during the financial years 1997 and 1998.

The FRIM library initially received a budget allocation of RM 150,000 during the financial year 1998. However, at the end of the year it got an additional RM 100,000 from savings in FRIM research expenditures. Under a special arrangement for a period of five years (1998-2002), FRIM will get an additional

allocation of 40 million Ringgit per annum for forestry research from *timber levy* collected by the Malaysian Timber Board. As a result, the FRIM library is also expecting to get comparatively higher allocations during this period.

4.4.1 Budget Per Library User

Table 4.8 provides data on the amount of money available to each library user. It was noted that among the research institutions, the PORIM library users were at the top for per capita availability of money. The library budget for each PORIM user was RM 1,250 during the financial year 1994 and it increased to RM 2,800 during the year 1998. Other three libraries, i.e., MARDI, RRIM and FRIM, showed a major decrease in per capita library budget during the same period. The worst hit was the MARDI library where per capita library budget decreased from RM 500 in 1994 to only RM 80 in 1998 – an 84 percent decrease.

Table 4.8
Per User Share in the Library Budget*

Malaysian Ringgit (RM)

Library	UPM**	MARDI	PORIM	RRIM	FRIM
1994	139.04	500.00	1250.00	1000.00	405.77
1995	178.03	500.00	1375.00	1033.33	590.83
1996	195.87	500.00	1375.00	1033.33	432.27
1997	179.43	500.00	2775.00	980.00	144.64
1998	183.26	80.00	2800.00	666.66	506.98

* *based on figures in Table 4.4*
** *based on 23,000 users*

4.4.2 Budget Constraints

At all libraries the staff salaries and allowances were directly handled by their parent institution. Maintenance of library buildings, except at the UPM library, was also the responsibility of the parent institution. The UPM library was getting a lump sum library budget for all purposes, including building repair and maintenance.

Only the PORIM library did not experience any difficulty in getting the desired budget for procuring library materials and maintaining library services and facilities (Table 4.9). The UPM library reported that it was facing difficulties in

getting an adequate budget for procuring all types of library materials. This library was also not getting adequate funds for purchasing library equipment and for sponsoring its staff to participate in continuing professional development programmes.

The MARDI library did not receive any budget for purchasing books since 1991. It was getting a fixed budget only to continue its journal subscriptions. This situation altogether changed during the financial year1998 due to a major budget cut and the library was obliged to cancel about 70-75 percent of its serial subscriptions. The MARDI scientists were expected to arrange money for purchasing books and non-book materials from their research budgets. It was worth noting here that only one-third of the MARDI respondents reported that they were asking money for literature procurement in their research budgets (Table 11.1). This means that a majority of MARDI respondents were not able to request books and non-book materials. The MARDI library was also facing problems in getting the desired budget for procuring AV materials, library equipment and supplies.

The RRIM library was encountering problems in getting the desired budget for purchasing books and non-book materials, subscription to CD-ROM databases, and sponsoring staff to attend continuing professional development programmes. During the interviews it was learnt that RRIM library was facing severe financial problems. It has cancelled about 80-85 percent of its journal subscriptions.

Table 4.9
Difficulties in Getting Desired Budget for Different Categories

Budget Category	UPM	MARDI	PORIM	RRIM	FRIM
Books and non-book materials	Yes	Yes	No	Yes	Yes
Serial subscriptions	Yes	No	No	No	Yes
CD-ROM databases, and access to online services and sources	Yes	No	No	Yes	Yes
Audio-visual materials	Yes	Yes	No	No	No
Library equipment and supplies	Yes	Yes	No	No	No
Staff training and professional development	Yes	Yes	No	Yes	No
Library building maintenance and furnishing	No	Yes	Yes	No	Yes

The FRIM library was facing difficulties in getting the desired budget for procuring books and non-book materials, subscription to serials and CD-ROM databases, and for providing access to online services. During the interviews with FRIM staff it was learnt that this library was hardly getting enough budget to continue its subscription to serials. Due to the financial crisis, this library had to cancel subscriptions to 52 percent of its serials during the financial year 1997. The FRIM library was also not getting any regular budget for book purchases. However, it would get some money for this purpose occasionally through different projects. As a policy, the FRIM research divisions were expected to bear the cost for books, reprints, and other literature ordered by their scientists. They were also required to finance DIALOG searching and subscriptions to new journal titles proposed by their scientists. However, it was worth noting that about two quarters of the FRIM scientists were not requesting a budget for literature procurement in their research proposals (Table 11.1).

It was observed that all libraries, except PORIM and to some extent UPM, were not getting the desired budget for purchasing book and non-book materials. Inadequacy of funds might be hindering these libraries from procuring library materials to satisfy the information needs of their users. Another area where three libraries, i.e., UPM, RRIM and FRIM, were facing budget constraints was subscription to CD-ROM databases and access to various online services.

Three libraries, i.e., MARDI, RRIM and FRIM, were badly affected by the Malaysian financial crisis of 1997 and were obliged to cancel a considerable number of their serials subscriptions, stop some user services, reduce the number of CD-ROM products, stop user education and promotional activities, etc. These libraries have been persuading their research divisions to make available funds to continue subscriptions to those journal titles that were directly related to their research. In most situations the response was very discouraging as these research divisions themselves were affected by the financial turmoil.

4.5 Library Resources

4.5.1 Library Collections

Table 4.10 provides information on the number of items available in each participating library for different types of materials. Among the research institutions, the biggest number of books and non-book materials were maintained by the RRIM library(150,000), followed by the FRIM library (50,000). The PORIM library had the smallest collection of book and non-book materials (12,500).

Among the research institutions, the FRIM library was getting the highest number of serial titles (1,300), followed by the MARDI library with 1,200 titles. However, these libraries were subscribing to only a small proportion of their serial titles. A large number of serials at FRIM (86.7%) and MARDI (82.8%) were received either through exchange or as gifts. The RRIM library was receiving 1,025 serial titles out of which 725 (70.7%) were received through exchange and gifts. The PORIM library was receiving 720 serial titles out of which 320 (44.4%) were received through exchange and gifts.

Table 4.10
Library Collections for Various Types of Materials

Category	UPM	MARDI	PORIM	RRIM	FRIM
Book and non-book materials including theses, pamphlets, manuals, fact books, etc.	404,137	33,000	12,500	150,000	50,000
Serials Titles					
Through subscription	2,400	207	400	300	173
Through exchange	-	88	-	475	
Through gifts	70	905	320*	250	1,127*
Total	**2,470**	**1,200**	**720**	**1,025**	**1,300**
Printed abstracts and indexes	50	2	1	10	15
CD-ROM databases	23	7	8	6	2
Audio-visual materials	28,656	500	270	30	40

** Both through exchange and gifts*

It was observed that, except for UPM and PORIM libraries, other libraries were getting between 70 to 86 percent of their serials through exchange and gifts. It is quite evident that the exchange and gift programmes of these libraries were very active. However, it is possible that all of these titles may not be directly related to the subject interests of their users.

A majority of the CD-ROM products acquired by the participating libraries were bibliographic in nature. Among the research institutions, PORIM library was subscribing to eight CD-ROM titles, MARDI to seven, RRIM to six, and FRIM to two. Four libraries, i.e., UPM, MARDI, PORIM and FRIM, were subscribing to CAB Abstracts and AGRICOLA databases. The UPM and RRIM libraries were also getting the AGRIS database.

Although libraries at the research institutions were acquiring audio-visual materials, their collection size was very small (30 to 500 items).

4.5.2 Library Equipment

The PORIM library had 5 OPAC terminals whereas 3 terminals were available at the FRIM library for its users. (Table 4.11). The average number of library users per OPAC terminal at the PORIM and FRIM libraries was 80 and 167 respectively. The partially automated catalogues of MARDI and RRIM libraries were not accessible to users.

Table 4.11
Equipment Available for Library Users

Equipment	UPM	MARDI	PORIM	RRIM	FRIM
OPAC terminals	26	-	5	-	3
CD-ROM workstations	10	2	1	1	1
Internet terminals	73*	1	6	-	4
Photocopiers	11	-	1	1	1
Microform equipment	7	1	1	-	-
Audio-video equipment	14	-	1	1	-
Microcomputers for general use (word processing, graphics, etc.)	24	-	-	-	-
Printers (for computers and CD-ROM workstations)	-	-	1	1	1

* *including computers in the user education room*

The UPM library had ten stand-alone CD-ROM workstations for users mounting 23 CD-ROM titles. Two CD-ROM workstations were available in the MARDI library with 250 users per workstation. One CD-ROM workstation each was available in the remaining three libraries, i.e., PORIM, RRIM and FRIM, with printing facility. The UPM and MARDI libraries did not provide printing facility and users were expected to download their results. However,

the UPM library maintains an independent computer laboratory equipped with 24 microcomputers. This computer laboratory could be used by library users for word processing and other computer applications including the printing of their CD-ROM search results.

The UPM library had 11 photocopying machines for its users maintained by a private company. At the MARDI library no exclusive photocopying machine was available for users. However, users were allowed to use the staff photocopier on payment basis. One photocopier each was available in the PORIM, RRIM and FRIM libraries for their users.

Five microform readers and two reader-printers were available in the UPM library. The MARDI library had one reader and the PORIM library one reader-printer. Fourteen audio-visual display and projection units were available in the UPM library. One video display unit was available in the RRIM library and one audio-listening unit in the PORIM library. No audio-visual equipment was available in the MARDI and FRIM libraries.

4.5.3 Library Seating Capacity

The UPM library had the maximum number of seats available for its users. On average, one seat was available for every 15.3 library users (Table 4.12). Sixty seats were available in the MARDI library with one seat for every 8.3 users. The lowest number of users per library seat (6 users) was recorded at the RRIM library and the highest number of users per seat (20 users) at the PORIM library.

Table 4.12
Library Seating Capacity

Library	Seating Capacity	No. of User per Seat
UPM	1,500	15.3*
MARDI	60	8.3
RRIM	50	6.0
FRIM	30	16.6
PORIM	20	20.0

* *based on 23,000 users*

4.6 Summary

This chapter presented data on library manpower, library users, budget allocations and other related aspects. Data on library resources including collections, equipment, and other physical facilities of the participating libraries were also presented. It was found that a majority of the library professionals possessed a postgraduate diploma whereas all library chiefs had a master's degree. Three libraries, i.e., MARDI, RRIM and FRIM, got 70-86 percent of their serials through exchange and gifts. All libraries, except PORIM library, were experiencing difficulties in getting desired budgets for procuring materials and maintaining library services and facilities. The financial crisis of 1997 have further aggravated this situation due to budget cuts and currency depreciation. The next chapter will present data on library operations and services as well as the perceptions of library chiefs of the participating libraries of resource sharing activities.

5. Library Operations, Services and Resource Sharing

5.1 Introduction

Beside library resources, the way various library operations are performed and the availability of information services can play an important role in satisfying the information needs of scientists. This chapter presents data on the status of various library operations in the participating libraries. It also provides data on library services with particular emphasis on interlibrary loan and document delivery service. Finally, this chapter will present the perceptions of library chiefs of the participating libraries of resource sharing activities.

5.2 Status of Library Operations

This section provides data on the ways various library operations were performed by the participating libraries. The UPM library reported that almost all of its operations and services were automated. It was using the VTLS library system for its standard library operations such as acquisitions, cataloguing, circulation, and serials management (Table 5.1). It was using MINISIS and Micro-CDS/ISIS for developing in-house databases and to run some current awareness services such as SDI, content pages, etc. On the contrary, the situation at the MARDI library was completely different where most of the activities and services were performed manually. Its catalogue was partially automated and not accessible to users. It was planning to migrate to a new library automation system but financial crisis delayed its implementation. The MARDI library had developed two small in-house databases on staff publications and materials procured through the document delivery service by using Micro-CDS/ISIS package.

Table 5.1
Method Used for Undertaking Library Activities/Services

Activity/ Service	UPM	MARDI	PORIM	RRIM	FRIM
Acquisition	Automated	Manual	Automated	Manual	Manual
Cataloguing	Automated	Mixed	Automated	Mixed	Automated
Circulation	Automated	Manual	Automated	Manual	Manual
Serials management	Automated	Manual	Automated	Manual	Mixed
Budgeting and fiscal management	Automated	Manual	Automated	Manual	NA
In-house databases	Automated	Automated	Automated	Automated	Automated
Interlibrary loaning	Mixed	Manual	Automated	Manual	Mixed
Document delivery service	Mixed	Manual	Mixed	Manual	Manual
Bibliography compilation	NA	Manual	Automated	Mixed	Automated
Current awareness services such as SDI, content pages	Automated	Manual	Automated	Manual	Manual

NA = Not Available *Mixed = Partially manual, partially automated*

All library operations and services at the PORIM library, except document delivery service, were automated. It was using BRS/Search for automating its library operations and services. The PORIM library was maintaining several in-house databases accessible through its online service called PALMOILIS (Palm Oil Information On-line Service) Access. The OPAC and several in-house databases of PORIM were accessible through the Internet, although pre-registration was required for this purpose.

The RRIM library was using 4-D library automation system to automate its catalogue. However, it was considering migrating to another system due to limitations of the existing system. The RRIM library has also developed two in-house databases on rubber-related patents and publications produced by its scientists. All other library activities and services at the RRIM library, except bibliography compilation, were performed manually.

The FRIM library was using the Micro-CDS/ISIS library package for automating its catalogue. Instead of developing a comprehensive library catalogue, it has developed several small specialised subject databases/ sub-catalogues. Another computerised activity at the FRIM library was bibliography compilation. Serials management and interlibrary loaning activities at this library were partially automated.

5.2.1 Internet Access

All the participating libraries were using the Internet for some of their operations. Two libraries, i.e., PORIM and RRIM, were using the Internet for placing orders with booksellers, jobbers and publishers (Table 5.2). None of the libraries were using the Internet for bibliographic verification for acquisition or for copy cataloguing. All libraries were using the Internet for accessing OPACs of local and overseas libraries. The UPM, PORIM and FRIM libraries were searching the international online retrieval services through the Internet. All libraries, except RRIM, were making document delivery requests to individual libraries or to commercial document delivery agencies through the Internet. All libraries were also using e-mail messaging to support their different library operations.

Table 5.2
Use of Internet for Performing Library Operations

Internet Services	UPM	MARDI	PORIM	RRIM	FRIM
Document ordering to booksellers, jobbers, publishers, etc.	No	No	Yes	Yes	No
Bibliographic verification (for acquisition and cataloguing)	No	No	No	No	No
Cataloguing and classification	No	No	No	No	No
Access to OPAC of Malaysian and overseas libraries	Yes	Yes	Yes	Yes	Yes
Access to online services such as DIALOG, Data Star, etc.	Yes	No	Yes	No	Yes
Document delivery request made to individual libraries or commercial document delivery agencies	Yes	Yes	Yes	No	Yes
E-mail messaging	Yes	Yes	Yes	Yes	Yes

Three libraries, i.e., UPM, PORIM and FRIM, maintain their Internet homepages. The UPM library homepage (*http://lib.upm.edu.my/*) was quite comprehensive, providing information on its collections, services and facilities, rules and regulations, and information on a two-credit hour course on *Information Literacy* offered by the library. The UPM library OPAC and eight in-house databases were also accessible through the Internet. The PORIM library homepage (*http://161.142.141.112/*) provided information on various

services and facilities available through the PORIM InfoCentre. The PORIM library OPAC and eleven in-house databases were accessible through the PALMOILIS Access. The FRIM library homepage (*http://library.frim.gov.my/*) provided information on library collections, services, rules and regulations, and a list of in-house databases. Under the current awareness service, it provided online access to titles of new books acquired by the library, books and periodicals on order, list of serials subscribed, and contents pages of selected journals. Registered users could also get different products of the current awareness service through e-mail.

5.3 Library Services and Facilities

In terms of various services and facilities, it was found that all the participating libraries were providing CD-ROM searching facilities. The UPM and PORIM libraries were also providing access to local online services and full-text newspapers such as NSTP (New Straits Times Publications) On-line, Bernama (Malaysian news agency), Civil Service Link, SIRIM Link, etc. Besides these two libraries, the FRIM library also provided access to the international online retrieval services.

Three libraries, i.e., PORIM, RRIM, and FRIM were compiling bibliographies on demand for their users. The UPM library was earlier compiling such bibliographies for its users but has stopped this activity as it was subscribing to 23 CD-ROM databases. All libraries, except the RRIM library, were providing the SDI service to their users. Four libraries, i.e., UPM, MARDI, RRIM and FRIM, were offering contents page service (Table 5.3). The FRIM library was providing SDI and contents page service through its Internet homepage. The document delivery and interlibrary loan services were available at all the participating libraries. The PORIM and RRIM libraries were maintaining an abstracting service whereas the RRIM library also offered the translation service.

Table 5.3
Library Services and Facilities

Service	UPM	MARDI	PORIM	RRIM	FRIM
CD-ROM searching	Yes	Yes	Yes	Yes	Yes
Access to local online services	Yes	No	Yes	No	No
Access to international online information retrieval services	Yes	No	Yes	No	Yes
Compiling bibliographies on demand	No	No	Yes	Yes	Yes
SDI service	Yes	Yes	Yes	No	Yes
Content page service	Yes	Yes	No	Yes	Yes
Document delivery service	Yes	Yes	Yes	Yes	Yes
Interlibrary loaning	Yes	Yes	Yes	Yes	Yes
Abstracting service	No	No	Yes	Yes	No
Translation service	Yes	No	No	Yes	No

It was observed that all libraries participating in this study were providing CD-ROM searching, interlibrary loan and document delivery service to their users. Access to local and international online services was only provided by some libraries at a limited scale. It might be due to high cost and less financial resources available to these libraries.

5.4 Interlibrary Lending

This section deals with different aspects related to document loaning and document supply activities undertaken by the participating libraries. Traditionally, the Malaysian libraries undertake document loaning and document supply activities under the generic term *interlibrary loaning.* However, items requested from international sources are placed under the *document delivery service.* Therefore, this section will provide combined data for local document loan (items to be returned) and document supply (items not to be returned) transactions under the heading 'interlibrary loan'. The data on items requested from overseas libraries and information agencies (not to be returned) will be presented under the term 'document delivery service'.

5.4.1 Magnitude of Interlibrary Loan (ILL) Transactions

The UPM library made 4,991 interlibrary loan requests during a period of three years (1995-97) and received 3,080 items with a success rate of 61.7 percent (Table 5.4). The MARDI library requested 1,913 and received 1,787 items during the same period. Out of the 1,340 ILL requests made, PORIM library received 1,315 items. The success rate for the MARDI and PORIM libraries was 93.4 and 98.1 percent respectively. The RRIM made the lowest number of ILL requests (388 items) with 86.3 percent success rate. The success rate for the MARDI, FRIM and PORIM libraries was considerably higher than the UPM library. During interviews it was learnt that these libraries checked the availability of the needed items before making their interlibrary loan requests. The low success rate for the UPM library might be due to the fact that it handled large number of transactions made to several libraries, covering a variety of subjects.

Table 5.4
Number of Interlibrary Loan Requests Made (1995-97)

Library	No. of Requests Made	No. of Documents Received	Success Rate
UPM	4,991	3,080	61.7%
MARDI	1,913	1,787	93.4%
PORIM	1,340	1,315	98.1%
RRIM	834	Not available	-
FRIM	388	335	86.3%
Total	**9,466**	**6,517**	**75.5%***

* *Excluding RRIM figures*

Table 5.5 provides data on the interlibrary loan requests received by the participating libraries during a period of three years (1995-97). The UPM library received 6,761 requests and supplied 3,189 items with a success rate of 47.2 percent. The PORIM library received 690 ILL requests and supplied 675 items. Out of the 287 requests received, the FRIM library supplied 255 items. The MARDI library received 184 requests and supplied 164 items. The RRIM library processed the lowest number of ILL requests. Once again the success rate for interlibrary loan requests received by the libraries of research institutions was considerably higher than the UPM library.

One possible reason for receiving a higher number of ILL requests by the UPM library, and to some extent by the PORIM library, might be due to the fact that their OPAC and several in-house databases were accessible through the Internet. It might have helped the borrowing libraries to quickly check the availability of needed items. The participating libraries reported that on an average they took 3 to 4 days to supply the requested items.

Table 5.5
Number of Interlibrary Loan Requests Received (1995-97)

Library	No. of Requests Received	No. of Documents Supplied	Success Rate
UPM	6,761	3,189	47.2%
PORIM	690	675	97.8%
FRIM	287	255	88.9%
MARDI	184	164	89.1%
RRIM	61	Not available	-
Total	**7983**	**4283**	**54.1%***

* *Excluding RRIM figures*

5.4.2 Preferred Sources for Making ILL Requests

Table 5.6 presents the type of libraries used by the participating libraries for making interlibrary loan requests. It was noted that agricultural libraries in the same city or in close geographical vicinity were the most preferred and four out of five participating libraries were 'very frequently' making ILL requests to them. Three libraries 'very frequently' and two 'frequently' making such requests to other libraries located in the same city or in their close vicinity. It was probably due to the fact that making interlibrary loan requests to libraries located in the same city or nearby areas was economical and less time-consuming. During interviews it was also learnt that the participating libraries were occasionally sending their office vehicle to collect and return materials to these libraries. Other libraries were less frequently used for making interlibrary loan requests.

Table 5.6
Libraries Contacted for Making Document Loan Requests

Source	UPM	MARDI	PORIM	RRIM	FRIM
Agricultural libraries in the city or in close geographical vicinity	VF	VF	VF	F	VF
Other libraries in the city or in close geographical vicinity	VF	VF	F	F	VF
Other libraries in other parts of Malaysia	LF	F	LF	N	VF
Agricultural libraries in other parts of Malaysia	LF	F	N	N	N
National Library of Malaysia	LF	LF	LF	N	N

5.4.3 Identification of the Needed Materials

The participating libraries were asked to indicate the sources used by them for identifying those libraries that might have the needed documents not available in their own collections. All libraries were using the OPAC of those local libraries that were accessible through the Internet (Table 5.7). All libraries were also making telephonic queries to other libraries for locating the needed documents. None of these libraries was using printed or microfilmed union catalogue of Malaysian libraries or library specific catalogues, as these were not being regularly updated now. During interviews it was learnt that now, these libraries were also using e-mail for checking the availability of needed items.

Table 5.7
Sources Used for Identifying Materials for Making ILL Requests

Source	UPM	MARDI	PORIM	RRIM	FRIM
Through online access to OPAC of other Malaysian libraries	Yes	Yes	Yes	Yes	Yes
Through telephonic query	Yes	Yes	Yes	Yes	Yes
Through union catalogue of monographs	No	No	No	No	No
Through library specific printed/ microfiche catalogues	No	No	No	No	No
Other sources (e-mail)	Yes	Yes	Yes	Yes	Yes

During interviews it was learnt that all participating libraries were making interlibrary loan requests either through telephone, followed by a formal request, or through e-mail. They used the postal service only for those local

libraries that did not have e-mail facility. In most situations, the lending library was asked to provide the needed item through the regular postal service. In case of urgency, they were requested to fax the document. In rare situations, one of the library staff would be sent to the local lending library to collect the required document.

It was also learnt that the participating libraries were following a flexible charging policy for document supply. They often charged other libraries based on the rates prescribed by the National Library of Malaysia. The libraries of some public institutions that had attained corporate status have started implementing their own rates that were often higher than the rates proposed by the National library. All the participating libraries mentioned that they often follow a policy of "what you charge us is what we will charge you".

5.5 Document Delivery Service

This section deals with those aspects of document delivery service through which photocopies of needed materials were acquired from overseas libraries and information agencies. During interviews it was learnt that all participating libraries first checked local libraries for the availability of needed materials and only unsuccessful requests were sent to international sources for copies of the needed items.

5.5.1 Magnitude of Document Delivery Transactions

The UPM library reported that it made 665 document delivery requests to overseas libraries and information agencies during the year 1997 and received 525 items with a success rate of 78.9 percent (Table 5.8). The PORIM library made 1,530 requests during a period of three years (1995-1997) and received 1,505 items. Out of the 215 document delivery requests made by the MARDI library during the same period, 201 items were received from overseas. The success rate for the PORIM and MARDI libraries was 98.4 and 93.5 percent respectively. The RRIM library only made 38 requests during a period of three years.

E-mail was the most popular medium for making document delivery requests to overseas libraries and information centres. However, the postal service was used for those overseas libraries, mostly in developing countries, that did not have the e-mail facility.

Table 5.8
Number of Document Delivery Requests (1995-97)

	Requests Made to Overseas Libraries and Information Agencies			Requests Received from Overseas Libraries and Information Agencies		
Library	**No. of Requests Made**	**No. of Documents Received**	**Success Rate**	**No. of Requests Received**	**No. of Documents Sent**	**Response Rate**
UPM*	665	525	78.9%	51	47	92.2%
PORIM	1,530	1,505	98.4%	460	445	96.7%
MARDI	215	201	93.5%	Nil	Nil	-
FRIM	105	83	79.0%	13	9	75.0%
RRIM	38	Not available	-	20	Not available	-
Total	**2,553**	**2314**	**92.0%****	**544**	**501**	**95.6%****

** Only 1997 data*
*** Excluding RRIM figures*

The UPM library reported that it received 51 document delivery requests from overseas during the year 1997. Among the research institutions participating in this study, the PORIM library received the biggest number of document delivery requests from abroad (460 requests). It might be due to the specialised collection developed by this library in the field of palm oil, accessible through the Internet. The RRIM and FRIM libraries received 20 and 13 requests respectively from overseas during a period of three years. The MARDI library reported that it did not receive any such request during the same period.

It is worth noting that the participating libraries made 2,553 document delivery requests to overseas libraries and information agencies and in turn received only 544 such requests from abroad (Table 5.8). The unidirectional flow of information was quite evident from these figures. Altogether the participating libraries acquired 8,831 items (excluding RRIM transactions) through the interlibrary loan and document delivery service. Out of these, 6,517 (73.8%) items were received from local libraries and 2,314 (26.2%) from overseas libraries and information agencies.

Only the UPM library reported that it received document delivery requests from libraries of international agricultural institutions such as IRRI, ICRISAT, ICARDA, ILARD, etc. (Table 5.9). Only two libraries got such requests from ASEAN agricultural and S&T libraries. However, four participating libraries reported getting document delivery requests from other overseas agricultural and S&T libraries.

Table 5.9
Document Delivery Requests from Overseas Libraries

Source	UPM	MARDI	PORIM	RRIM	FRIM
Libraries of international agricultural institutions	Yes	No	No	No	No
Agricultural and S&T libraries from the ASEAN countries	Yes	No	No	No	Yes
Agricultural and S&T libraries from other countries	Yes	No	No	Yes	Yes

5.5.2 Preferred Sources for Making International Document Delivery Requests

Among the international commercial and non-commercial document delivery agencies, the British Library Document Supply Centre (BLDSC) was the most preferred agency for making document delivery requests (Table 5.10). Out of five participating libraries, four were 'very frequently' making their document delivery requests to the BLDSC. Other sources such as the Internet-based commercial document delivery services, overseas agricultural and S&T libraries, and libraries of international research institutions were less frequently used. Agricultural and S&T libraries in ASEAN countries were the least frequently used for making document delivery requests. Similarly, none of the participating libraries made such requests to the National Agricultural Library (NAL), USA and CISRO, Australia.

Table 5.10
Overseas Libraries/ International Agencies Used for Making Document Delivery Requests

Source	UPM	MARDI	PORIM	RRIM	FRIM
British Library Document Supply Centre (BLDSC)	VF	VF	VF	VF	LF
Internet based document delivery services	N	N	F	N	N
Agricultural and S&T libraries in other countries	LF	N	LF	N	N
Libraries of international agricultural Centres	F	N	N	N	N
Agricultural and S&T libraries in ASEAN countries	LF	N	N	N	N
National Agricultural Library (NAL), USA	N	N	N	N	N
CISRO, Australia	N	N	N	N	N

5.5.3 Per Capita ILL and Document Delivery Requests Made by Users

The average number of interlibrary loan and document delivery requests (from both local and international sources) made annually by all scientists from each research institution was calculated. The PORIM scientists requested the largest number of documents amounting to 2.39 items per year per person. The MARDI scientists requested 1.42 items, RRIM 0.97 item and FRIM 0.33 item. On the aggregate, 1.25 items were annually requested by the research scientists. The average number of requests for the UPM academicians was not calculated due to heterogeneity in library users and that only a small proportion of them was included in this study.

5.6 Charging for Fee-based Library Services

The UPM library reported that it was charging its users for document delivery requests, online searchers, and some other fee-based services. However, users were not charged if the needed item was received free of charge. All library services at the PORIM library including interlibrary loans, document delivery, access to online services, etc. were absolutely free and all expenditures were borne by the library. At MARDI, either the requester or his/her research division was expected to pay for the document delivery requests. In situations where no money was available with them for literature procurement, the

MARDI library tried to arrange funds from other sources or projects. Almost a similar situation existed at FRIM and the respective research division was expected to pay for fee-based services used by its scientists. The RRIM users were also expected to pay for services but the library was flexible in its implementation.

During interviews with library chiefs, it was learnt that they would like to charge their users for services provided. They felt that it was particularly desirable at a time when most libraries were facing serious financial problems. However, they were unable to strictly implement their charging policy either due to lack of support from the management or unavailability of funds for literature procurement in research budgets. The participating library chiefs also pointed out that most of their users were reluctant to pay for library services. Even in certain situations the scientists complained and criticised their libraries for charging them for library services. Some library chiefs felt that it might be partially due to the prevailing culture of not paying for library services and partially due to cuts imposed on research budgets. One library chief commented on this situation saying that the "funny thing is that these users happily pay at other libraries but are reluctant to pay to their own library. They feel that it is the responsibility of their library to make available all the needed literature, and then why should they pay for it."

5.7 Management of Resource Sharing Activities

Perceptions of the library chiefs were explored of different management related aspects of resource sharing such as satisfaction with the current level of resource sharing, participation in a resource sharing scheme, desired level of library co-operation, and the co-ordination of a resource sharing scheme. Their opinions were also sought on the development and management of a union list of serials and co-operative acquisition of library materials. In this section, identification of the participating libraries will be withheld for the sake of anonymity.

5.7.1 Satisfaction with Resource Sharing Activities

Library chiefs of the participating libraries were asked about their satisfaction with the existing level of resource sharing among Malaysian agricultural libraries. Out of the five library chiefs, three expressed their dissatisfaction with the existing level of co-operation. The reasons given by them for their dissatisfaction are presented in Table 5.11. All the three dissatisfied library chiefs felt that 'absence of a resource sharing agreement' among Malaysian agricultural libraries was one of the reasons for unsatisfactory level of co-operation. Other reasons put forward by at least two library chiefs were 'lack of consciousness among library professionals'; 'absence of proper planning'; and 'absence of adequate communication among agricultural libraries'. It is worth noting that none of them felt that lack of co-operation was due to inadequate financial resources available to them.

Table 5.11
Reasons for Lack of Co-operation among Agricultural Libraries
(N=3)

S. No.	Reason	Number of Libraries
1	Absence of resource sharing agreement	3
2	Lack of consciousness among professionals	2
3	Absence of proper planning	2
4	Absence of adequate communication among agricultural libraries	2
5	Absence of institutional leadership	1
6	Inadequate library resources (collection/ equipment)	1
7	Inadequate manpower resources	1
8	Human factor (personality conflicts; professional jealousy; resistance to change, etc.)	1
9	Inadequate financial resources	0

5.7.2 Participation in a Resource Sharing Scheme

All the five library chiefs agreed that they would join in a resource sharing scheme if one was developed for Malaysian agricultural libraries. However, a split response was received on the proposal that once a resource sharing scheme was worked out, all Malaysian agricultural libraries should be required to participate in it. One library chief each 'strongly agreed' and 'agreed' with this proposal while three remained 'neutral'.

5.7.3 Level of Co-operation

Opinions of the library chiefs of the participating libraries were sought on whether they would agree or disagree that each library should have the option to decide about its level of participation and with which libraries to share its resources. Two library chiefs 'strongly agreed' and one 'agreed' with this proposal while two library chiefs remained 'neutral'. This means that a majority of the library chiefs were interested in some sort of 'loose arrangement' for resource sharing among Malaysian agricultural libraries.

5.7.4 Co-ordination of Resource Sharing Scheme

The participating library chiefs were asked that if a resource sharing scheme was developed for Malaysian agricultural libraries, which library in their opinion, should assume the responsibility to co-ordinate this activity. Three respondents suggested the name of the UPM library for this purpose. One respondent proposed the name of the Ministry of Agriculture library. One library chief did not respond to this question.

5.7.5 Development and Maintenance of Union List of Serials

Opinions of the participating library chiefs were sought about different aspects related to the development and maintenance of a union list of serials. They were asked to provide their opinion about the type of union list of serials they consider most suitable for Malaysian agricultural libraries. The choices provided were: a national level union list of serials covering all libraries and all subjects; a national level serials list for all S&T libraries; a national level union list for all agricultural libraries; a union list of serials for S&T and agricultural libraries at city/local level; a union list for agricultural libraries in the ASEAN region; and finally, an individual serials list to be developed by the each library.

Four library chiefs supported the development of a comprehensive union list of serials at the national level, comprising serial holdings of all libraries and covering all disciplines. Only one library chief felt that a union list of serials for S&T and agricultural libraries at city/local level would be more useful for promoting resource sharing.

A split response was received regarding the preferred medium for the compilation of a union list of serials. Two library chiefs felt that data on serial holdings of all Malaysian agricultural libraries should be compiled at one central location with online access to all participating libraries. Two library chiefs supported that all libraries should compile their own serials list and make them accessible through the Internet. One library chief felt that a CD-ROM containing serials information would be a better choice. All library chiefs participating in this study agreed that they would actively participate in any effort to develop a union list of serials for agricultural libraries in Malaysia.

5.7.6 Co-operative Serials Acquisition

The participating library chiefs were asked if they would agree or disagree that all agricultural libraries in Malaysia should consult each other before subscribing to journals to avoid duplication and to help procure additional journal titles. One library chief 'strongly agreed' and two 'agreed' with this proposal while one remained 'neutral'. One library chief 'disagreed' with the proposal for co-operative selection and acquisition of serials.

5.7.7 SmartCard for Agricultural Libraries

The concept of SmartCard - a single card valid for a variety of applications and privileges - was being promoted by the Malaysian government. Library chiefs of the participating libraries were asked if they would agree with a proposal that library membership card issued by one agricultural library should be valid for borrowing from other agricultural libraries in Malaysia. Two library chiefs each 'strongly disagreed' and 'disagreed' with this proposal. Only one library chief 'agreed' that card holders from one agricultural library may be allowed to borrow materials from other agricultural libraries. During interviews, it was learnt that library chiefs were reluctant to support the idea of SmartCard due to some practical problems. They pointed out that it would result in losing control over their collections and will cause difficulties in monitoring the borrowers. They felt that at this time, interlibrary loan was an appropriate method in providing access to users from other libraries.

5.7.8 Perceptions of Resource Sharing Activities

In order to understand the perceptions of library chiefs of the participating libraries of resource sharing, their response to various statements dealing with resource sharing activities was sought. Altogether there were 15 statements in the questionnaire, seven representing the positive aspects and eight representing the negative side of resource sharing. The purpose was to find out the overall perceptions of these library chiefs concerning resource sharing.

It was noted that a majority of the library chiefs either 'strongly agreed' or 'agreed' with the first seven statements depicting the '*positive*' side of resource sharing activities. Out of the five participating libraries, three 'strongly agreed' and two 'agreed' with the statement that 'resource sharing scheme would help resolve some of the existing problems faced by agricultural libraries in Malaysia' (Table 5.12). The next four statements also received strong endorsement from the participating library chiefs. However, they were relatively uncertain if 'participation in resource sharing scheme would help libraries to ask for more funds' and three of them stayed 'neutral'.

Table 5.12
Perceptions of Resource Sharing

	S. No.	Statement	UPM	MARDI	PORIM	RRIM	FRIM
Positive	1.	Resource sharing scheme will help resolve some of the existing problems faced by agricultural libraries in Malaysia	A	SA	SA	A	SA
	2.	Resource sharing scheme will result in increased user satisfaction	A	SA	A	A	SA
	3.	Resource sharing scheme will result in increased use of library materials	A	SA	A	A	SA
	4.	Participation in resource sharing scheme will ultimately enhance the image of libraries due to access to more information	A	SA	A	A	SA
	5.	A national resource sharing scheme will result in saving money being spent on document procurement from foreign sources	A	SA	A	A	SA
	6.	Each agricultural library in Malaysia should be assigned a discipline to build comprehensive collection in that particular area	N	SA	SA	A	D
	7.	Participation in resource sharing scheme may help libraries to ask for more funds	N	N	A	N	SA

Table 5.12 (Continued)

	S. No.	Statement	UPM	MARDI	PORIM	RRIM	FRIM
Negative	1.	Attitude of library staff is the most important obstacle in the success of any resource sharing scheme	A	SA	SA	A	N
	2.	Lending materials to other libraries will deprive your own library users	A	SA	D	N	SA
	3.	Some member libraries do not fulfil their resource sharing obligations	A	D	N	A	A
	4.	Participation in a resource sharing scheme will result in increase workload for library staff	A	D	D	A	A
	5.	Resource sharing schemes are usually more suitable for large libraries than small/ medium sized libraries	A	D	SA	N	D
	6.	Most libraries usually request more than what they are ready to share	A	N	A	N	D
	7.	A resource sharing scheme shall only be successful if more manpower and resources are provided to participating libraries	N	D	D	N	A
	8.	Participation in a resource sharing scheme will result in less control on library collections	D	D	N	N	D

SA= Strongly Agree; A= Agree; N= Neutral; D= Disagree; SD= Strongly Disagree

A split response was received for most of the statements presenting the possible '*negative*' side of resource sharing. It was interesting to note that two library chiefs each 'strongly agreed' and 'agreed' with the statement that 'attitude of library staff is the most important obstacle in the success of any resource sharing scheme'. Similarly, two library chiefs 'strongly agreed' and one 'agreed' with the statement that 'lending materials to other libraries would deprive their own library users'. For the last two statements, most of the respondents either 'disagreed' or remained 'neutral'. This means that they did not feel that more manpower and resources would be required to participate in a resource sharing scheme or that such participation would result in less control over their collections.

On the whole, it was noted that almost all library chiefs were convinced of the benefits and were supportive of resource sharing but also had some reservations about it. It was also interesting to note that four out of the five library chiefs agreed that attitude of library staff was the biggest hurdle in the successful implementation of any resource sharing scheme.

5.7.9 Suggestions for Improving Library Co-operation

The participating library chiefs were asked to offer suggestions for improving co-operation among Malaysian agricultural libraries. Only one library chief responded and suggested two measures, i.e., 'develop a union list of holdings of main agricultural libraries for distribution on diskettes, CD-ROM and also for online access' and 'cultivate professionalism in library co-operative practices; formalise co-operative pacts; and determine rules and regulations'.

5.8 Summary

Most of the library operations and services were computerised at the UPM and PORIM libraries and partially computerised at the FRIM library. Most of these activities were performed manually by the MARDI and RRIM libraries. Almost all participating libraries were using the Internet for e-mail messaging, making document delivery requests, and accessing OPACs of local and overseas libraries. On the average, each scientist from the participating research institutions made 1.25 document delivery and interlibrary loan requests per annum. Nearly 74 percent of these requests were met from Malaysian libraries. The participating libraries preferred to make their overseas document delivery requests to the BLDSC. Only a limited resource sharing activity was observed between the participating libraries and libraries in the ASEAN region. The library chiefs of the participating libraries were in favour of a flexible resource sharing scheme where it should be their discretion to decide with whom to share their resources and at what level. The next six chapters (chapter 6-11) will present data collected through the *user survey* questionnaire. Chapter 6 will present demographic information about the respondents such as institutional affiliation, job titles, age, gender, highest academic qualification, length of experience, etc.

Part III. Information Needs, Seeking Behaviour and Perception of Library Effectiveness

6. Demographic Characteristics

6.1 Introduction

This chapter provides demographic information about the respondents. It also covers information about the publication record and personal collections of the respondents. The population of the study comprised 1,328 individuals representing four major agricultural research institutions and one university called University Putra Malaysia (UPM). All scientists and academicians working in these institutions, with at least a bachelor's degree in science, were included in the study population. The UPM faculty members working in agriculture-related academic departments only (e.g., Agronomy, Plant Protection, Soil Science, Agricultural Economics, Plant Breeding, Horticulture, Food Science and Biotechnology, Forest Management, Forest Production, Agricultural Engineering, etc.) were included in the population.

A sample size of 25 percent was drawn based on stratified proportional random sampling technique. Each institution constituted a stratum for sampling. A total of 332 questionnaires were distributed and 236 filled-in questionnaires were received back. The overall response rate for the survey was 71.1 percent. Two questionnaires, one each from UPM and MARDI, were not usable and thus excluded from the data analysis. Therefore, the data for 234 (70.5 percent) respondents will be presented in the analysis.

6.2 Personal Characteristics of Respondents

This section deals with personal characteristics of respondents. Data on institutional affiliation, job title, age, gender, qualification, and the institution from where the highest degree was obtained, etc., have been presented. Data regarding length of experience, research and publication record of respondents, and amount of office time devoted to various activities including literature

searching and reading have also been analysed. Finally, data related to the computing and library use skills of respondents is presented in this section.

Only 142 (60.7%) respondents provided data about their field of specialisation. Some provided more than one area of specialisation. Similarly, several respondents indicated a very narrow and highly specialised field as their area of specialisation, while certain others stated broad disciplines. As the available data in its existing format was not useful, it was decided to exclude this variable from further analysis.

Data related to personal characteristics of respondents have been cross-tabulated with other variables to investigate if any relationship existed between them. These relationships will be discussed together with other pertinent data related to these variables.

6.2.1 Institutional Affiliation of Respondents

A breakdown of respondents' institutional affiliation is presented in Table 6.1. The largest number of respondents was from MARDI (37.1%), followed by UPM (25.6%). The proportion of respondents from the remaining three institutions was in the range of 10-15 percent.

Table 6.1
Distribution of Respondents
N=234

Institution	Number	Percentage
University Putra Malaysia (UPM)	60	25.6
Malaysian Agricultural Research and Development Institute (MARDI)	87	37.1
Palm Oil Research Institute Malaysia (PORIM)	24	10.3
Rubber Research Institute Malaysia (RRIM)	33	14.1
Forest Research Institute of Malaysia (FRIM)	30	12.8
Total	**234**	**100**

6.2.2 Job Titles of Respondents

Table 6.2 shows job titles of the respondents. It was observed that job titles of participants from research institutions were different from those of the UPM. The UPM faculty members have three job titles, i.e., professor, associate professor, and lecturer, whereas respondents from the four research institutions use identical job titles, that are head of division, principal research officer, senior research officer, and research officer.

Table 6.2
Job Titles of Respondents
N=234

	Job Title	Number	Percentage
Univ. Putra Malaysia	Professor	8	3.4
	Associate Professor	20	8.8
	Lecturer	32	13.7
Research Institutions	Head of Division	13	5.6
	Principal Research Officer	5	5.6
	Senior Research Officer	22	9.4
	Research Officer	134	57.3

Eight professors, 20 associate professors, and 32 lecturers represented UPM. Of the remaining 174 participants affiliated with four research institutions, the distribution was: 13 (5.6%) heads of division; five (2.1%) principal research officers; 22 (9.4%) senior research officers; and 134 (75.3%) research officers.

6.2.3 Age of Respondents

Table 6.3 presents data on respondents by their age groups. Twenty-four (10.3%) respondents were 30 years old or less. Fifty-eight (24.8%) were in the age group of 31 to 40 years. The largest group of respondents (59.8%) belonged to the age group of 41 to 50 years. Only 12 (5.1%) participants were in the age group of 51 years or above.

Table 6.3
Age Groups of Respondents
N=234

Age Group	Number	Percentage
30 Years or Below	24	10.3
31 to 40 Years	58	24.8
41 to 50 Years	140	59.8
51 Years or Above	12	5.1

6.2.4 Gender of Respondents

The breakdown of respondents by their gender is given in Table 6.4. One hundred sixty-six (70.9%) respondents were male and 68 (29.1%) female. Nearly one-quarter of the respondents from UPM, MARDI and RRIM were females. The share of female participants from FRIM and PORIM was 40.0 and 41.7 percent respectively.

Table 6.4
Gender of Respondents
N=234

Institution	Male	Female
UPM	44 (74.1%)	16 (25.9%)
MARDI	66 (75.3%)	21 (24.7%)
PORIM	14 (58.3%)	10 (41.7%)
RRIM	24 (71.9%)	9 (28.1%)
FRIM	18 (60.0%)	12 (40.0%)
Total	**166 (70.9%)**	**68 (29.1%)**

6.2.5 Highest Academic Qualifications of Respondents

Table 6.5 provides data on the highest academic qualification of respondents. Of the 233 participants who provided this data, 103 (44.2%) hold a Ph.D. degree; 98 (42.1%) had a M.Sc. or M.Phil.; and 32 (13.7%) held a B.Sc. degree. Only one respondent had a M.Phil. degree and was grouped with other participants having a M.Sc. qualification for further data analysis. Altogether 86.3 percent of the respondents possessed a post-graduate qualification.

Table 6.5
Qualification of Respondents
N=233

Qualification	Number	Percentage
Ph.D.	103	44.2
M.Sc./M.Phil.	98	42.1
B.Sc.	32	13.7
Total	**233**	**199**

Table 6.6 shows the highest academic qualification of respondents from various institutions. Of the 59 UPM faculty members, 54 (91.5%) possessed a doctoral degree. From MARDI, 22 (25.3%) respondents hold a Ph.D., whereas 57 (65.5%) possessed a masters degree. Only 4 (16.7%) of the PORIM respondents

possessed a doctorate which was the lowest percentage among all the institutions participating in this study. Nine (37.5%) respondents from PORIM had a B.Sc. degree. However during interviews, it was learnt that the PORIM management is now aggressively motivating and providing scholarships to its scientific staff to improve their qualifications.

Table 6.6
Highest Qualification of Respondents by Institution
N=233

Institution	N	Ph.D.	M.Sc./M.Phil.	B.Sc.
UPM	59	54 (91.5%)	4 (6.8%)	1 (1.7%)
MARDI	87	22 (25.3%)	57 (65.5%)	8 (9.2%)
PORIM	24	4 (16.7%)	11 (45.8%)	9 (37.5%)
RRIM	33	17 (51.5%)	11 (33.3%)	5 (15.2%)
FRIM	30	6 (20.0%)	15 (50.0%)	9 (30.0%)
Total	**233**	**103 (44.2%)**	**98 (42.1%)**	**32 (13.7%)**

Over 50 percent of the participants from RRIM possessed a doctoral qualification. Another 11 (33.3%) participants from this institution were holding masters in science degree. One-half of the FRIM respondents had an M.Sc. degree.

6.2.6 Institution Awarding the Highest Qualification

It was assumed that the institutions from which the respondents obtained their highest qualification might have some bearing on their information seeking behaviour and level of satisfaction. Therefore, this data was also gathered and presented in Table 6.7. Among the 58 UPM academicians, 52 (89.7%) had acquired their highest qualification from overseas universities. For MARDI, the number of locally and overseas trained respondents was 21.8 and 78.2 percent respectively. Of the 24 respondents from PORIM, 14 (58.3%) were locally trained and 10 (41.7%) had overseas qualifications. Over three-quarters of the RRIM participants had their highest qualifications from overseas whereas 46.7 percent of FRIM respondents were in this category. On the whole, 73.2 percent of the respondents had overseas qualifications and 26.7 percent had degrees from local academic institutions.

Table 6.7
Source of Awarding the Highest Qualification
N=232

Institution	Source of Qualification	
	Local Universities	Overseas Universities
UPM	6 (10.3%)	52 (89.7%)
MARDI	19 (21.8%)	68 (78.2%)
PORIM	14 (58.3%)	10 (41.7%)
RRIM	7 (21.2%)	26 (78.8%)
FRIM	16 (53.3%)	14 (46.7%)
Total	**62 (26.7%)**	**170 (73.2%)**

6.2.7 Length of Experience

Table 6.8 presents the length of work experience possessed by the respondents. Over two-thirds of the respondents had more than 10 years of work experience. Only 13.4 percent of the participants had a working experience of five years or less.

Table 6.8
Length of Work Experience
N=231

Experience	Number	Percentage
5 Years or Below	31	13.4
6 to 10 Years	44	19.1
11 to 15 Years	44	19.1
16 to 20 Years	78	33.7
21 to 25 Years	28	12.1
More than 25 Years	6	2.6
Total	**231**	**100**

Personal characteristics of the respondents are summarised as follows:

1. Over 64 percent of the respondents were older than 40.
2. Over 86 percent of the respondents possessed a post-graduate qualification.
3. Over 73 percent of the respondents had acquired their highest qualification from overseas.
4. Over 67 percent of the participants had more than 10 years of work experience.

Based on the personal characteristics of the respondents, it may be concluded that a majority of the respondents were mature, well-qualified, and possessed substantial work experience. They had acquired their highest qualification from universities abroad and were most probably exposed to modern information sources and facilities. It is, therefore, reasonable to expect that respondents with such qualifications and experience will provide a balanced, objective, and reliable assessment about the effectiveness of Malaysian agricultural libraries.

6.3 Publication Record of Respondents

Respondents were asked to provide the number of publications produced by them during the last five years. It was assumed that there might be some relationship between the number of publications produced and other variables such as use of library resources and facilities, level of library use skills, perceptions of library effectiveness, etc. However, it was observed that some respondents provided a record of all of their publications, not restricted to the last five years as was requested in the questionnaire. It was, therefore, decided to limit the use of this data without investigating its relationship with other variables.

Table 6.9 presents the number of publications produced by the respondents. Data analysis revealed that 107 (46.7%) participants had published one to five journal articles. Another 48 (21.0%) had produced 6 to 10 journal articles. About one-fourth of the respondents reported that they had not produced any journal article. They included four heads of division, one PRO, five SRO, 41 research officers and three lecturers. A further analysis of these 54 respondents who had not published any journal articles showed that 3 (5.6%) were from UPM, 26 (48.1%) from MARDI, 9 (16.7%) from PORIM, 12 (22.2%) from RRIM and 4 (7.4%) from FRIM.

It was observed that a larger number of respondents had produced conference papers as compared to journal articles. Only 10 percent of the participants had not produced any conference paper. About two-thirds of the respondents had

produced up to ten conference papers whereas over 26 percent authored more than ten conference papers each.

Table 6.9
Publications Produced by Respondents
N=229

No. of Publications	Journal Articles	Conference Papers	Reports	Books
None	54 (23.6%)	23 (10.0%)	63 (27.5%)	181 (79.0%)
1-5	107 (46.7%)	90 (39.3%)	100 (43.7%)	46 (20.1%)
6-10	48 (21.0%)	56 (24.5%)	33 (14.4%)	1 (0.4%)
11-15	7 (3.1%)	22 (9.6%)	10 (4.4%)	1 (0.4%)
16-20	4 (1.8%)	18 (7.9%)	14 (6.1%)	-
21-25	5 (2.2%)	3 (1.3%)	2 (0.8%)	-
>25	4 (1.6%)	17 (7.4%)	7 (3.1%)	-

The trend in producing research reports was quite similar to that of journal articles. One hundred and sixty-five (72.5%) participants had produced research reports. Of these, 133 (80.1%) had produced up to ten reports. It was found that only about 21 percent of the respondents had published books. Of these, a majority had only published up to five books.

Other publications produced by individuals included technical articles in newsletters, popular articles published in magazines and newspapers, research and commodity bulletins, feasibility and consultancy reports, chapter in a book, standards for rubber related products, etc.

Table 6.10 presents the mean number of publications produced by participants from various institutions. It was observed that each UPM faculty member had produced 9.1 journal articles. This was followed by FRIM and MARDI respondents who had published 4.46 and 4.00 journal articles respectively. The mean number of conference papers produced by each UPM respondents was also the highest (15.38), followed by respondents from FRIM (9.10), MARDI (7.54), and PORIM (7.43). However, the mean number of research reports produced by participants from PORIM was the highest (8.71), followed by RRIM (7.97). Respondents from FRIM were at the top for compiling different types of publications.

Table 6.10
Average Number of Publications Produced by Each Respondent
N=229

Publication Type	UPM	MARDI	PORIM	RRIM	FRIM
Journal Articles	9.10	4.00	2.95	1.85	4.46
Conference Articles	15.38	7.54	7.43	5.85	9.10
Research Reports	3.62	6.79	8.71	7.97	4.70
Books	0.67	0.26	0.76	0.33	0.57
Compilations, Manuals, etc.	1.18	1.00	0.52	1.15	1.93

It was noted that the respondents from UPM had produced considerably more journal articles and conference papers whereas individuals from the remaining four research institutions had produced more research reports. It may be concluded that faculty members have stronger interest towards publishing in journals, probably because of their wide circulation, high intellectual contents, academic recognition, and as pre-requisites for their career development. Similarly, most Malaysian universities had been quite generous and encouraged their academic staff to present papers in local as well as overseas conferences. On the other hand, researchers are often expected to promptly report their detailed research findings in research reports. Similarly, often sponsors of research projects also need these reports to complete the documentation of projects funded by them. These factors might have resulted in more research reports being produced by the respondents from research institutions.

6.4 Personal Collections of Respondents

Respondents were asked to provide information about the number of documents in their personal collections. Only 160 (64.4%) respondents answered this question. One possible reason for the low response could be that it was difficult for the respondents to provide data about various types of publications in their personal collections, although they were asked to provide only estimated figures.

Table 6.11 provides data on the number of various types of documents in the personal collections of the respondents. Seventy-one (44.4%) participants reported that they had up to one hundred journal articles and conference papers in their personal collections. Another 20.6 percent of the participants had more than 300 articles. One hundred (63.7%) respondents had up to 50 issues of

various journals. Similarly, 139 (88%) participants reported having up to 50 conference proceedings. Over sixty percent respondents had up to 50 books each.

Table 6.11
Personal Collections of Respondents

No. of Respondents (percentage)

Document Type	N	Number of Publications					
		Nil	1-50	51-100	101-200	201-300	>300
Journal Articles and Conference Papers	160	9 (5.6%)	38 (23.7%)	33 (20.7%)	37 (23.1%)	10 (6.3%)	33 (20.6%)
Journal Issues	157	24 (15.3%)	100 (63.7%)	121 (13.3%)	8 (5.1%)	2 (1.3%)	2 (1.3%)
Conference Proceedings	158	10 (6.3%)	139 (88.0%)	4 (2.5%)	3 (1.9%)	1 (0.6%)	1 (0.6%)
Books	160	13 (8.1%)	97 (60.6%)	25 (15.6%)	14 (8.8%)	7 (4.4%)	4 (2.5%)
Reports, Manuals, etc.	158	32 (20.2%)	97 (61.4%)	21 (13.3%)	5 (3.2%)	-	3 (1.9%)

Other publications in the personal collections of respondents included theses, manufacturers' indexes and guides, consultancy and feasibility reports, local rubber standards, newsletters, commodity and research bulletins, etc.

During interviews, it transpired that most of the interviewees collect literature from various sources in their specific areas of specialisation. They also shared the opinion that often the needed information is scattered in different journals and other types of publications. Usually, it is time consuming and laborious to visit the library at various occasions such as during research design, conducting experiments, report writing, etc., to consult this literature. They considered it more effective and efficient to keep photocopies of these materials in their personal collections. A majority of the interviewees kept copies of frequently used materials in their offices and laboratories for ready reference.

6.4.1 Article and Book Collections of Respondents

Table 6.12 provides data on the article collections of respondents belonging to various institutions. A higher number of the UPM respondents (73.0%) had more than one hundred journal articles and conference papers in their personal collections as compared to working scientists (MARDI 53.3 percent, PORIM 41.7 percent, RRIM 33.3 percent, and FRIM 40.0 percent).

Table 6.12
Article Collections of Respondents by Institution

No. of Respondents (percentage)

Institution	N	Number of Journal Articles		
		1-100	101-200	>200
UPM	37	10 (27.0%)	11 (29.7%)	16 (43.3%)
MARDI	60	28 (46.7%)	13 (21.7%)	19 (31.6%)
PORIM	12	7 (58.3%)	3 (25.0%)	2 (16.7%)
RRIM	21	14 (66.7%)	4 (19.0%)	3 (14.3%)
FRIM	20	12 (60%)	6 (30.0%)	2 (10.0%)

Similarly, nearly one-half of the UPM respondents indicated that they had more than 50 books in their personal collections as compared to about 30 percent of the participants each from MARDI, FRIM and PORIM (Table 6.13). Only 19.1 percent of the participants from RRIM had as many books in their personal collections.

Table 6.13
Personal Book Collections of Respondents by Institution

No. of Respondents (percentage)

Institution	Number of Books		
	1-50	51-100	>100
UPM (N=37)	19 (51.4%)	9 (24.3%)	9 (24.3%)
MARDI (N=59)	41 (69.5%)	9 (15.3%)	9 (15.2%)
PORIM (N=14)	10 (71.4%)	2 (14.3%)	2 (14.3%)
RRIM (N=21)	17 (80.9%)	3 (14.3%)	1 (4.8%)
FRIM (N=20)	14 (70.0%)	3 (15.0%)	3 (15.0%)

It may be concluded that academicians show a tendency of having more journal articles and books in their personal collections compared to research scientists. It seems that, besides some other factors, academic staff tend to build their personal collections for supporting their teaching as well research activities.

6.4.2 Use of Serials Collections

Table 6.14 provides data on the number of journal titles often scanned by the respondents. The data revealed that 122 (57%) of the participants scanned up to five journal titles. Another 67 (31.3%) of the participants reported that they regularly went through up to ten journal titles. Only 21 (9.8%) respondents scanned more than 10 journal titles each. On the two extremes, four respondents examined more than 20 journal titles each whereas another four participants did not look at even a single title.

Table 6.14
Number of Journal Titles Regularly Scanned by Respondents
N=214

No. of Journals Title	Respondents	
	Number	Percentage
None	4	1.9
1-5	122	57.0
6-10	67	31.3
11-15	12	5.6
16-20	5	2.3
> 20	4	1.9
Total	214	100

A further data analysis showed that over 56 percent of the UPM respondents were scanning more than five journal titles whereas only 32 to 37 percent of the respondents from research institutions were using the same number of journal titles (Table 6.15).

Table 6.15
Number of Journal Titles Regularly Scanned by Respondents by their Institutional Affiliation
N=210

No. of Journals Title	UPM (N=57)	MARDI (N=75)	PORIM (N=19)	RRIM (N=30)	FRIM (N=29)
1-5	25 (43.9%)	51 (68.0%)	12 (63.2%)	19 (63.4%)	19 (65.5%)
6-10	24 (42.1%)	20 (26.7%)	2 (10.5%)	9 (30%)	8 (27.6%)
> 10	8 (14.0%)	4 (5.3%)	5 (26.3%)	2 (6.6%)	2 (6.9%)

6.4.3 Acquisition of Personal Copies of Journals

Respondents were asked to indicate the number of journal titles received by them through personal subscriptions, as members of professional associations or through other means. One hundred and twelve (51.6%) participants reported that they were receiving personal copies of journals (Table 6.16). Nearly 70 percent of the participants from FRIM and 60 percent from UPM were receiving personal copies of journals. Similarly, between 40 to 50 percent of the respondents from other institutions were getting personal copies of journals.

Table 6.16
Personal Copies of Journals Received by Respondents
N=217

Institution	N	Number	Percentage
UPM	60	36	60.0
MARDI	75	32	42.7
PORIM	19	9	47.4
RRIM	30	12	40.0
FRIM	33	23	69.7
Total	**217**	**112**	**51.6**

Of the 112 participants who were getting personal copies of journals, 69 (61.6%) were getting only one journal each. Of these 69 respondents, 28 were getting this journal through personal subscription and 35 as members of professional associations (Table 6.17). Another 48 respondents reported that they were getting two journal titles – 18 through personal subscription and 24 as members of professional associations. Some participants were getting complimentary copies of journals either as a member of the editorial board or as journal referees. Several respondents were getting complimentary copies of journals published by their own organisations.

Table 6.17
Number of Journal Titles Received by Respondents
(Multiple Response)
N=112

	Number of Respondents			
Number of Journal Titles	Through Personal Subscription (N=64)	As a Member of Prof. Association (N=76)	Other Sources (N=17)	Total
1	28	35	6	69
2	18	24	6	48
3	8	11	1	20
4	4	3	1	8
5 or more	6	3	3	10

It may be concluded that a majority of the respondents were regularly scanning up to five journals. Nearly one-half of the participants were also getting personal copies of journals. Most of these participants reported that they were getting up to two journal titles, either through personal subscription or as members of professional associations.

6.5 Summary

The personal characteristics of the respondents showed that nearly 65 percent of them were older than 40 years, over 86 percent possessed a post-graduate qualification, and over 73 percent of them acquired their highest qualification from overseas academic institutions. Nearly 68 percent of the participants had more than 10 years' work experience. The UPM faculty members showed a tendency to publish more journal articles and conference papers whereas scientists from the research institutions produced more research reports. Over 60 percent of the respondents had up to 50 books in their personal collections and nearly 52 percent of the participants got personal copies of journals. The next chapter will present data on library use skills and computing skills of the respondents. Data on the use of various IT-based information sources and facilities, including the Internet will also be presented.

7. Library Use and Computing Skills of Respondents

7.1 Introduction

The library use skills and computer literacy of the respondents are expected to have some relationship with their information needs and seeking behaviour. This chapter presents data on the library use skills of the respondents and their participation in user education programmes. It also provides data on the computing skills of the respondents and their use of IT-based information sources and facilities. The library use and computing skills of the respondents are cross-tabulated with several other related variables to investigate if any relationship existed between them.

7.2 Library Use Skills of Respondents

Respondents were asked to indicate their level of library use skills. It was assumed that respondents with adequate library use skills would feel comfortable in using library resources and facilities. It was also expected that these individuals would be familiar with basic tools and techniques for manual as well as automated literature searching. Table 7.1 presents library use skills of the respondents. One hundred and nineteen (51.5%) respondents considered their library use skills as 'good'. Another 65 (28.2%) respondents perceived their library use skills either as 'very good' or 'excellent'. A little over 20 percent of the respondents considered their library use skills either as 'fair' or 'poor'. This meant that nearly 80 percent of the participants of this study possessed good or better library use skills.

Table 7.1
Library Use Skills of Respondents
N=231

Skill Level	Number	Percentage
Excellent	8	3.5
Very Good	57	24.7
Good	119	51.5
Fair	45	19.5
Poor	2	0.9

7.2.1 Relationship between Library Use Skills and Institutional Affiliation of Respondents

Table 7.2 shows the library use skills possessed by respondents from different institutions. Out of the 29 respondents from FRIM, 26 (89.6%) respondents possessed 'good' or better than that library use skills. They were followed by PORIM, where 83.4 percent of the respondents were in this category. The lowest percentage of respondents (75%) possessing 'good' or better than that library use skills belonged to RRIM. However, the Median test showed no significant differences for library use skills among respondents from different institutions.

Table 7.2
Library Use Skills and Institutional Affiliation of Respondents
N=231

Library Use Skills	Institution					Total
	UPM	MARDI	PORIM	RRIM	FRIM	
Excellent	4 (6.7%)	3 (3.5%)	-	-	1 (3.4%)	8 (3.5%)
Very Good	20 (33.3%)	22 (25.6%)	4 (16.7%)	5 (15.6%)	6 (20.7%)	57 (24.7%)
Good	22 (36.7%)	43 (50.0%)	16 (66.7%)	19 (59.4%)	19 (65.5%)	119 (51.5%)
Fair	14 (23.3%)	16 (18.6%)	4 (16.7%)	8 (25.0%)	3 (10.3)	45 (19.5%)
Poor	-	2 (2.3%)	-	-	-	2 (0.9%)
Total	**60 (100%)**	**86 (100%)**	**24 (100%)**	**32 (100%)**	**29 (100%)**	**231 (100%)**

Median Test

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Library use skills	> Median	24	25	4	5	7
	<= Median	36	61	20	27	22

N=231, Median=3.00
Chi-square=8.481, *df*=4, *p*=.075

7.2.2 Relationship between Library Use Skills and the Highest Qualification of Respondents

Table 7.3 shows the relationship between the qualification and library use skills of the respondents. It was found that 81.4 percent of the respondents with a Ph.D. qualification possessed 'good' or better library use skills. The percentage

of respondents in this category, with M.Sc. and B.Sc. qualifications, was 77.1 and 81.2 respectively. However, the Median test showed no significant differences among participants with different qualifications for their library use skills. It appeared that individuals with higher academic qualifications do not essentially possess better library use skills.

Table 7.3
Library Use Skills of Respondents by the Highest Qualifications
N=230

Library Use Skills	Degree			Total
	Ph.D.	M.Sc.	B.Sc.	
Excellent	6 (5.9%)	-	2 (6.3%)	8 (3.5%)
Very Good	27 (26.5%)	23 (24.0%)	6 (18.8%)	56 (24.3%)
Good	50 (49.0%)	51 (53.1%)	18 (56.3%)	119 (51.7%)
Fair	19 (18.6%)	20 (20.8%)	6 (18.8%)	45 (19.6%)
Poor	-	2 (2.1%)	-	2 (0.9%)
Total	**102 (100%)**	**96 (100%)**	**32 (100%)**	**230 (100%)**

Median Test

		Degree		
		PhD	M.Sc.	B.Sc.
Library use skills	> Median	32	23	8
	<= Median	70	73	24

N=230, Median=3.00
Chi-square=1.656, df=2, p=.437

7.2.3 Relationship between Library Use Skills and Source of Obtaining the Highest Qualification

The library use skills of the respondents were cross-tabulated with their source of obtaining the highest academic qualification to find out if any relationship existed between these two variables. It was found that 85.5 percent of the respondents with local degrees and 77.8 percent respondents with overseas degrees possessed 'good' or better library use skills (Table 7.4). However, the Mann-Whitney U test showed no significant differences among both categories of respondents for their library use skills.

Table 7.4
Library Use Skills and Source of Obtaining Highest Qualification
N=229

Library Use Skills	Qualification Source		Total
	Local Degree	Overseas Degree	
Excellent	2 (3.2%)	6 (3.6%)	8 (3.5%)
Very Good	12 (19.4%)	44 (26.3)	56 (24.5%)
Good	39 (62.9%)	80 (47.9%)	119 (52.0%)
Fair	9 (14.5%)	35 (21.0%)	44 (19.2%)
Poor	-	2 (1.2%)	2 (0.9%)
Total	26 (100%)	167 (100%)	229 (100%)

Mann-Whitney U=5157.50, p=.962

7.2.4 Relationship between Library Use Skills and Age and Gender of Respondents

It was found that 84.2 percent of the respondents from the age group '31-40 years' possessed 'good' to 'excellent' library use skills (Table 7.5). Slightly over 83 percent of the respondents from the age groups '30 years or below' and '51 years or above' possessed this level of library use skills. The lowest percentage of respondents (76.8%) possessing 'good' or better library use skills belonged to the age group '41-50 years'. The Median test showed no significant differences among respondents belonging to different age groups for their library use skills.

Table 7.5
Library Use Skills by Age Groups of Respondents

Library Use Skills	Age Group				Total
	30 Years or Below	31-40 Years	41-50 Years	51 Years or Above	
Excellent	1 (4.2%)	-	6 (4.3%)	1 (8.3%)	8 (3.5%)
Very Good	6 (25.0%)	19 (33.3%)	31 (22.5%)	1 (8.3%)	57 (24.7%)
Good	13 (54.2%)	29 (50.9%)	69 (50.0%)	8 (66.7%)	119 (51.5%)
Fair	4 (16.7%)	9 (15.8%)	30 (21.7%)	2 (16.7%)	45 (19.5%)
Poor	-	-	2 (1.4%)	-	2 (0.9%)
Total	**24 (100%)**	**57 (100%)**	**138 (100%)**	**12 (100%)**	**231 (100%)**

Median Test

		Age Group			
		30 or below	31-40 year	41-50 year	51 and above
Library use skills	> Median	7	19	37	2
	<= Median	17	38	101	10

N=231, Median=3.00
Chi-square=1.674, *df*=3, *p*=.643

The Mann-Whitney test was used to find out if any difference existed between male and female respondents for their library use skills. No significant difference was found between respondents belonging to both genders (Mann-Whitney U=4551.5, *p*=.059).

The profile of library use skills of respondents is summarised as follows:

1. Almost all respondents, irrespective of their institutional affiliation, possessed about the same level of library use skills.

2. There were no significant differences among participants for their library use skills based on their age groups, gender, academic qualification and the place of obtaining their highest degree.

It was observed that a majority of the respondents possessed almost the same level of library use skills. This homogeneity among respondents is expected to render uniform responses in their assessment about the effectiveness of Malaysian agricultural libraries. It is also expected that their responses would provide more reliable data for a meaningful interpretation and for arriving at tenable results.

7.3 User Education

Data from the respondents was sought about their participation in various user education activities organised by their library during the last three years. Table 7.6 provides data on the number of respondents who had participated in user education programmes organised by their library. It was surprising that 205 (88.7%) of the participants had not attended such training programmes. Nearly

21 percent of the respondents each from UPM and FRIM reported that they had attended such programmes. All participants from MARDI revealed that they had not participated in any user education programme.

Table 7.6
Participation in User Education Programmes
N=231

User Education Programmes	UPM (N=60)	MARDI (N=86)	PORIM (N=24)	RRIM (N=32)	FRIM (N=29)	Total (N=231)
Attended	13 (21.7%)	-	4 (16.7%)	3 (9.4%)	6 (20.7%)	26 (11.3%)
Not Attended	47 (78.3%)	86 (100.0%)	20 (83.3%)	29 (90.6%)	23 (79.3%)	205 (88.7%)

Of the 26 respondents who had attended user education programmes, 17 (65.4%) participated in only one and 6 (23.1%) attended two user education programmes. One respondent attended 5 programmes (Table 7.7).

Table 7.7
Number of User Education Programmes Attended
N=26

No. of Programme	Number	Percentage
1	17	65.4
2	6	23.1
4	2	7.7
5	1	3.8

7.3.1 Effectiveness of User Education Programmes

Twenty-five respondents provided their assessment about the effectiveness of user education programmes organised by their library (Table 7.8). Eight (61.5%) of the UPM respondents rated these programmes as either 'effective' or 'very effective'. Over 83 percent of the participants from FRIM gave the same rating to courses organised by their library. All the PORIM and RRIM respondents who had attended user education programmes assessed them as 'effective' and 'somewhat effective' respectively. None of the respondents who had participated in user education programmes assessed them as 'ineffective' or 'very ineffective'. This means that although only a very small number of respondents had participated in user education programmes, all of them rated these as effective.

Table 7.8
Effectiveness of User Education Programmes

Course Effectiveness	UPM (N=13)	PORIM (N=4)	RRIM (N=2)	FRIM (N=6)
Very Effective	1 (7.7%)	-	-	1 (16.7%)
Effective	7 (53.8%)	4 (100.0%)	-	4 (66.6%)
Somewhat Effective	5 (38.5%)	-	2 (100.0%)	1 (16.7%)
Ineffective	-	-	-	-
Very Ineffective	-	-	-	-

7.3.2 Relationship between Participation in User Education Programmes and Library Use Skills

A cross-tabulation was performed to investigate if any relationship existed between participation in user education programmes and library use skills of respondents. It was found that 81.5 percent of the respondents who had attended user education programmes possessed 'good' or better library use skills (Table 7.9). On the other hand, 78.4 percent of the respondents who had not participated in any such programme possessed the same level of library use skills. However, the Mann-Whitney U test showed no significant difference in the library use skills of participants who had and who had not participated in user education programmes. It appeared that user education programmes run by the participating libraries did not significantly improve the library use skills of the participants.

Table 7.9
Relationship between Participation in User Education Programmes and Library Use Skills

Library Use Skills	Training Attended (N=27)	No Training (N=204)
Excellent	2 (7.4%)	6 (2.9%)
Very Good	6 (22.2%)	51 (25.0%)
Good	14 (51.9%)	105 (51.5%)
Fair	5 (18.5%)	40 (19.6%)
Poor	-	2 (1.0%)

Mann-Whitney Test - Ranks

	Participated in training	N	Mean Rank	Sum of Ranks
Library use skills	No	204	115.43	23548.00
	Yes	27	120.30	3248.00
	Total	231		

Mann-Whitney U=2638.0, p=.698

7.4 Computing Skills of Respondents

Respondents were asked to provide their self-assessment about the level of computing skills they possessed. It was assumed that the level of computing skills of respondents might have some bearing on their use of technology-based information service and facilities. The computing skills possessed by respondents are presented in Table 7.10. Only sixteen (6.9%) participants considered their computing skills as 'excellent', while another 52 (22.4%) rated them as being 'very good'. On the whole, about three-quarters of the respondents rated their computing skills from 'good' to 'excellent'. This means that a majority of the respondents were computer literate and capable of using IT-based information sources and facilities.

Table 7.10
Computing Skills of Respondents
N=232

Computing Skill Level	Number	Percentage
Excellent	16	6.9
Very Good	52	22.4
Good	104	44.8
Fair	47	20.3
Poor	13	5.6
Total	**232**	**100**

7.4.1 Relationship between Computing Skills and Institutional Affiliation of Respondents

Table 7.11 presents data on computing skills possessed by respondents from various institutions. Ninety percent of the respondents from FRIM possessed 'good' or better computing skills. Slightly over 83 percent of the respondents from PORIM were also in this category. The lowest percentage of respondents (63.7%) possessing 'good' or better computing skills belonged to RRIM. However, the Median test did not show any significant differences among respondents from different institutions for their computing skills.

Table 7.11
Computing Skills of Respondents by Institution
N=232

Computing Skills	Institution					Total
	UPM	MARDI	PORIM	RRIM	FRIM	
Excellent	9 (15.3%)	1 (1.2%)	-	3 (9.1%)	3 (10.0%)	16 (6.9%)
Very Good	10 (16.9%)	22 (25.6%)	8 (33.3%)	3 (9.1%)	9 (30.0%)	52 (22.4%)
Good	25 (42.4%)	37 (43.0%)	12 (50.0%)	15 (45.5%)	15 (50.0%)	104 (44.8%)
Fair	11 (18.6%)	21 (24.4%)	4 (16.7%)	8 (24.2%)	3 (10.0%)	47 (20.3%)
Poor	4 (6.8%)	5 (5.8%)	-	4 (12.1%)	-	13 (5.6%)
Total	**59 (100%)**	**86 (100%)**	**24 (100%)**	**33 (100%)**	**30 (100%)**	**232 (100%)**

Median Test

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Computing skills	> Median	19	23	8	6	12
	<= Median	40	63	16	27	18

N=232, Median=3.00
Chi-square=4.326, *df*=4, *p*=.364

7.4.2 Relationship between Computing Skills and the Highest Qualification of Respondents

Table 7.12 shows computing skills possessed by the respondents with various qualifications. It was found that 81.3 percent of the respondents with a B.Sc. degree possessed 'good' or better computing skills. The lowest percentage of respondents (68.3%) possessing the same levels of computing skills were holding a M.Sc. degree. However, the Median test showed no significant differences among respondents with different academic qualifications and computing skills. This means that individuals with higher academic qualifications do not necessarily possess better computing skills.

Table 7.12
Computing Skills of Respondents by the Highest Qualification
N=231

Computing Skills	Degree			Total
	Ph.D.	M.Sc.	B.Sc.	
Excellent	13 (12.9%)	2 (2.0)	1 (3.1%)	16 (6.9%)
Very Good	19 (18.8%)	25 (25.5%)	7 (21.9%)	51 (22.1%)
Good	46 (45.5%)	40 (40.8%)	18 (56.3%)	104 (45.0%)
Fair	19 (18.8%)	23 (23.5%)	5 (15.6%)	47 (20.3%)
Poor	4 (4.0%)	8 (8.2%)	1 (3.1%)	13 (5.6%)
Total	**101 (100%)**	**98 (100%)**	**32 (100%)**	**231 (100%)**

Median Test

		Degree		
		Ph.D.	M.Sc.	B.Sc.
Computing skills	> Median	32	27	8
	<= Median	69	71	24

N=231, Median=3.00
Chi-square=.702, *df*=2, *p*=.704

7.4.3 Relationship between Computing Skills of Respondents and Source of the Highest Qualification

The computing skills of respondents were cross-tabulated with their source of obtaining the highest qualification to find out if any relationship existed between these two variables. It was found that 82.3 percent of the respondents who got their highest qualifications from local academic institutions possessed 'good' or better computing skills whereas 71.4 percent of the respondents with overseas degrees possessed the same levels of computing skills (Table 7.13). However, Mann-Whitney U test showed no significant differences for computing skills possessed by locally and overseas trained respondents.

Table 7.13
Computing Skills and Source of Obtaining Highest Qualification
N=229

Computing Skills	Qualification Source		Total
	Local Degree	Overseas Degree	
Excellent	4 (6.5%)	12 (7.1%)	16 (7.0%)
Very Good	13 (21.0%)	38 (22.6)	51 (22.2%)
Good	34 (54.8%)	70 (41.7%)	104 (45.2%)
Fair	10 (16.1%)	36 (21.4%)	46 (20.0%)
Poor	1 (1.6%)	12 (7.1%)	13 (5.7%)
Total	26 (100%)	167 (100%)	229 (100%)

Mann-Whitney U=4859.0, p=.408

7.4.4 Relationship between Computing Skills and Age and Gender of Respondents

Data on the computing skills possessed by respondents belonging to different age groups is presented in Table 7.14. It was found that 88 percent of the respondents belonging to the age group '31-40 years' possessed 'good' or better computing skills. They were closely followed by 87.5 percent of the respondents in the age group '30 years or below' with similar computing skills. Participants in the age group '50 years or more' possessed the lowest level of computing skills. Only 33.3 percent of these respondents possessed 'good' or better computing skills. However, the Median test showed no significant differences in the computing skills of respondents belonging to different age groups.

Table 7.14
Computing Skills of Respondents by Age Groups
N=232

Computing Skills	Age Group				Total
	30 Years or Below	31-40 Years	41-50 Years	51 Years or Above	
Excellent	1 (4.2%)	8 (13.8%)	6 (4.3%)	1 (8.3%)	16 (6.9%)
Very Good	6 (25.0%)	15 (25.9%)	29 (21.0%)	2 (16.7%)	52 (22.4%)
Good	14 (58.3%)	28 (48.3%)	61 (44.2%)	1 (8.3%)	104 (44.8%)
Fair	3 (12.5%)	7 (12.1%)	32 (23.2%)	5 (41.7%)	47 (20.3%)
Poor	-	-	10 (7.2%)	3 (25.0%)	13 (5.6%)
Total	**24 (100%)**	**58 (100%)**	**138 (100%)**	**12 (100%)**	**232 (100%)**

Median Test

		Age Group			
		30 or below	31-40 year	41-50 year	51 and above
Computing skills	> Median	7	23	35	3
	<= Median	17	35	103	9

N=232, Median=3.00
Chi-square=4.142, *df*=3, *p*=.247

Data were also analysed to investigate if any differences existed in the computing skills of male and female respondents. The Mann-Whitney U test showed significant differences between both genders for their computing skills (Mann-Whitney U=4282.0, *p*=.010).

7.4.5 Relation between Computing and Library Use Skills of Respondents

Table 7.15 presents a relationship between the level of computing skills of respondents and their library use skills. It was found that of the 68 respondents with 'excellent/very good' computing skills, 29 (42.6%) possessed the same level of library use skills. On the contrary, of the 59 respondents with 'fair/poor' computing skills, only 22 (37.3%) possessed 'fair/poor' level of library use skills. Relationship between computing and library use skills was also tested through the Kendall's tau-b test. For this purpose, data for both the variables were collapsed to eliminate 14 cells (56%) having an expected count of less than 5. A strong relationship was found between the level of computing skills of respondents and their library use skills. This means that individuals with better computing skills are more likely to possess a higher level of library use skills.

Table 7.15
Relationship between Computing and Library Use Skills of Respondents
N=229

Computing Skill	Library Use Skills			Total
	Excellent/ Very Good	Good	Fair/ Poor	
Excellent/ Very Good	29 (42.6%) (45.3%)	32 (47.1%) (27.1%)	7 (10.3%) (14.9%)	68 (100%) (29.7%)
Good	27 (26.5%) (42.2%)	57 (55.9%) (48.3%)	18 (17.6%) (38.3%)	102 (100%) (44.5%)
Fair/ Poor	8 (13.6%) (12.5%)	29 (49.1%) (24.6%)	22 (37.3%) (46.8%)	59 (100%) (25.8%)
Total	64 (100%)	118 (100%)	47 (100%)	229 (100%)

Chi-square=22.368, *df*=4, *p*=.000
Kendall's Tau-b=.271, *p*=.000

An analysis of the computing skills of respondents is summarised below:

1. Respondents from different institutions possessed similar levels of computing skills.

2. Respondents with better computing skills also possessed better levels of library use skills.

3. Male respondents possessed better computing skills compared to their female counterparts.

4. There were no significant differences among respondents for their computing skills based on their age groups, academic qualification and the place of obtaining their highest degrees.

7.5 Use of Information Technology Based Library Sources and Facilities

Respondents were asked to indicate their use of various IT-based library sources and facilities. A five-point Likert scale from 1 to 5 was used to record their responses. Another option provided in the questionnaire was 'NA' - not available. The purpose of this option was to find out how many respondents were unaware of IT-based library sources and facilities actually provided by their library. It was also an indirect way of assessing the effectiveness of promotional activities undertaken by these libraries.

Table 7.16 provides data on the use of different IT-based sources and facilities. It was found that of the 199 respondents, only 69 (34.7%) were using the CD-ROM databases and products 'frequently' or 'very frequently'. This percentage plunged further for the use of in-house databases (25.7%) and OPAC (24.5%). The percentage of respondents using microform and audio-visual collections 'frequently' or 'very frequently' were 10.5 and 9 percent respectively.

Table 7.16
Use of IT-Based Library Sources and Facilities

IT-Based Library Source and Facilities	N	Very Frequently	Frequently	Quite Frequently	Less Frequently	Not at All
CD-ROM databases and products	199	28 (14.1%)	41 (20.6%)	50 (25.1%)	44 (22.1%)	36 (18.1%)
In-house information databases	183	13 (7.1%)	34 (18.6%)	62 (33.9%)	37 (20.2%)	37 (20.2%)
Automated library catalogue	151	7 (11.3%)	20 (13.2%)	31 (20.5%)	30 (19.9%)	53 (35.1%)
Online local/international databases and sources	157	3 (1.9%)	18 (11.5%)	36 (22.9%)	41 (26.1%)	59 (37.6%)
Microform collection	191	7 (3.7%)	13 (6.8%)	28 (14.7%)	62 (32.5%)	81 (42.4%)
Audio-visual and multi-media collection	178	2 (1.1%)	14 (7.9%)	26 (14.6%)	65 (36.5%)	71 (39.9%)

It was worth noting that the overall response rate for this question was quite low. A high number of respondents also chose 'NA' (not available), although most libraries were offering these IT-based sources and facilities. This number would further increase if those respondents who did not answer this question were considered as 'non-users' or 'unaware users'. An analysis of respondents in these categories is presented in Table 7.17. Out of the 136 (58.1%) respondents who were not searching their library OPAC, 66 (48.5%) were from MARDI and 25 (19.0%) from RRIM. These libraries had only partially developed their OPAC which were not yet accessible to the users. In certain situations, library staff would search their incomplete OPAC for some users. The remaining 45 respondents not searching OPAC were affiliated with UPM (19), PORIM (15) and FRIM (11).

Table 7.17
Breakdown of Respondents not Using IT-Based Library Sources and Facilities
(Multiple Response)

IT-Based Library Sources and Facilities	Non-Users of IT Sources and Facilities			
	Not Using at All	Not Available	Missing Responses	Total (N=234)
Automated library catalogue	53	56	27	136 (58.1%)
In-house information databases	37	25	24	86 (36.8%)
CD-ROM databases and products	36	22	13	71 (30.3%)
Online local and international databases and sources	59	51	26	136 (58.1%)
Microform collection	81	27	16	124 (53.0%)
Audio-visual and multimedia collection	71	35	21	127 (54.3%)

Seventy-one (30.3%) respondents were not using CD-ROM databases and products. Out of these, about two-thirds of the respondents were affiliated with MARDI and RRIM. One hundred thirty-six (58.1%) respondents were not using online local and international databases and services. It might be due to the fact that most libraries were either not offering this facility due to the exorbitant cost involved or it was only available to those users who were willing to bear the full cost. Only the PORIM library was providing free access to online services to its users. Well over one-half of the respondents reported that they were not using microform and audio-visual collections. This was expected as most of the surveyed libraries, except the UPM library, had very small collections for this type of materials.

7.5.1 Relationship between the Use of IT-Based Library Sources and Institutional Affiliation of Respondents

Table 7.18 presents the distribution of respondents belonging to different institutions, based on the median value for the use of each IT-based library source. It was observed that respondents from FRIM and PORIM used OPAC more frequently and MARDI participants the least. The Median test also showed high significant differences among respondents from different institutions for their use of OPAC. The in-house databases were also used frequently by respondents from FRIM and PORIM and least frequently by MARDI respondents. It might be due to the fact that PORIM and FRIM libraries have developed a number of quality databases in the field of palm oil and forestry respectively.

The use of CD-ROM databases and products were high among respondents from UPM and FRIM whereas online local/international databases and sources were more popular among the participants from PORIM and FRIM. For both the sources, high significant differences were found among the participants belonging to different institutions. Respondents from UPM were using the microform and audio-visual collections more frequently whereas participants from RRIM least frequently. High significant differences were also found among the participants from different institutions for their use of microform collections.

Table 7.18
Use of IT-Based Library Sources and Institutional Affiliation of Respondents

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Automated lib catalogue OPAC	> Median	25	14	11	3	15
	<= Median	23	36	8	12	4
In-house info databases	> Median	12	14	8	5	8
	<= Median	37	47	11	21	20
CD-ROM databases	> Median	21	33	4	0	11
	<= Median	35	42	14	21	18
Online databases and sources	> Median	21	11	11	1	13
	<= Median	25	41	8	15	11
Microform collection	> Median	23	13	8	0	4
	<= Median	34	55	13	23	18
AV & multimedia collection	> Median	18	12	2	4	6
	<= Median	38	51	17	16	14

Test Statistics

	OPAC	In-house databases	CD-ROM databases	Online databases	Microform collection	AV and multimedia
N	151	183	199	157	191	178
Median	1.00	2.00	2.00	1.00	1.00	1.00
Chi-Square	20.720	3.649	15.592	20.291	18.485	5.391
df	4	4	4	4	4	4
p	.000	.456	.004	.000	.001	.250

7.5.2 Relationship between the Use of IT-based Library Sources and Computing Skills of Respondents

The Kendall's tau-b test was used to find out relationship between the use of IT-based library sources and facilities and computing skills of participants (Table 7.19). Only those sources were included that involve the use of computer. As for almost all IT-sources over 20 percent of the cells had an expected count of less than 5, data for both variables were collapsed to give a 3x3 table. A relationship was found between computing skills of respondents and their use of various IT-based sources, except CD-ROM databases and products. This means that CD-ROM databases and products were equally popular among all respondents irrespective of their computing skills. On the whole, it appeared that individuals with better computing skills are likely to use IT-based sources and facilities more frequently compared to those with low computing skills.

Table 7.19
Use of IT-Based Library Sources and Computing Skills of Respondents

IT-Based Library Source and Facilities	N	Chi-Square	Kendall's tau-b
Automated library catalogue	149	X^2=10.451 *df*=4, *p*=.033	K. tau-b=.166 *p*=.018
In-house information databases	181	X^2=10.693 *df*=4, *P*=.030	K. tau-b=.178 *p*=.008
CD-ROM databases and products	197	X^2=4.320 *df*=4, *P*=.364	K. tau-b=.013 *p*=.843
Online local and inter-national databases and sources	156	X^2=7.461 *df*=4, *P*=.113	K. tau-b=.174 *p*=.020

7.5.3 Relationship between the Use of IT-based Library Sources and the Library Use Skills of Respondents

The library use skills of respondents were cross-tabulated with their use of IT-based library sources and facilities and the Kendall's tau-b test was used to investigate if any relationship existed between them (Table 7.20). Data was collapsed for both the variables as almost all IT-sources had over 20 percent of the cells with an expected count of less than 5. A relationship was found between the library use skills of respondents and their use of various IT-based library sources and facilities. It appeared that individuals with better library use skills are likely to use IT-based information sources and facilities more frequently.

Table 7.20
Use of IT-Based Library Sources and Library Use Skills of Respondents

IT-Based Library Source and Facilities	N	Chi-Square	Kendall's tau-b
Automated library catalogue	149	X^2=11.332 *df*=4, *p*=.023	K. tau-b=.193 *p*=.008
In-house information databases	180	X^2=16.642 *df*=4, *p*=.002	K. tau-b=.173 *p*=.019
CD-ROM databases and products	197	X^2=20.785 *df*=4, *p*=.000	K. tau-b=.258 *p*=.000
Online local and international databases and sources	155	X^2=9.633 *df*=4, *p*=.047	K. tau-b=.208 *p*=.003
Microform collection	188	X^2=8.238 *df*=4, *p*=.083	K. tau-b=.176 *p*=.007
Audio-visual and multimedia collections	176	X^2=8.574 *df*=4, *p*=.073	K. tau-b=.144 *p*=.040

7.5.4 Relationship between the Use of IT-based Library Source and Age of Respondents

Table 7.21 presents the distribution of respondents belonging to different age groups, based on the median value for the use of each IT-based library source. The Median test was used to investigate if any relationship existed between age groups of respondents and their use of IT-based library sources and facilities. It was found that for all IT-based sources, except microform and audio-visual collections, respondents in the age groups '30 years or below' and '31-40 years' were the most frequent users. However, the Median test only showed significant differences for the use of OPAC by respondents belonging to different age groups.

Table 7.21
Use of IT-Based Library Sources and Age Groups of Respondents

		Age Group			
		30 or below	31-40 year	41-50 year	51 and above
Automated lib catalogue OPAC	> Median	9	29	29	1
	<= Median	7	12	58	6
In-house info databases	> Median	7	15	23	2
	<= Median	13	33	85	5
CD-ROM databases	> Median	10	19	39	1
	<= Median	13	32	78	7
Online databases and sources	> Median	8	19	28	2
	<= Median	13	20	62	5
Microform collection	> Median	6	10	30	2
	<= Median	16	35	85	7
AV & multimedia collection	> Median	4	10	25	3
	<= Median	17	33	80	6

Test Statistics

	OPAC	In-house databases	CD-ROM databases	Online databases	Microform collection	AV and multimedia
N	151	183	199	157	191	178
Median	1.00	2.00	2.00	1.00	1.00	1.00
Chi-Square	19.237	2.808	2.766	3.859	.352	.720
df	3	3	3	3	3	3
p	.000	.422	.429	.277	.950	.869

7.5.5 Relationship between the Use of IT-based Library Sources and Gender of Respondents

Table 7.22 shows the relationship between gender of respondents and their use of IT-based sources and facilities. It was found that female respondents were comparatively more frequent users of certain IT-sources and facilities such as OPACs, CD-ROM, online sources and microform collections while male respondents were using in-house databases and audio-visual collections more frequently. However, the Mann-Whitney U test showed no significant difference between respondents from both genders for their use of IT-based sources and facilities.

Table 7.22
Use of IT-Based Library Sources and Gender of Respondents

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Automated lib catalogue OPAC	Male	107	72.86	7796.50
	Female	41	78.77	3229.50
	Total	148		
In-house info databases	Male	129	91.62	11818.50
	Female	50	85.83	4291.50
	Total	179		
CD-ROM databases	Male	136	92.85	12627.00
	Female	59	109.88	6483.00
	Total	195		
Online databases and sources	Male	108	74.56	8052.00
	Female	45	82.87	3729.00
	Total	153		
Microform collection	Male	134	92.68	12419.50
	Female	53	97.33	5158.50
	Total	187		
AV & multimedia collection	Male	129	89.66	11565.50
	Female	46	83.36	3834.50
	Total	175		

Test Statistics

	OPAC	In-house databases	CD-ROM databases	Online sources	Microform collection	AV nd multimedia
Mann-Whitney U	2018.500	3016.500	3311.000	2166.000	3374.500	2753.500
Wilcoxon W	7796.500	4291.500	12627.000	8052.000	12419.500	3834.500
Z	-.775	-.692	-1.980	-1.105	-.563	-.771
Asymp. Sig. (2-tailed)	.438	.489	.048	.269	.573	.441

7.5.6 Relationship between the Use of IT-based Library Sources and Participation in User Education Programmes

It was found that those respondents who had participated in user education programmes were comparatively more frequent users of certain IT-based library sources and facilities (Table 7.23). However, the Mann-Whitney U test showed significant differences between both categories of respondents for their use of in-house databases, online databases and sources, and microform collections. It may be concluded that user education programmes are likely to help improve the use of certain IT-based sources and facilities.

Table 7.23
Use of IT-Based Library Sources and Participation in User Education Programmes

Ranks

	User Education	N	Mean Rank	Sum of Ranks
Automated lib catalogue OPAC	No	67	68.22	4571.00
	Yes	83	81.37	6754.00
	Total	150		
In-house info databases	No	83	78.71	6533.00
	Yes	98	101.41	9938.00
	Total	181		
CD-ROM databases	No	90	91.61	8244.50
	Yes	108	106.08	11456.50
	Total	198		
Online databases and sources	No	62	56.39	3496.00
	Yes	94	93.09	8750.00
	Total	156		
Microform collection	No	83	83.30	6914.00
	Yes	106	104.16	11041.00
	Total	189		
AV & multimedia collection	No	78	85.96	6704.50
	Yes	99	91.40	9048.50
	Total	177		

Test Statistics

	OPAC	In-house databases	CD-ROM databases	Online sources	Microform collection	AV nd multimedia
Mann-Whitney U	2293.000	3047.000	4149.500	1543.000	3428.000	3623.500
Wilcoxon W	4571.000	6533.000	8244.500	3496.000	6914.000	6704.500
Z	-1.905	-2.998	-1.810	-5.193	-2.766	-.747
Asymp. Sig. (2-tailed)	.057	.003	.070	.000	.006	.455

7.6 Access to the Internet

The use of Internet in Malaysian libraries is in its infancy. At the time of this survey most public sector organisations were either considering or in the process of getting access to the Internet. One hundred and twenty (52.4%) respondents reported that they had access to the Internet (Table 7.24). Some of the respondents mentioned that they were expecting to get access to the Internet soon. However, considerable variation was observed between the participating institutions in providing access to the Internet. Over 90 percent of the respondents from FRIM reported having access to the Internet, followed by nearly 83 percent from PORIM. Respondents having access to the Internet from UPM and MARDI were 61 percent and 42.9 percent respectively. None of the RRIM respondents had access to the Internet at the time of this survey.

Table 7.24
Access to the Internet by Institutional Affiliation of the Respondents
N=229

Access to Internet	UPM (N=59)	MARDI (N=84)	PORIM (N=24)	RRIM (N=32)	FRIM (N=30)	Total (N=229)
Available	36 (61.0%)	36 (42.9%)	20 (83.3%)	-	28 (93.3%)	120 (52.4%)
Unavailable	23 (39.0%)	48 (57.1%)	4 (16.7%)	32 (100%)	2 (6.7%)	109 (47.6%)

However during interviews, it was noted that this situation has altogether changed and now almost all respondents, including those from RRIM, have access to the Internet. It was also observed that now, a majority of the respondents have either a microcomputer on their office desk or an easy access to one. Similarly, most of them have personal computers at their home, many connected to the Internet.

7.6.1 Use of the Internet Sources and Services

Among the Internet sources and services, e-mail was the most popular application and was being used by 110 (91.7%) respondents having access to the Internet (Table 7.25). Slightly over 34 percent of the participants were using the Internet-based electronic information sources such as electronic journals, content pages, etc. Other Internet sources and services used by the respondents

were: access to library catalogues (25.8% respondents); homepages of local and overseas universities (22.5% respondents); and file transfer through the 'ftp' (13.3% respondents).

Table 7.25
Use of Internet Sources and Services
N=120

Internet Sources and Services	Using	Not Using
Electronic Mail	110 (91.7%)	10 (8.3%)
Internet-based Electronic Information Sources (electronic journals, content pages, etc.)	41 (34.2%)	79 (65.8%)
Access to Library Catalogues of Local/ Overseas Universities and Research Institutions	31 (25.8%)	89 (74.2%)
Home Pages of Local and Foreign University and Research Institutions	27 (22.5%)	93 (77.5%)
File Transfer through 'ftp'	16 (13.3%)	104 (86.7%)
Access to Online Services	14 (11.7%)	106 (88.3%)
Electronic Bulletin Board and Discussion Groups	13 (10.8%)	107 (89.2%)

A further analysis of the use of Internet-based sources and services showed that the e-mail facility was equally popular among participants from all institutions (Table 7.26). Over 46 percent of the respondents from FRIM and 36.1 percent from UPM were using the Internet-based electronic information sources. The MARDI respondents used these resources the least (25%). Searching of OPACs of local and foreign universities and research institutions was most popular among the PORIM respondents (40.0%), followed by FRIM respondents (32.1%). Access to the homepages of local and foreign universities and institutions was equally popular among respondents from PORIM and UPM. This source of information was least popular among the MARDI respondents.

Table 7.26
Use of Internet-Based Sources and Services by Institutional Affiliation of the Respondents

N=120

Internet Sources and Services	UPM N=36	MARDI N=36	PORIM N=20	FRIM N=28
Electronic Mail	33 (91.7%)	33 (91.7%)	18 (90.0%)	26 (92.9%)
Internet Based Electronic Information Sources	13 (36.1%)	9 (25.0%)	6 (30.0%)	13 (46.4%)
Access to Library Catalogues of Local/ Overseas University and Research Inst.	9 (25.0%)	5 (13.9%)	8 (40.0%)	9 (32.1%)
Home Pages of Local and Foreign University and Research Institutions	11 (30.6%)	3 (8.3%)	6 (30.0%)	6 (21.4%)
File Transfer through 'ftp'	3 (8.3%)	6 (16.7%)	2 (10.0%)	5 (17.9%)
Access to Online Services	3 (8.3%)	3 (8.3%)	3 (15.0%)	5 (17.9%)
Electronic Bulletin Boards and Discussion Groups	4 (11.1%)	2 (5.6%)	2 (10.0%)	5 (17.9%)

During interviews it was noted that almost all interviewees were using e-mail frequently for both formal and informal communication with their fellow scientists and other individuals. However, it may be interesting to note that a majority of these respondents did not reply to the e-mail sent by this researcher for making interview appointments. Most of these interviewees expressed their ignorance about receiving any such e-mail, though many admitted that they had not checked their mail for the last several days. It may be concluded that most of the respondents were aware of the potential of e-mail but were using it infrequently, probably due to the low volume of e-mail transactions currently handled by them.

During interviews, several individuals also mentioned that they were using electronic journals and content pages. However, a majority of them could not name any specific electronic journal or the source of content pages. They might have come across such sources accidentally while surfing through the Net, but were not particularly familiar with a specific source.

It may be concluded that a majority of the respondents now have access to the Internet but its use is mainly limited to e-mail communications. It was observed that they navigate through the Internet occasionally to find out what is available in their disciplines. However, it was felt that a majority of them were not fully

exposed to a variety of information sources and facilities available through the Internet. However some respondents, well exposed to the Internet sources and facilities, complained that often the information available through the Internet was very elementary in nature, usually targeting the general public and not researchers. They also pointed out that almost all good sites were fee-based and thus cumbersome and expensive for them to register with and use.

The observations about the use of IT-based library sources and the Internet are summarised below:

1. Use of most IT-based library sources and facilities was quite low among the respondents although nearly 75 percent of them possessed good or better computing skills.
2. A high number of participants either did not respond to the question related to the use of IT-based sources and facilities or reported that these were not available to them. This low awareness might be due to inadequate promotional activities undertaken by their library.
3. Significant differences were found among respondents from various institutions towards their use of most IT-based sources and facilities. It was also found that those respondents who had participated in user education programmes were comparatively more frequent users of the IT-based facilities.
4. A relationship was also found between the use of IT-based sources and facilities and computing and library use skills of respondents. It means that a computer and library literate individual is likely to use IT-based library sources and facilities more frequently.
5. No relationship was found between the use of IT-based library sources and facilities and the age group and gender of the respondents.
6. Most of the participants had access to the Internet. However, e-mail was the only popular Internet application being used frequently. The use of other Internet based sources and services was very low.

7.7 Summary

A majority of the respondents (79.7%) had good or better library use skills. Similarly, over 74 percent of the respondents possessed good or better computing skills. Irrespective of their institutional affiliation, the respondents possessed almost the same level of library use and computing skills. It was also found that in spite of having good computing skills, the use of IT-based library sources and facilities was quite low. However, a relationship was found between the level of computing skills of the respondents and their use of IT-based sources and facilities. It was also found that e-mail was the most popular Internet application whereas other Internet-based sources and applications were used infrequently.

The next chapter will provide data on library and information use pattern of the respondents. Data on the relative importance attached to various information sources by the respondents will also be presented.

8. Information Needs, Library and Information Use Pattern

8.1 Introduction

Adequate knowledge about the information needs and seeking behaviour of the participants is desirable to properly understand their responses about library effectiveness. This chapter provides data on library and information use pattern of the respondents. It covers topics such as the information needs of respondents; office time spent by them on various activities including reading and literature searching; methods used for getting information from the library; library location; frequency of library visits; and occasions when library was extensively used. Data on the importance attached by the respondents to different information sources and their ability to keep in touch with scientific literature is also presented. Several cross-tabulations are performed to investigate the relationships between different variables.

8.2 Information Needs

This section deals with the information needs of respondents. Data for this purpose was collected through additional interviews with the respondents at each participating institution. Interviewees were asked to describe their information needs for performing different tasks. It was noted that participants had different information needs at different stages of their research projects such as during identification of their research topics and appropriate methodologies, during execution of research, and while reporting their research results.

8.2.1 Information Needs for the Identification of Research Topics

Almost all research institutions in Malaysia including agriculture, forestry and livestock get public funding for their research projects through the Committee on the Intensification of the Research in Priority Areas (IRPA). All interviewees mentioned that they select their research topics in line with IRPA priority areas.

For this purpose IRPA seeks help from a panel of experts to identify priority research areas for each discipline. For agriculture sector, beside researchers and academicians, representation is also given to certain other groups such as agriculture extension workers, farmer associations, agriculture-based industries, etc. Interviewees mentioned that for developing research proposals, they needed information on priorities set by IRPA for awarding new research projects. They pointed out that personal contacts with key individuals in the relevant ministries and other concerned agencies were often useful in getting information on current IRPA policies and priorities. Usually such information is not readily available through normal office channels.

Interviewees pointed out that they also needed information on problems currently faced by the farming community, which in certain situations helped them in identifying their research topics. For this purpose, they often interact and get feedback from extension workers, farmers, and farmer associations at different occasions. Information technology has also helped foster a closer link between the farming community and researchers. One such example is *TaniNet*[1], an interactive web-based advisory service for Malaysian farmers. The Farmers' Organisation Authority (FOA), a co-sponsor of this pilot web-site with over 12,800 members, has initially established five centres in Selangor State for its members to access this web-site (NST, 1999). Farmers can use these centres to ask online questions or send e-mail to agricultural scientists for their expert advice on problems encountered by them.

Interviewees also mentioned that for selecting their research topics and to avoid duplication of research efforts, they often needed information on ongoing and completed research projects in their specific areas of interest. Although some institutions have established their in-house databases to keep track of such projects, all interviewees expressed the need for developing a comprehensive national-level database on research projects. Six interviewees, with less than five years' research experience, revealed that they also consulted senior colleagues for the identification of their research topics and for seeking information on appropriate methodologies.

[1] <www.tropbio.com.my>

Another vital area of information need, as pointed out by almost all interviewees, was the identification of research methodologies used by earlier researchers. Research reports and journal articles were considered useful for this purpose. Interaction with professional colleagues, particularly during conferences and meetings, was considered an important source for knowing current areas of research, methodologies used and major research findings. Some interviewees pointed out that through these informal communication channels they usually get up-to-date information immediately, even before it is published. They also mentioned that as Malaysia is a small country, they do not find much difficulty in identifying other researchers in their area of specialisation. However, they expressed the need for a database of agricultural experts in ASEAN region to encourage interaction among them.

8.2.2 Information Needs for Project Implementation and Monitoring

Interviewees revealed that during implementation of their research projects, in addition to information on experiment designs, procedures and methodology, they often needed information on approved government contractors for the purchase of equipment, chemicals and other research related products and supplies. They also needed information on current government directives and policies on expenditures, purchases, recruitment of research and support staff, etc. Five interviewees mentioned that occasionally they needed more detailed information on the use of certain specialised equipment or procedures. They considered equipment suppliers as a useful source in this regard. One RRIM researcher, working on rubber glove allergy, mentioned that she often needed information on medical explanations for various types of skin allergies and reactions. For this purpose she frequently contacted dermatologists in a local hospital to get the needed information.

Four interviewees with administrative responsibilities (one dean, one head of an academic department and two heads of research divisions) needed information on research projects under their control to effectively monitor their progress. They often needed information on the project objectives, funding source, principal investigator and co-researchers, implementation status, salient findings, project publications, and new techniques or technologies developed.

They also mentioned that for efficient project monitoring and to avoid research duplication, in addition to information on completed and on-going research projects within their own faculty/division, they also needed this information from other divisions within the organisation and from other scientific institutions. They reiterated the need for the establishment of a national-level database on research projects.

8.2.3 Information Needs for the Dissemination of Research Findings

Interviewees indicating their information needs for reporting research results mentioned that in addition to research articles, conference papers, research reports, etc. used by them for literature review, they also needed some background information for writing the introductory part of their progress reports and articles. For this purpose they usually needed information on current agriculture related problems, basic crop statistics (per unit yield, total area under a crop, total production, etc.), information on general economic scenario of the country, agriculture-related import/export statistics, market intelligence data, etc. They reported using a variety of formal and informal sources to get the needed information.

Another important area that was considered crucial by interviewees was technology transfer to farmers and agriculture-based industries. The information needed related to the demographic characteristics of those farmers (i.e., their location, type and size of farm, crops planted and yields, farm manpower and equipment, etc.) who were willing to embrace new techniques or were ready to co-operate by allowing researchers to use their land to demonstrate newly developed techniques. They also needed information on agriculture-based industries in their areas of specialisation to market newly developed technologies. Although a few research divisions maintained such lists, they did not consider them up-to-date and complete.

8.2.4 Information Needs for Instruction

Four UPM respondents participating in interviews were asked if they had certain specific information needs for classroom instruction. It was noted that for developing new course outlines or to modify the existing ones, they needed

information on topics covered by similar courses in other local and overseas academic institutions. Availability of this information through the Internet has helped them a great deal. They also needed information on latest information sources to be included in their course reading lists. Besides using their personal and library collections, they felt that direct contacts with local booksellers and access to publishers' catalogues were very useful for this purpose. Regarding assigning topics to students for their course projects and thesis research, all UPM interviewees mentioned that they usually determine these topics based on their personal knowledge and interest. However, they agreed that availability of information on projects and thesis research undertaken by students in other academic institutions would considerably reduce the duplication of effort.

As a result of interviews conducted with respondents to determine their information needs, it appeared that they have diverse information needs to perform different tasks. It was worth noting that, in addition to formal information sources usually made available by libraries, they used a variety of information channels to effectively perform their duties. Professional colleagues and peers were considered an important source for meeting some of these needs. However, certain information needs identified by the interviewees can only be met effectively by developing appropriate in-house databases. Data on importance attached to various formal and informal information sources by the respondents is presented in the following section.

8.3 Relative Importance of Different Information Sources

The opinion of respondents was sought regarding the relative importance of various information sources in keeping themselves up-to-date with current scientific developments. A list of possible information sources was provided in the questionnaire and the respondents were asked to assign a value to each source from a five-point Likert scale. An open-ended option was also provided to accommodate other possible information sources considered important by the respondents.

It was found that of the 229 respondents, 204 (89%) considered journal articles as either 'extremely important' or 'very important' in keeping themselves up-to-

date about current developments in their areas of interest (Table 8.1). One hundred seventy (75.6%) respondents assigned the same importance to "review articles". Interaction with professional colleagues was considered as the third most important source as 158 (69.3%) respondents considered them as 'extremely important' or 'very important' for keeping themselves in touch with current scientific developments.

The next two information sources in the list were 'conference abstracts and proceedings' and 'professional meetings, talks, and workshops' where 63.6 percent and 59 percent of the respondents respectively considered them 'extremely important' or 'very important'. On the other hand, 'newsletters', 'bibliographies' and 'theses' were assigned comparatively less importance as 28.7%, 30.2% and 36.6% of the respondents respectively considered them either 'sometimes important' or 'not important' at all in keeping them up-to-date about current scientific developments. In response to an open-ended option for this question, some participants mentioned that the Internet, visits to different research institutions and agriculture-based industries, and science columns in newspapers were also important for them in getting the current scientific information.

Table 8.1
Relative Importance of Different Information Sources

Information Source	N	Extremely Important	Very Important	Important	Sometimes Important	Not Important
Journal Articles	229	143 (62.4)	61 (26.6)	18 (7.9)	4 (1.7)	3 (1.3)
Review Articles	225	81 (36.0)	89 (39.6)	42 (18.7)	9 (4.0)	4 (1.8)
Interaction with Professional Colleagues	228	76 (33.3)	82 (36.0)	54 (23.7)	13 (5.7)	3 (1.3)
Conference Abstracts and Proceedings	225	47 (20.9)	96 (42.7)	63 (28.0)	19 (8.4)	-
Professional Meetings/ Talks/ Workshops	227	59 (26.0)	75 (33.0)	68 (30.0)	21 (9.2)	4 (1.8)
Sources of Current Contents	215	52 (24.2)	66 (30.7)	68 (31.6)	24 (11.2)	5 (2.3)
Research Reports/ Patents/ Fact Books	224	36 (16.1)	79 (35.3)	71 (31.7)	33 (14.7)	5 (2.2)
Indexing and Abstracting Journals	213	58 (27.2)	43 (20.2)	74 (34.7)	32 (15.0)	6 (2.8)
Books	224	26 (11.6)	73 (32.6)	93 (41.5)	25 (11.2)	7 (3.0)
Newsletters	223	24 (10.8)	48 (21.5)	87 (39.0)	57 (25.6)	7 (3.1)
Bibliographies	215	14 (6.5)	49 (22.8)	87 (40.5)	54 (25.1)	11 (5.1)
Theses/ Dissertations	224	16 (7.1)	42 (18.7)	84 (37.5)	67 (29.9)	15 (6.7)

It was observed that the respondents considered primary sources of information as more important in keeping them up-to-date with the current scientific developments. Another source that was considered important was formal or informal interaction with professional colleagues at different occasions including professional meetings, talks, workshops, etc. Some secondary sources of information such as sources of current contents and indexing and abstracting journals were considered relatively less important. Reference tools and monographs (such as fact books, reports, patents, books and bibliographies), theses and dissertations, etc., were considered the least important by the respondents in getting current information.

8.3.1 Relative Importance of Different Information Sources and Institutional Affiliation of Respondents

Table 8.2 provides data on the relative importance of different information sources, based on Kruskal-Wallis test, as perceived by the respondents from different institutions. It was found that irrespective of their institutional affiliation, participants from all institutions considered journal articles as the most important source of current information. However, significant differences were found among the participants from different institutions for the level of importance assigned to journal articles.

Table 8.2
Relative Importance Assigned to Different Information Sources by Respondents from Different Institutions

Ranks

Information Source	Institution					Chi-square
	UPM	MARDI	PORIM	RRIM	FRIM	
Journal Articles	135.38 (N=60)	105.65 (N=84)	113.25 (N=24)	91.64 (N=32)	127.14 (N=29)	X^2=16.716 *df*=4 *p*=.002
Review Articles	122.72 (N=59)	114.10 (N=83)	107.90 (N=24)	107.85 (N=31)	99.32 (N=28)	X^2=3.296 *df*=4 *p*=.510
Interaction with Professional Colleagues	112.36 (N=60)	116.45 (N=84)	114.29 (N=24)	114.29 (N=32)	113.98 (N=28)	X^2=.155 *df*=4 *p*=.997
Conference Abstracts and Proceedings	96.19 (N=58)	131.23 (N=82)	95.83 (N=24)	107.44 (N=32)	115.41 (N=29)	X^2=13.745 *df*=4 *p*=.008
Professional Meetings/ Talks/ Workshops	114.59 (N=59)	121.50 (N=84)	104.98 (N=23)	109.27 (N=32)	103.45 (N=29)	X^2=2.666 *df*=4 *p*=.615
Sources of Current Contents	116.49 (N=56)	113.42 (N=79)	102.83 (N=24)	93.10 (N=29)	95.13 (N=27)	X^2=5.003 *df*=4 *p*=.287

Table 8.2 (continued)

Information Source	Institution					Chi-square
	UPM	MARDI	PORIM	RRIM	FRIM	
Research Reports/ Patents/ Fact Books	97.28 (N=58)	124.02 (N=81)	115.40 (N=24)	118.08 (N=32)	102.21 (N=29)	X^2=7.393 *df*=4 *p*=.117
Indexing & Abstracting Journals	109.43 (N=58)	113.08 (N=77)	104.07 (N=23)	95.17 (N=29)	99.35 (N=26)	X^2=2.550 *df*=4 *p*=.636
Books	125.70 (N=56)	102.47 (N=83)	108.27 (N=24)	109.89 (N=32)	122.10 (N=29)	X^2=5.726 *df*=4 *p*=.221
Newsletters	108.06 (N=57)	125.08 (N=84)	91.13 (N=24)	103.14 (N=29)	108.00 (N=29)	X^2=7.488 *df*=4 *p*=.112
Bibliographies	106.87 (N=54)	115.80 (N=80)	81.55 (N=22)	102.82 (N=30)	114.02 (N=29)	X^2=6.331 *df*=4 *p*=.176
Theses/ Dissertations	120.46 (N=58)	108.52 (N=82)	132.88 (N=22)	87.58 (N=31)	123.62 (N=29)	X^2=9.262 *df*=4 *p*=.045

Two other information sources showing significant differences among the participants from different institutions were conference abstracts/proceedings and theses. All other information sources did not show any significant differences among the respondents from different institutions, meaning that the level of importance assigned to these sources was comparable.

It may be concluded that most of the respondents preferred to use the same types of information material to support their research, teaching and other related assignments. A majority of them perceived primary sources of information as more important for keeping them up-to-date with current scientific developments. It was equally worth noting that interaction with professional colleagues was considered as an important source for information sharing. It is, therefore, important for agricultural libraries, besides strengthening their information resources, to also consider organising certain programmes in their premises to provide an opportunity for scientists to socialise and informally share information with their professional colleagues.

8.4 Use of Office Time on Various Activities

Respondents were asked to indicate the amount of office time they normally spend on various activities. It was assumed that this data would be useful in investigating its relationship with the use of library resources and services. It

was also assumed that office time devoted to various activities by a university faculty might be different from that of scientists of research institutions. It was, therefore, considered desirable to treat these two categories of respondents separately.

Table 8.3 shows the amount of office time spent by respondents from UPM on various activities. About one-quarter of the UPM respondents were spending less than 30 percent of their office time in teaching. A majority of these individuals was performing certain administrative functions such as deanship, deputy deanship, department headship, etc. Over 63 percent of the UPM academicians reported that they spent 31 to 50 percent of their office time in teaching. On the average, UPM faculty members were spending 43.3 percent of their office time in teaching.

All the UPM respondents were devoting part of their office time for research purposes. Apart from the universally accepted norm of 'publish or perish' for academicians, one possible reason for involvement of all faculty members in research could be that the majority of post-graduate degrees offered by UPM were research based. On the average, the UPM respondents were spending 28.9 percent of their office time on research and 9.3 percent time on management related activities.

Table 8.3
Office Time Spent on Various Activities by UPM Respondents
N=60

Time (%)	Teaching	Research	Management	Reading/ Literature Searching	Other Activities
None	-	-	3 (5.0%)	6 (10.0%)	46 (76.7%)
1-10	1 (1.7%)	4 (6.7%)	22 (36.7%)	43 (71.7%)	11 (18.3%)
11-20	1 (1.7%)	12 (20.0%)	26 (43.3%)	11 (18.3%)	2 (3.3%)
21-30	12 (20.0%)	29 (48.3%)	6 (10.0%)	-	1 (1.7%)
31-40	17 (28.3%)	13 (21.7%)	2 (3.3%)	-	-
41-50	21 (35.0%)	2 (3.3%)	1 (1.7%)	-	-
51 +	8 (13.3%)	-	-	-	-
Mean Time (Std. Dev.)	**43.3% (11.9)**	**28.9%) (9.6)**	**15.9% (9.7)**	**9.3% (5.4)**	**2.6% (5.9)**

It was observed that 10 percent of the respondents from UPM were not spending any of their office time on reading and literature searching. They might be doing some of their reading at home. Nearly 72 percent of the

participants devoted up to 10 percent of their office time to reading and literature searching. On the average, UPM respondents were spending 9.3 percent of their office time on reading and literature searching.

Time spent on different activities by respondents from the four research institutions is presented in Table 8.4. Ninety-one (53.2%) of the participants were involved in certain teaching activities. A majority of them was engaged in conducting workshops and training courses for their fellow scientists, agricultural extension workers, farmers, and individuals associated with agro-based industries. Of these 91 respondents, nearly 86 percent was spending up to 10 percent of their office time on instructional purposes. On average, respondents from research institutions were spending 54.8 percent of their office time on research and 18.3 percent on management related activities.

Table 8.4
Time Spent on Various Activities by Respondents from Research Institutions (MARDI, PORIM, RRIM and FRIM)
N=171

Time (%)	Teaching	Research	Management	Reading/ Literature Searching	Other activities
None	80 (46.8%)	3 (1.8%)	13 (7.6%)	15 (8.8%)	111 (64.9%)
1-10	78 (45.6%)	9 (5.3%)	78 (45.6%)	60 (35.1%)	39 (22.8%)
11-20	12 (7.0%)	7 (4.1%)	42 (24.6%)	63 (36.8%)	9 (5.3%)
21-30	1 (0.6%)	12 (7.0%)	19 (11.1%)	26 (15.2%)	5 (2.9%)
31-40	-	8 (4.7%)	5 (2.9%)	5 (2.9%)	1 (0.6%)
41-50	-	31 (18.1%)	4 (2.3%)	2 (1.2%)	2 (1.2%)
51 +	-	101 (59.0%)	10 (5.9%)	-	4 (2.4%)
Mean Score (Std. Dev.)	**4.6% (5.9)**	**54.8% (20.5)**	**18.3% (17.5)**	**16.0% (9.8)**	**6.3% (13.08)**

Data analysis revealed that respondents affiliated with research institutions were, on the average, spending 16 percent of their office time on reading and literature searching as compared to 9.3 percent by the UPM respondents. The t-test showed very high significant differences between respondents from UPM and those belonging to research institutions with regard to the amount of time spent on reading and literature searching (t=5.042, df=229, p=.000). This means that working scientists spend more time on reading and literature searching as compared to academicians. However, during interviews with the academic staff, it appeared that they often ask their graduate students or para-professional staff to collect materials for them from the library.

Of the 234 respondents, 74 (31.6%) reported spending part of their time on certain other activities. The most popular activity was consultancy and advisory services provided to public and agro-based industries. Of the 74 respondents, 30 (40.5%) reported that they were spending 10-20 percent of their time on providing such consultancy services. Another 27 (36.5%) participants were spending 15-20 percent of their time on agricultural extension activities and technology transfer to farmers. Four respondents, holding certain positions in professional associations, mentioned that they spent about 10-20 percent of their time on works related to these associations. Some other activities mentioned by the respondents included preparation of research exhibitions, public relations, etc.

8.5 Library Use Patterns

This section deals with information seeking patterns of respondents, covering the ways library collections were used, frequency of their library visits, and use of other libraries. Data were also analysed about occasions when respondents used their library heavily.

8.5.1 Methods Used for Getting Information from the Library

Respondents were asked to indicate as to how they get the needed information from their library. The purpose was to find out whether respondents prefer visiting the library personally or use other options for getting the needed information. It was found that all participants visited their library, though with varied frequencies. Of the 234 respondents, 78 (33.3%) visited their library always, 92 (39.3%) frequently and 64 (27.4%) occasionally (Table 8.5).

Table 8.5
Methods Used for Getting Information from the Library

Method	N	*Visit Frequency*			
		Always	Frequency	Occasionally	Never
Going to Library Themselves	234	78 (33.3%)	92 (39.3%)	64 (27.4%)	-
Sending Junior Professionals	178	4 (2.2%)	17 (9.6%)	66 (37.1%)	91 (51.1%)
Sending Para-professionals	179	4 (2.2%)	28 (15.7%)	61 (34.1%)	86 (48.0%)
Calling the Library	182	1 (0.5%)	17 (9.4%)	113 (62.1%)	51 (28.0%)
Writing to the Library	164	-	9 (5.5%)	74 (45.1%)	81 (49.4%)

One hundred and seventy-eight (76.1%) participants responded to the method 'sending junior professional' to the library to get the needed information for them. Of these respondents, 4 (2.2%) sent their junior professionals always, 17 (9.6%) frequently and 66 (37.1%) occasionally. The remaining 91 (51.1%) of these respondents reported that they never send their junior professionals to get information for them. A similar pattern was observed for the method 'sending para-professionals'. Of the 179 respondents, 86 (48.0%) reported that they never used this method.

One hundred and eighty-two participants responded to the option 'calling the library' for acquiring the needed information. Of these respondents, 1 (0.5%) reported using this method always, 17 (9.4%) frequently, and 113 (62.1%) occasionally. A split response was received for the method 'writing to the library'. Of the 164 respondents, 83 (50.6%) mentioned that they used this method for getting the needed information.

Three UPM academicians, in response to an open-ended option for this question, reported that they occasionally used their graduate students for getting information from the library. However during interviews it was interesting to note that of the 16 interviewees from the UPM, 12 (75.0%) mentioned that they occasionally used their students for getting information from the library.

During interviews it was also found that a majority of the respondents personally visit their library when they need to search the library OPAC, scan periodicals, and use other sources for identifying new information on their topics. However, they were using other methods for getting photocopies of articles, checking out books or getting information from other sources already known to them.

8.5.1.1 Information Collection Methods and Institutional Affiliation of Respondents

An institution-wise breakdown of respondents using different methods for getting information from their library is presented in Table 8.6. All participants visited their library in person. Well over one-half of the participants from different institutions, except RRIM and MARDI (out stations), sent their junior

professionals to get the needed information from the library. About one-quarter of the respondents from MARDI (out stations) assigned this work to their junior professionals. The same trend was observed for the option 'sending para-professionals'. About 50 to 68 percent of the respondents from all institutions, except MARDI (out stations), used this method. It is quite natural that individuals from out-stations are less likely to send their junior professionals for getting the needed information from their main library (MARDI headquarters) because this would have financial and administrative implications.

Table 8.6
Breakdown of Respondents for Each Method
(Multiple Response)

Method	UPM	MARDI (Head Office)	MARDI (Out Stations)	PORIM	RRIM	FRIM
Going to Library Themselves	60 (100%) (N=60)	49 (100%) (N=49)	38 (100%) (N=38)	24 (100%) (N=24)	33 (100%) (N=33)	30 (100%) (N=30)
Sending Junior Professionals	25 (58.1%) (N=43)	20 (51.3%) (N=39)	7 (24.1%) (N=29)	12 (57.1%) (N=21)	9 (42.9%) (N=21)	14 (56.0%) (N=25)
Sending Para-Professionals	32 (68.1%) (N=47)	21 (52.5%) (N=40)	3 (10.3%) (N=29)	13 (68.4%) (N=19)	10 (50.0%) (N=20)	14 (58.3%) (N=24)
Calling the Library	33 (76.7%) (N=43)	24 (61.5) (N=39)	15 (53.6%) (N=28)	16 (76.2%) (N=21)	18 (81.8%) (N=22)	24 (82.8%) (N=29)
Writing to the Library	14 (37.8%) (N=37)	14 (36.8%) (N=38)	23 (76.7%) (N=30)	11 (68.8%) (N=16)	10 (50.0%) (N=20)	11 (47.8%) (N=23)

It was observed that from 76 to nearly 83 percent of the respondents from UPM, PORIM, RRIM and FRIM called their library to get the needed information. On the contrary, 61.5 percent of the respondents from MARDI (head office) and 53.5 percent from MARDI (out stations) used this method. One possible reason for a small number of respondents from MARDI (out stations) using this option might be due to the high cost of long-distance calls. An opposite pattern was observed for the method 'writing to the library' to get the required information. The highest number of respondents using this method was from MARDI (out stations). It was also observed that a small number of the UPM respondents (37.8%) wrote to their library as compared to respondents from research institutions (54.3%). Different methods used by the respondents for getting information from their library were also cross-tabulated with their job titles. No

clear trend was observed among the respondents with different job titles for using these methods.

It appeared that a majority of the participants preferred to visit their library personally, though the frequency of library visits varied for different agricultural institutions. It was also observed that the UPM respondents were the least frequent visitors of their library. They preferred sending their junior professionals, para-professionals, laboratory technicians and postgraduate students for getting information for them. This finding is supported by the fact that UPM participants spent on average 9.3 percent of their office time on reading and literature searching as compared to 16 percent by respondents from research institutions (Tables 8.3 and 8.4). Other methods of obtaining information from the library were relatively less popular among the respondents.

8.5.2 Library Location

Respondents were asked if the location of their library was convenient for them for visiting and using library collections and facilities. All the respondents from PORIM and FRIM felt that the location of their library was convenient (Table 8.7). A majority of the respondents from UPM and MARDI (head office) shared this opinion. One-third of the participants from RRIM considered the location of their library as inconvenient. Over one-half of the out-station respondents from MARDI quite naturally considered the location of their main library as inconvenient.

Table 8.7
Location of the Library
N=233

Library Location	UPM	MARDI (Head Office)	MARDI (Out Station)	PORIM	RRIM	FRIM
Convenient	55 (91.7%)	44 (89.8%)	18 (48.6%)	24 (100%)	22 (66.7%)	30 (100%)
Inconvenient	5 (8.3%)	5 (10.2%)	19 (51.4%)	-	11 (33.3%)	-

The relationship between perceptions of location of libraries and certain other variables will be dealt with in the relevant sections.

8.5.3 Frequency of Library Visits

Table 8.8 presents information on library visits by the participants. They were asked how frequently they normally visited their library. One hundred and two (43.8%) respondents reported that they visited their library 'at least once or twice a week'. Another 33.9 percent of the respondents mentioned that, on the average, they visited their library 'once or twice a month'. Altogether 77.7 percent of the respondents visited their library 'at least once a month'. Of the 8 respondents who visited their library 'once or twice a year' or 'rarely', six belonged to MARDI (3 each from head office and out stations) and one each from UPM and RRIM. Seven of them were research officers and one, an associate professor.

Table 8.8
Frequency of Library Visits
N=233

Visit Frequency	Number	Percentage
Almost Daily	9	3.9
Once or Twice a Week	93	39.9
Once or Twice a Month	79	33.9
Several Times a Year	44	18.9
Once or Twice a Year	5	2.1
Rarely	3	1.3
Total	**233**	**100**

8.5.3.1 Relationship between Frequency of Library Visits and Institutional Affiliation of Respondents

Respondents from the participating institutions demonstrated different patterns of library visits. Two-thirds of the respondents from FRIM and PORIM were visiting their library 'at least once a week' (Table 8.9). Nearly 42 percent of the respondents, each from UPM and MARDI (head office), exhibited a similar frequency of library visits. On the other hand, only 21.6 percent of the participants from MARDI (out stations) were visiting their central library 'once or twice a week'. One possible reason for fewer library visits by these individuals may be attributed to the long distance of some MARDI out-stations from the central library.

The Chi-square test was administered to find out if significant differences existed among participants from different institutions for their library visits. In order to remove 16 (53.5%) of the cells having an expected count of less than 5, data from the category 'almost daily' were merged with the category 'once or twice a week'. Similarly, data from cells for 'once or twice a year' and 'rarely' were merged with 'several times a year'. The Chi-square test showed high significant differences among respondents from various institutions for their frequency of library visits.

Table 8.9
Frequency of Library Visits and Institutional Affiliation
N=233

Visit Frequency	UPM (N=60)	MARDI (Head Office) (N=49)	MARDI (Out Stations) (N=37)	PORIM (N=24)	RRIM (N=33)	FRIM (N=30)
Twice a Week or Less	25 (41.7%)	21 (42.9%)	8 (21.6%)	16 (66.7%)	12 (36.4%)	20 (66.7%)
Once or Twice a Month	22 (36.7%)	22 (44.9%)	7 (18.9%)	5 (20.8%)	13 (39.4%)	10 (33.3%)
Several Times a Year or Less	13 (21.6%)	6 (12.2%)	22 (59.5%)	3 (12.5%)	8 (24.2%)	-

Chi-square=22.405, *df=8*, *p*=.004

8.5.3.2 Relationship between Frequency of Library Visits and Location of Library

Table 8.10 shows the relationship between frequency of library visits and location of libraries. Ninety-three (48.2%) respondents who perceived location to be 'convenient' reported that they visited their library at least once a week. On the contrary, only 22.5 percent of the respondents who considered the location of their library as 'inconvenient' indicated that they visited the library at least once a week. A majority of the respondents in this category (inconvenient) was visiting their library infrequently. The Chi-square test, after data collapsing to remove 5 (41.7%) of the cells having an expected count of less than 5, showed very high significant differences among both categories of respondents for their frequency of library visits. It means that those patrons who consider the location of their library as convenient, are likely to visit their library more frequently.

Table 8.10
Frequency of Library Visits and Location of Library
N=233

Visit Frequency	Location Convenient (N=193)	Location Inconvenient (N=40)
Twice a Week or Less	93 (48.2%)	9 (22.5%)
Once or Twice a Month	69 (35.8%)	10 (25.0%)
Several Times a Year or Less	31 (16.0%)	21 (52.5%)

Chi-square=25.835, *df=2*, *p*=.000

8.5.3.3 Relationship between Frequency of Library Visits and Age of Respondents

The relationship between frequency of library visits and age of the respondents is presented in Table 8.11. It was found that over 70 percent of the respondents in the age group '30 years or below' visited their library once or twice a week. Nearly one-half of the respondents in the age groups '31-40 years' and '51 years or above' visited their library at least once a week. On the whole, the frequency of library visits generally decreased with increase in age of the respondents. The Chi-square test, after data collapsing to remove 15 (62.5%) of the cells having an expected count of less than 5, showed high significant differences among respondents from different age groups for their frequency of library visits. It appeared that younger scientists are likely to visit their library more frequently as compared to their senior colleagues.

Table 8.11
Frequency of Library Visits and Age Groups of Respondents
N=233

Visit Frequency	*Age Groups*			
	30 years or Below (N=24)	31-40 Years (N=58)	41-50 Years (N=139)	51 Years or Above (N=12)
Twice a Week or Less	17 (70.8%)	28 (48.3%)	51 (36.7%)	6 (50.0%)
Once or Twice a Month	7 (29.2%)	20 (34.5%)	50 (36.0%)	2 (16.7%)
Several Times a Year or Less	-	10 (17.2%)	38 (27.3%)	4 (33.3%)

Chi-square=15.622, *df=6*, *p*=.016

8.5.4 Use of Other Libraries

As all the major agricultural and several academic libraries are located in the Klang Valley, it was probable that besides using their own library, respondents might be visiting other libraries to satisfy their information needs. It was found that among the five agricultural libraries participating in this study, the UPM library was most popular and heavily used by respondents from other

agricultural institutions (Table 8.12). Of the 174 non-UPM respondents, 110 (63.2%) were visiting the UPM library. It was followed by the MARDI library that was used by 27 (18.4%) respondents from other agricultural institutions. The remaining three libraries participating in this survey were less frequently visited by the respondents.

Table 8.12
Use Frequency of Other Libraries
(Multiple Response)
N=197

	Library	(1) Occasionally	(2) Frequently	(3) Always	Total
Agric. Libraries	UPM	76	26	8	110
	MARDI	22	5	-	27
	PORIM	3	1	-	4
	RRIM	2	1	-	3
	FRIM	4	1	-	5
Non-Agriculture Libraries	UKM	26	6	4	36
	UM	31	6	1	38
	NLM	10	1	-	11
	Other Libraries	37	4	-	41

Among the non-agricultural libraries, the University Kebangsaan Malaysia (UKM) and University of Malaya (UM) libraries were more popular. Both universities have strong science faculties, having course-work and research projects on agriculture related topics. As a result, their libraries might have developed good collections in agriculture-related disciplines. This was confirmed during interviews when respondents pointed out that in certain disciplines collections of these libraries were better than their own library.

The National Library of Malaysia (NLM) was visited by eleven participants. University Science Malaysia (USM), located in Penang, was used by 15 respondents from those MARDI out-stations that were located in close proximity to it. Seven respondents reported visiting The British Council Library, located in Kuala Lumpur.

8.5.4.1 Institutional Affiliation of Respondents Using Other Libraries

Only a few respondents from UPM were using collections and facilities of other libraries (Table 8.13). It may be considered as an indirect expression of

satisfaction of UPM respondents with the resources and facilities of their library. On the contrary, of the 87 MARDI respondents, 67 (77.0%) were using the UPM library which is about two kilometers away. Eleven (12.6%) of the MARDI respondents were also using the UKM library. This might be due to a Memorandum of Understanding (MOU) signed by libraries in Bangi-Sardang area to provide special treatment to each other's members. The MARDI respondents from out-stations used the University Science Malaysia (USM) library.

Table 8.13
Use of Agricultural and Other Libraries by Respondents
(Multiple Response)

Library Visited	*Number of Respondents (Percent)*					
	UPM (N=60)	MARDI (N=87)	PORIM (N=24)	RRIM (N=33)	FRIM (N=30)	Total
UPM	//////////	67 (77.0%)	13 (54.2%)	11 (33.3%)	19 (63.3%)	110 (63.2%) (N=174)
MARDI	6 (10.0%)	//////////	-	-	2 (6.7%)	8 (5.4%) (N=147)
PORIM	2 (3.3%)	2 (2.3%)	//////////	-	-	4 (1.9%) (N=210)
RRIM	-	-	2 (8.3%)	//////////	1 (3.3%)	3 (1.5%) (N=201)
FRIM	3 (5.0%)	1 (1.2%)	-	1 (3.0%)	//////////	5 (2.5%) (N=204)
NLM	3 (5.0%)	2 (2.3%)	-	4 (12.1%)	2 (6.7%)	11 (4.7%) (N=234)
UKM	7 (11.7%)	11 (12.6%)	10 (41.7%)	2 (6.1%)	6 (20.0%)	36 (15.4%) (N=234)
UM	8 (13.3%)	6 (6.9%)	5 (20.8)	8 (24.2%)	11 (36.7%)	38 (16.2%) (N=234)
Other Libraries	6 (10.0%)	19 (21.8%)	5 (20.8%)	5 (15.2%)	6 (20.0%)	41 (17.5%) (N=234)

Two academic libraries used by the participants from PORIM were UPM (54.2% of the respondents) and UKM (41.7% of the respondents) libraries. Both libraries were only a few kilometers away from PORIM. A substantial number of respondents from RRIM (33.3% of the respondents) and FRIM (63.3% of the respondents), located several kilometers away from UPM, used its library.

About one-quarter of the RRIM and 36.7 percent of the FRIM respondents also used the University of Malaya (UM) library.

It may be concluded that the UPM library is playing a vital role in meeting the information needs of its own users as well as agricultural scientists from other institutions. Respondents from research institutions were using other agricultural libraries, except UPM, quite infrequently. Two other university libraries, i.e., UKM and UM were also used by the participants.

8.5.5 Occasions of Extensive Library Use

It was assumed that there might be certain occasions when respondents would be using their library more extensively. In order to verify this assumption, a list of possible occasions was provided in the questionnaire with an open-ended option. Respondents were asked to choose any number of options according to their situations. Analysis of responses, presented in Table 8.14, revealed that there were two occasions when agricultural libraries were used extensively. Two hundred and five (88.4%) participants consulted their library more frequently 'while writing research reports'. Another 203 (87.5%) participants used their library extensively 'while preparing research proposals'. Two other occasions when libraries were used extensively were 'while conducting actual research' and 'while submitting future research plans'.

Twelve participants, in response to an open-ended option for this question, mentioned certain other occasions when they used their library more frequently. Two such occasions were while preparing for a new academic course and while working on a new research project. Some participants reported that they used libraries more extensively while undertaking feasibility studies and providing consultancy services.

Table 8.14
Occasions of Extensive Library Use
N=232

Occasion (Ranked)	Number	Percentage
While writing research reports	205	88.4
While preparing research proposals	203	87.5
While conducting actual research	159	68.5
While submitting future research plans	139	59.9
While going to attend conferences	100	43.1
While preparing for lectures	76	32.8
During off-season of the research crop	46	19.8
While scrutinising research proposal from other researchers	42	18.1
While preparing for interviews	14	6.0
Other occasions	12	5.2

8.5.5.1 Occasions of Extensive Library Use and Institutional Affiliation of Respondents

Table 8.15 provides a breakdown of occasions of extensive library use by the institutional affiliation of the respondents. It was observed that, irrespective of their affiliation, all respondents used their library heavily while developing their research proposals and writing research reports. Although the use of libraries while conducting actual research was quite heavy but it was substantially lower than the aforementioned two occasions. A possible explanation for it could be that during actual research, most respondents might be busy in conducting field research or over-occupied in research laboratories. Other occasions did not show a heavy use of library collections and facilities.

As the population of the study comprised two distinct categories of individuals, academicians and research scientists, the Chi-square test was administered for each occasion to find out if there was any difference between both categories of respondents. For this purpose, respondents from four research institutions, i.e., MARDI, PORIM, RRIM and FRIM, were grouped together. High significant differences were found between both categories of users for three occasions, i.e., while preparing research proposals (Chi-square=8.68, df=1, p=.003), while preparing lectures (Chi-square=76.31, df=1, p=.000), and while submitting future research plans (Chi-square=5.91, df=1, p=.051).

Table 8.15
Occasions of Extensive Library Use and Institutional Affiliation
(Multiple Response)
N=232

Occasion	*Number of Respondents (Percent)*				
	UPM (N=60)	MARDI (N=85)	PORIM (N=24)	RRIM (N=33)	FRIM (N=30)
While writing research reports	52 (86.7%)	76 (89.4%)	24 (100.0%)	27 (81.8%)	26 (86.7%)
While preparing research proposals	46 (76.7%)	78 (91.8%)	23 (95.8%)	27 (81.8%)	29 (96.7%)
While conducting actual research	40 (66.7%)	52 (61.2%)	16 (66.7%)	23 (69.7%)	24 (80.0%)
While submitting future research plans	28 (46.7%)	56 (65.9%)	13 (54.2%)	17 (51.5%)	25 (83.3%)
While going to attend conferences	23 (38.3%)	47 (55.3%)	6 (25.0%)	10 (30.3%)	14 (46.7%)
While preparing for lectures	4 (78.3%)	13 (20.0%)	2 (8.3%)	6 (18.2%)	4 (13.3%)
During off-season of the research crop	9 (15.0%)	25 (29.4%)	3 (12.5%)	4 (12.1%)	5 (16.7%)
While scrutinising research proposals from other researchers	7 (11.7%)	16 (18.8%)	2 (8.3%)	8 (24.2%)	9 (30.0%)
While preparing for job interviews	2 (3.3%)	3 (3.5%)	-	3 (9.1%)	6 (20.0%)
Other occasions	3 (5.0%)	4 (4.7%)	2 (8.3%)	1 (3.0%)	2 (6.9%)

It may be concluded that a majority of the agricultural scientists are likely to use their library more extensively during two important stages of research, i.e., proposal development and report writing. A comparatively less number of the scientists is expected to visit their library during actual execution of research projects. A majority of academicians, in addition to research-related activities, are also expected to use the library extensively while preparing their lectures.

The library use pattern of the respondents is summarised as follows:

1. All respondents personally visited their library, with varied frequency, for using library resources and facilities. However, it was found that respondents personally visited the library when they needed to search OPACs, scan current issues of periodicals or find information on new topics. They sent junior researchers and/or para-professionals for getting photocopies of articles, checking out books or getting information from sources already known to them.

2. Nearly 78 percent of the respondents visited their library at least once a month.

3. Those respondents who felt that their library was conveniently located made more library visits.

4. Besides their own library, the UPM library was also used by over 63 percent of the respondents.

5. Respondents used their library more extensively during two important stages of research, i.e., proposal development and report writing. Comparatively fewer respondents visited their libraries during the actual execution of their research projects.

6. Respondents from research institutions, on the average, spent 16 percent of their office time (approximately 7.4 hours per week) on reading and literature searching whereas UPM academicians spent 9.3 percent of their time (4.3 hours per week) for this purpose.

8.6 Ability to Keep in Touch with Scientific Literature

Respondents were asked if they were able to keep in touch, as much as they would like to, with information produced in their specific areas of interest. Responses of the participants are presented in Table 8.16. It was found that 131 (57.0%) respondents felt that they were keeping in touch with literature produced in their areas of interest. Over 60 percent of the participants from UPM, PORIM, RRIM, and FRIM fall in this category as compared to only 44.6 percent from MARDI. However, a more worrying finding is that 43.0 percent of all the respondents were unable to keep themselves in touch with the current literature of their interest.

Table 8.16
Ability to Keep in Touch with Scientific Literature
N=230

Institution	N	Keeping in Touch	Not Keeping In Touch
UPM	60	38 (63.3%)	22 (36.7%)
MARDI	83	37 (44.6%)	46 (55.4%)
PORIM	24	16 (66.7%)	8 (33.3%)
RRIM	33	20 (60.6%)	13 (39.4%)
FRIM	30	20 (66.7%)	10 (33.3%)
Total	**230**	**131 (57.0%)**	**99(43.0%)**

8.6.1 Relationship between Ability to Keep in Touch with Scientific Literature and Age of Respondents

Table 8.17 presents the relationship between age groups of respondents and their ability to keep in touch with scientific literature. Of the 131 respondents who were keeping in touch, 80 (61.1%) were in the age group '41-50 years', 28 (21.3%) in '31-40 years', 17 (13.0%) in '30 years or below', and 9 (4.6%) in the age group '50 years or above'. Data analysis to find out trend within each age group showed that 70.8 percent of the respondents in the age group '30 years or below' were keeping in touch with scientific literature. It was interesting to note that exactly the same percentage (70.8%) of the respondents in this age group were visiting their library at least once a week (Table 8.11). Their regular visits to the library might have helped them in keeping in touch with the literature. Nearly 59 percent of the respondents in the age group '41-50 years' were also keeping in touch with scientific literature. Nearly one-half of the respondents in the age groups '31-40 years' and '51 years or above' reported that they were able to keep in touch with literature in their areas of specialisation. This means that younger scientists are more likely to keep in touch with literature compared to their senior colleagues. It might be due to the fact that senior scientists often spend more time on administrative and management related tasks.

Table 8.17
Ability to Keep in Touch with Scientific Literature and Age Groups of Respondents
N=230

Age Group	N	Keeping in Touch	Not Keeping in Touch
30 Years or Below	24	17 (70.8%) (13.0%)	7 (29.2%) (7.1%)
31-40 Years	58	28 (48.3%) (21.3%)	30 (51.7%) (30.3%)
41-50 Years	136	80 (58.8%) (61.1%)	56 (41.2%) (56.5%)
51 Years and Above	12	6 (50.0%) (4.6%)	6 (50.0%) (6.1%)
Total		**131 57.0%**	**99 43.0%**

8.6.2 Relationship between Ability to Keep in Touch with Scientific Literature and Gender of Respondents

Table 8.18 presents the relationship between the ability to keep in touch with scientific literature and gender of the respondents. Of the 130 respondents who were keeping in touch with scientific literature, 90 (69.2%) were male and 40 (30.8%) female. Out of 159 male respondents, 90 (56.6%) were keeping in touch with literature in their areas of specialisation. Of the 66 female respondents, 40 (60.6%) were keeping in touch. The Chi-square test showed no significant differences between respondents from both genders for their ability to keep in touch with the literature.

Table 8.18
Ability to Keep in Touch with Scientific Literature and Gender of Respondents
N=225

Gender	N	Keeping in Touch	Not Keeping in Touch
Male	159	90 (56.6%) (69.2%)	69 (43.4%) (72.6%)
Female	66	40 (60.6%) (30.8%)	26 (39.4%) (27.4%)
Total		**130 57.8%**	**95 42.2%**

Chi-square=.306, *df=1*, *p*=.580

8.6.3 Relationship between Ability to Keep in Touch with Scientific Literature and the Location of Library

Table 8.19 shows a relationship between ability to keep in touch with scientific literature and location of libraries. Of the 131 respondents who were able to keep in touch, 118 (90.1%) considered location of their library as 'convenient' and 13 (9.9%) as 'inconvenient'. On the other hand, of the 99 participants who were unable to keep in touch with scientific literature, 73 (73.7%) reported that the location of their library was 'convenient' and 26 (26.3%) as 'inconvenient'. The Chi-square test showed high significant differences for the ability of respondents to keep in touch with scientific literature and the location of their library. This means that location of a library has a relationship with the ability of its patrons to keep in touch with literature in their areas of specialisation.

Table 8.19
Ability to Keep in Touch with Scientific Literature and Location of the Library
N=230

Library Location	N	Keeping in Touch	Not Keeping in Touch
Convenient	191	118 (61.8%) (90.1%)	73 (38.2%) (73.7%)
Inconvenient	39	13 (33.3%) (9.9%)	26 (66.7%) (26.3%)
Total		**131 (57.0%)**	**99 (43.0%)**

Chi-square=10.690, *df*=1, *p*=.001

8.6.4 Relationship between Ability to Keep in Touch with Scientific Literature and Frequency of Library Visits

The ability of respondents to keep in touch with scientific literature was cross-tabulated with their frequency of library visits to investigate if any relationship existed between these two variables (Table 8.20). The Chi-square test, after data collapsing to remove 5 (41.7%) of the cells having an expected count of less than 5, showed no significant differences among respondents for their ability in keeping in touch with scientific literature and frequency of their library visits.

Table 8.20
Ability to Keep in Touch with Scientific Literature and Frequency of Library Visits
N=233

Frequency of Library Visit	Keeping in Touch	Not Keeping In Touch
About Once or Twice a Week	62 (48.1%)	40 (38.5%)
About Once or Twice a Month	43 (33.3%)	36 (34.6%)
Several Times a Year	24 (18.6%)	28 (26.9%)
Total	**129 (55.4%)**	**104 (44.6%)**

Chi-square=1.128, *df*=2, *p*=.569

It may be concluded that the ability of scientists to keep in touch with scientific literature is influenced by the location of their library. A conveniently located library may help its users to promptly acquire the desired information. Probably, this was the reason why over 55 percent of the MARDI respondents, mostly working in out-stations often located several hundred kilometres away from the main library, were not keeping in touch with scientific literature. Other factors such as gender of the participants and frequency of their library visits were not related to their ability to keep in touch with scientific literature.

The relationship of certain factors with the ability of respondents to keep in touch with scientific literature will be treated with other data about these variables in the relevant sections.

8.6.5 Reasons for Not Keeping in Touch with Scientific Literature

Those respondents who expressed their inability in keeping in touch with scientific literature were asked to provide reasons for it. A list of possible reasons was provided in the questionnaire with an open-ended option. Respondents were allowed to pick any number of reasons according to their work situations. The Chi-square test, administered for each reason, showed no significant differences among respondents from various institutions for their inability to keep in touch with scientific literature (Table 8.21). This means that factors hampering respondents from keeping in touch with scientific literature were common among all the participating institutions.

Table 8.21
Reasons for Inability to Keep in Touch with Scientific Literature
(Multiple response)
N=99

Reason	UPM N=22	MARDI N=46	PORIM N=8	RRIM N=13	FRIM N=10	Total N=99	Chi-Square
Too busy in research	5	11	4	2	5	27 27.3% (N=99)	X^2= 3.148 *df*=4 *p*=.533
Too many meetings and administrative work	7	14	-	4	4	29 29.3% (N=99)	X^2= 4.899 *df*=4 *p*=.298
Not sure where to look for information	3	5	1	2	3	14 14.1% (N=99)	X^2= 1.083 *df*=4 *p*=.897
Information not readily available	18	27	4	7	7	63 63.6% (N=99)	X^2= 3.577 *df*=4 *p*=.466
Deficient library collections and services	9	29	6	6	6	56 56.6%) (N=99)	X^2= 8.896 *df*=4 *p*=.637
Other reasons	3	4	-	4	-	11 11.1% (N=99)	X^2= 6.621 *df*=4 *p*=.157

Of the 99 participants who were unable to keep in touch with scientific literature, 27 (27.3%) felt that it was due to their over-occupation in research activities. Contrary to a general perception that involvement of scientists in too

many meetings and administrative work might be one of the reasons for under-utilisation of libraries was not supported by this study when only 29 (29.3%) respondents supported this perception. Similarly, only 14 (14.1%) respondents shared the opinion that their lack of knowledge about information sources and services was responsible for their inability to keep in touch with scientific literature.

A large number of the participants (63 or 63.6%) blamed the fact that 'information was not readily available' as the main hurdle that prevented them from getting informed about the current literature produced in their areas of specialisation. In order to understand possible reasons for this high percentage, these respondents were cross-tabulated with several variables. Of these 63 respondents, 37 (58.7%) reported that they 'occasionally' or 'hardly ever' got the needed information from their library. Fifty-two (82.5%) participants assessed their library as ineffective in meeting their information needs. Forty-two (66.7%) respondents in this category also revealed that they were not being notified about the latest publications acquired by their library. However, only 10 (15.9%) of these participants were 'frequently' or 'always' requesting their library to acquire unavailable documents either through interlibrary loan (ILL) or document delivery service. Of the 22 UPM respondents who were unable to keep in touch with scientific literature, 18 (81.8%) claimed that 'information not readily available' was the reason for it. One possible explanation for this large number could be that these faculty members might be engaged in research on very current and highly specialised topics where only a limited amount of literature was available.

Equally worth noting was the response of 56 (56.6%) respondents who felt that 'deficient library collections and services' was responsible for their inability to keep in touch with scientific literature. Of these, 29 (51.8%) belonged to MARDI. A further analysis of these 56 respondents revealed that 24 (42.9%) of them perceived their library as either ineffective or very ineffective in meeting their information needs. Only 6 (10.7%) respondents in this category reported that they were getting the desired materials from their library. Similarly, only 4 (7.1%) of these respondents considered the book collections of their library as

adequate or very adequate. Of the 56 respondents who considered 'deficient library collections and services' were responsible for their inability to keep in touch, nearly one-half reported that their library was not consulting them while selecting library materials. Another 24 (42.8%) assessed their serials collections as inadequate or very inadequate.

Certain other reasons extended by participants for not keeping in touch with scientific literature were: too much information was being generated, inconvenient library location, and locally produced documents not readily available. Several participants from MARDI out-stations complained that their main library was located several hundred kilometres away from their research stations and it was not possible for them to visit it regularly. A majority of them also pointed out that either no library was available at their research station or it was extremely deficient.

On the whole, the inability of 99 (43.0%) of the respondents to keep in touch with scientific literature should be a matter of concern for Malaysian agricultural libraries. It was worth noting that most of these respondents felt that their library was responsible for it. They did not consider that it was due to their lack of knowledge about information sources and services, involvement in meetings and administrative work, or research engagements. Rather they felt that it was mainly due to deficient library collections and facilities.

8.7 Summary

Respondents from the research institutions, on average, spent 7.4 hours and the UPM academicians 4.3 hours per week on reading and literature searching. Nearly 78 percent of the respondents visited their library at least once a month. Respondents mainly visited their library for searching OPAC, scanning current issues of periodicals and for finding information on new topics. However, they sent junior researchers and/or para-professionals for getting photocopies of articles, checking out books or getting information from sources already known to them. Libraries were used more extensively during two important stages of research, i.e., proposal development and report writing. A substantial number (43.0%) of the respondents were unable to keep in touch with scientific

literature and they felt that it was due to deficient library collections and services. Among various information sources, respondents preferred to use research and review articles. Interaction with professional colleagues was also considered an important source for information exchange. The next chapter will present data on the adequacy of different library resources such as collections, equipment and physical facilities.

9. Adequacy of Information Resources

9.1 Introduction

Adequacy of library resources plays an important role in determining the effectiveness of a library in meeting the information needs of its clients. In particular, the knowledge about the adequacy of library collections is vital as many library services are based on them. Similarly, adequate library equipment and other physical facilities can help meet the information needs of the users more effectively. This chapter deals with the assessment of respondents of the adequacy of various library resources and facilities. A five-point Likert scale was used for eliciting responses. An additional option 'NA' (not available) was provided in case some of these resources and facilities were not available.

9.2 Adequacy of Library Collections

9.2.1 University Putra Malaysia (UPM)

Table 9.1 presents an assessment of the UPM respondents of their library collections. Fifty-five percent of the respondents considered book collection of their library as 'adequate' or 'very adequate' whereas 20 percent assessed it as either 'inadequate' or 'very inadequate'. Over 50 percent of the UPM respondents considered scientific journals, abstracts and indexes, and CD-ROM databases at their library as 'adequate' or 'very adequate'. However, a split response was received for reference materials, research reports/ monographs and and audio-visual materials.

Table 9.1
Adequacy of Library Collections at UPM

Collection Type	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Books	60	8 (13.3%)	25 (41.7%)	15 (25.0%)	10 (16.7%)	2 (3.3%)
Scientific Journals	60	9 (15.0%)	25 (41.7%)	13 (21.7%)	9 (15.0%)	4 (6.7%)
Research reports/ monographs, etc.	56	4 (7.1%)	12 (21.4%)	24 (42.9%)	15 (26.8%)	1 (1.8%)
Reference materials	58	4 (6.9%)	17 (29.3%)	20 (34.5%)	16 (27.6%)	1 (1.7%)
Abstracts and indexes	58	8 (13.8%)	23 (39.7%)	20 (34.5%)	6 (10.3%)	1 (1.7%)
CD-ROM databases	55	8 (14.5%)	20 (36.4%)	19 (34.5%)	5 (9.1%)	3 (5.5%)
Audio-visual materials	52	4 (7.7%)	7 (13.5%)	24 (46.2%)	15 (28.8%)	2 (3.8%)

9.2.2 Malaysian Agric. Research and Development Institute (MARDI)

One-half of the MARDI respondents assessed their book collection as 'inadequate' or 'very inadequate' (Table 9.2). Nearly 39 percent of the respondents evaluated scientific journals as 'adequate' or 'very adequate' and 26 percent as 'inadequate' or 'very inadequate'. Almost the same trend was observed for research reports, reference materials and CD-ROM databases where nearly one-third of the respondents considered them as adequate and one quarter as inadequate. Over one-half of the MARDI respondents rated audio-visual materials at their library either as 'inadequate' or 'very inadequate'.

Table 9.2
Adequacy of Library Collections at MARDI

Collection Type	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Books	82	3 (3.7%)	16 (19.5%)	22 (26.8%)	33 (40.2%)	8 (9.8%)
Scientific Journals	84	5 (6.0%)	28 (33.3%)	29 (34.5%)	19 (22.6%)	3 (3.6%)
Research reports/ monographs, etc.	84	4 (4.8%)	23 (27.4%)	33 (39.3%)	21 (25.0%)	3 (3.6%)
Reference materials	82	4 (4.9%)	24 (29.3%)	31 (37.8%)	21 (25.6%)	2 (2.4%)
Abstracts and indexes	81	7 (8.6%)	36 (44.4%)	19 (23.5%)	17 (21.0%)	2 (2.5%)
CD-ROM databases	71	6 (8.5%)	21 (29.6%)	26 (36.6%)	11 (15.5%)	7 (9.9%)
Audio-visual materials	64	1 (1.6%)	10 (15.6%)	20 (31.3%)	23 (35.9%)	10 (15.6%)

9.2.3 Palm Oil Research Institute of Malaysia (PORIM)

A split response was received for the adequacy of books at the PORIM library where 29.2 percent of the respondents rated them as 'adequate' or 'very adequate' (Table 9.3). Exactly the same percentage (29.2%) of the respondents assessed the book collection as 'inadequate' or 'very inadequate'. Nearly one-half of the PORIM respondents considered journals, research reports, reference materials, and abstracts and indexes as 'adequate' or 'very adequate'. On the contrary, over 52 percent of the respondents assessed CD-ROM databases and AV materials at their library as 'inadequate' or 'very inadequate'.

Table 9.3
Adequacy of Library Collections at PORIM

Collection Type	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Books	24	-	7 (29.2%)	10 (41.7%)	6 (25.0%)	1 (4.2%)
Scientific Journals	24	2 (8.3%)	11 (45.8%)	7 (29.2%)	4 (16.7%)	-
Research reports/ monographs, etc.	23	2 (8.7%)	10 (43.5%)	9 (39.1%)	2 (8.7%)	-
Reference materials	23	1 (4.3%)	10 (43.5%)	11 (47.8%)	1 (4.3%)	-
Abstracts and indexes	24	3 (12.5%)	8 (33.3%)	10 (41.7%)	3 (12.5%)	-
CD-ROM databases	19	-	-	9 (47.4%)	7 (36.8%)	3 (15.8%)
Audio-visual materials	22	-	3 (13.6%)	7 (31.8%)	9 (40.9%)	3 (13.6%)

9.2.4 Rubber Research Institute of Malaysia (RRIM)

Table 9.4 presents an assessment of the RRIM respondents of their library collections. The highest ratings were given to journals and research reports where 69.7 and 63.7 percent of the respondents respectively considered these materials as 'adequate' or 'very adequate'. Nearly one-half of the respondents gave the same assessment to reference materials and abstracts and indexes. On the contrary, nearly one-half of the RRIM respondents judged CD-ROM databases and AV materials at their library as 'inadequate' or 'very inadequate'.

Table 9.4
Adequacy of Library Collections at RRIM

Collection Type	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Books	33	2 (6.1%)	15 (45.5%)	11 (33.3%)	5 (15.2%)	-
Scientific Journals	33	6 (18.2%)	17 (51.5%)	7 (21.2%)	2 (6.1%)	1 (3.0%)
Research reports/ monographs, etc.	33	2 (6.1%)	19 (57.6%)	9 (27.3%)	3 (9.1%)	-
Reference materials	31	1 (3.2%)	14 (45.2%)	10 (32.3%)	6 (19.4%)	-
Abstracts and indexes	31	1 (3.2%)	15 (48.4%)	8 (25.8%)	7 (22.6%)	-
CD-ROM databases	21	-	6 (28.6%)	5 (23.8%)	8 (38.1%)	2 (9.5%)
Audio-visual materials	27	-	3 (11.1%)	10 (37.0%)	12 (44.4%)	2 (7.4%)

9.2.5 Forest Research Institute of Malaysia (FRIM)

Nearly 52 percent of the FRIM respondents considered journals and CD-ROM databases at their library as 'adequate' or 'very adequate' (Table 9.5). The same adequacy assessment was given to research reports, reference materials, abstracts and indexes, and books by 44.8, 37.9, 37.9, and 33.3 percent of the respondents respectively. Audio-visual materials received the lowest rating where 51.8 percent of the respondents assessed these as 'inadequate' or 'very inadequate'.

Table 9.5
Adequacy of Library Collections at FRIM

Collection Type	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Books	30	-	10 (33.3%)	14 (46.7%)	4 (13.3%)	2 (6.7%)
Scientific Journals	30	6 (20.0%)	10 (33.3%)	8 (26.7%)	5 (16.7%)	1 (3.3%)
Research reports/ monographs, etc.	29	2 (6.9%)	11 (37.9%)	12 (41.4%)	3 (10.3%)	1 (3.4%)
Reference materials	29	1 (3.4%)	10 (34.5%)	13 (44.8%)	4 (13.8%)	1 (3.4%)
Abstracts and indexes	29	2 (6.9%)	9 (31.0%)	14 (48.3%)	3 (10.3%)	1 (3.4%)
CD-ROM databases	29	4 (13.8%)	11 (37.9%)	9 (31.0%)	4 (13.8%)	1 (3.4%)
Audio-visual materials	21	-	4 (19.0%)	8 (38.1%)	5 (23.8%)	4 (19.0%)

The overall picture of the adequacy of library materials and information resources, based on the Median test, showed that the UPM library was comparatively strong in books, abstracting and indexing sources, audio-visual materials, and CD-ROM databases (Table 9.6). The RRIM library was ranked high for its research reports, books, reference materials, and serials. The strength of the PORIM library lay in its research reports, reference collection, and abstracting and indexing sources. The FRIM library received better assessment for CD-ROM databases and serials. The MARDI library received the lowest evaluation for most of its collections. However, the Median test showed significant differences among the participating libraries for their book collections, research reports and monographs, and CD-ROM databases.

Table 9.6
Adequacy of Library Collections at the Participating Libraries

Frequencies

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Books	> Median	33	19	7	17	10
	<= Median	27	63	17	16	20
Scientific journals	> Median	9	5	2	6	6
	<= Median	51	79	22	27	24
Res reports monographs	> Median	16	27	12	21	13
	<= Median	40	57	11	12	16
Reference materials	> Median	21	28	11	15	11
	<= Median	37	54	12	16	18
Abstracts and indexes	> Median	8	7	3	1	2
	<= Median	50	74	21	30	27
Audio-visual materials	> Median	11	11	3	3	4
	<= Median	41	53	19	24	17
CD-ROM databases	> Median	28	27	0	6	15
	<= Median	27	44	19	15	14

Test Statistics

	Books	Journals	Reports	Reference	Abstracts	AV	CD-ROM
N	229	231	225	223	223	186	195
Median	3.00	4.00	3.00	3.00	4.00	3.00	3.00
Chi-Square	18.712	6.677	14.629	2.912	3.236	1.520	18.393
df	4	4	4	4	4	4	4
Asymp. Sig.	.001	.154	.006	.573	.519	.823	.001

9.3 Involvement of Users in the Selection of Library Materials

It was assumed that involvement of users in the selection of library materials might have some bearing on their satisfaction with library collections. Respondents were asked if their library sought their opinion in the selection of library materials. Out of the 60 UPM respondents, 47 (78.3%) responded in the affirmative (Table 9.7). Similarly, over 73 percent of the FRIM respondents indicated that they were consulted for the selection of library materials. A split response was received from the three remaining institutions, i.e. MARDI, PORIM and RRIM, where from 50 to 60 percent of their respondents said that their library did involve them in the selection of library materials. It is worth noting that the UPM and FRIM libraries, getting comparatively better assessment for the adequacy of their collections, were more frequently consulting their users for the selection of library materials. It appeared that the involvement of library users in the selection of library materials is likely to result in higher user satisfaction.

Table 9.7
Involvement of Library Users in the Selection of Library Materials
N=230

Selection of Materials	UPM	MARDI	PORIM	RRIM	FRIM	Total
Users Involved in The Selection	47 (78.3%)	43 (50.0%)	12 (54.5%)	19 (59.4%)	22 (73.3%)	143 (62.2%)
Users Not Involved in the Selection	13 (21.7%)	43 (50.0%)	10 (45.5%)	13 (40.6%)	8 (26.7%)	87 (37.8%)
Total	**60 (100%)**	**86 (100%)**	**22 (100%)**	**32 (100%)**	**30 (100%)**	**230 (100%)**

The relationship between the involvement of respondents in the selection of library materials and their assessment about the effectiveness of their library and some other related variables will be discussed in the next chapter.

9.4 Adequacy of Library Equipment

9.4.1 University Putra Malaysia (UPM)

Table 9.8 presents assessment of the UPM respondents of the adequacy of their library equipment. OPAC terminals were considered 'adequate' or 'very adequate' by 45 percent and CD-ROM workstations by 51 percent of the respondents. The same adequacy assessment was given to microform and audio-visual equipment by 48.8 and 41.6 percent of the respondents respectively. While 46.3 percent of the respondents assessed printers attached to CD-ROM and OPAC terminals as 'inadequate' or 'very inadequate'.

Table 9.8
Adequacy of Library Equipment at UPM

Library Equipment	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
OPAC Terminals	40	6 (15.0%)	12 (30.0%)	16 (40.0%)	5 (12.5%)	1 (2.5%)
CD-ROM Work-stations	51	7 (13.7%)	19 (37.3%)	13 (25.5%)	10 (19.6%)	2 (3.9%)
Printer Attached to CD-ROM/ OPAC	41	(3 (7.3%)	8 (19.5%)	11 (26.8%)	13 (31.7%)	6 (14.6%)
Microform Reader-printers	41	3 (7.3%)	17 (41.5%)	12 (29.3%)	8 (19.5%)	1 (2.4%)
AV Equipment	48	4 (8.3%)	16 (33.3%)	15 (31.3%)	12 (2.1%)	1 (2.1%)

9.4.2 Malaysian Agric. Research and Development Institute (MARDI)

The MARDI library received the lowest assessment for most of the library equipment. Nearly 67 percent of the respondents considered OPAC terminals as 'inadequate' or 'very inadequate' (Table 9.9). It was probably because incomplete MARDI OPAC was only accessible through a computer installed in the librarian's office. Other library equipment considered 'inadequate' or 'very inadequate' by the respondents was audio-visual equipment (73.9% respondents), microform equipment (53.8% respondents), printers (48.3% respondents) and CD-ROM workstations (41.9% respondents).

Table 9.9
Adequacy of Library Equipment at MARDI

Library Equipment	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
OPAC Terminals	30	-	2 (6.7%)	8 (26.7%)	12 (40.0%)	8 (26.7%)
CD-ROM Work-stations	62	2 (3.2%)	13 (21.0%)	21 (33.9%)	19 (30.6%)	7 (11.3%)
Printer Attached to CD-ROM/ OPAC	58	2 (3.4%)	9 (15.5%)	19 (32.8%)	21 (36.2%)	7 (12.1%)
Microform Reader-printers	39	1 (2.6%)	4 (10.3%)	13 (33.3%)	14 (35.9%)	7 (17.9%)
AV Equipment	46	1 (2.2%)	5 (10.9%)	6 (13.0%)	23 (50.0%)	11 (23.9%)

9.4.3 Palm Oil Research Institute of Malaysia (PORIM)

Table 9.10 presents assessment of the PORIM respondents about the adequacy of their library equipment. OPAC terminals were considered 'adequate' by 42.1 percent of the respondents and 'inadequate' or 'very inadequate' by 21.3 percent respondents. For all other types of library equipment, 40 to 50 percent of the respondents assessment them as 'inadequate' or 'very inadequate'.

Table 9.10
Adequacy of Library Equipment at PORIM

Library Equipment	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
OPAC Terminals	19	-	8 (42.1%)	7 (36.8%)	3 (15.8%)	1 (5.3%)
CD-ROM Work-stations	14	-	3 (21.4%)	5 (35.7%)	3 (21.4%)	3 (21.4%)
Printer Attached to CD-ROM/ OPAC	14	-	2 (14.3%)	5 (35.7%)	4 (28.6%)	3 (21.4%)
Microform Reader-printers	15	-	5 (33.3%)	4 (26.7%)	4 (26.7%)	2 (13.3%)
AV Equipment	14	-	2 (14.3%)	5 (35.7%)	3 (21.4%)	4 (28.6%)

9.4.4 Rubber Research Institute of Malaysia (RRIM)

The RRIM library also received low assessment for the adequacy of its equipment. The OPAC terminals were considered 'inadequate' or 'very inadequate' by 46.7 percent of the respondents (Table 9.11). The same assessment was given by 70 percent of the RRIM respondents to their CD-ROM workstations. Other library equipment also received low appraisal and 45 to 55 percent of the respondents considered them as 'inadequate' or 'very inadequate'.

Table 9.11
Adequacy of Library Equipment at RRIM

Library Equipment	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
OPAC Terminals	15	-	5 (33.3%)	3 (20.0%)	4 (26.7%)	3 (20.0%)
CD-ROM Work-stations	20	-	2 (10.0%)	4 (20.0%)	8 (40.0%)	6 (30.0%)
Printer Attached to CD-ROM/ OPAC	20	-	3 (15.0%)	6 (30.0%)	6 (30.0%)	5 (25.0%)
Microform Reader-printers	17	1 (5.9%)	2 (11.8%)	6 (35.3%)	5 (29.4%)	3 (17.6%)
AV Equipment	22	-	3 (13.6%)	9 (40.9%)	8 (36.4%)	2 (9.1%)

9.4.5 Forest Research Institute of Malaysia (FRIM)

A split response was received by the FRIM library for the adequacy its equipment . Nearly one-half of the respondents considered OPAC terminals and CD-ROM workstations as 'adequate' or 'very adequate' (Table 9.12). Microform equipment and printers received the same level of assessment from only 33.3 and 25.9 percent of the respondents respectively.

Table 9.12
Adequacy of Library Equipment at FRIM

Library Equipment	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
OPAC Terminals	13	-	7 (53.8%)	3 (23.1%)	2 (15.4%)	1 (7.7%)
CD-ROM Work-stations	29	1 (3.4%)	13 (44.8%)	9 (31.0%)	4 (13.8%)	2 (6.9%)
Printer Attached to CD-ROM/ OPAC	27	1 (3.7%)	6 (22.2%)	14 (51.9%)	4 (14.8%)	2 (7.4%)
Microform Reader-printers	6	-	2 (33.3%)	2 (33.3%)	2 (33.3%)	-
AV Equipment	11	-	5 (45.5%)	3 (27.3%)	2 (18.2%)	1 (9.1%)

The item on photocopying equipment was unintentionally missed from the question on the adequacy of library equipment. However, assessment of respondents on the availability of photocopying facility was sought during interviews. The UPM library had privatised its photocopying service and a majority of the interviewees expressed their satisfaction with this arrangement. No exclusive photocopying facility was available to the users at the MARDI library where they were allowed to do fee-based photocopying on a machine used by the library staff. Alternatively, library users were allowed to check-out materials for making photocopies in other MARDI offices. Photocopying

service at the remaining three institutions, i.e. PORIM, RRIM and FRIM, was maintained by their library. A mixed response was obtained from respondents affiliated with these institutions and a majority of them desired their library to install more photocopying machines.

It was noted that at almost all instututions respondents were comparatively less satisfied with the availability of library equipment. Nevertheless, the Median test showed that for almost all types of library equipment, the UPM library received better assessment, followed by the FRIM library (Table 9.13). Significant differences were also found among the participating libraries for the adequacy of various library equipment, except printers attached to CD-ROM workstations and OPACs.

Table 9.13
Adequacy of Library Equipment at the Participating Libraries

Frequencies

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
OPAC terminals	> Median	18	2	8	5	7
	<= Median	22	28	11	10	6
CD-ROM workstations	> Median	26	15	3	2	14
	<= Median	25	47	11	18	15
Printers for CD-ROM	> Median	11	11	2	3	7
	<= Median	30	47	12	17	20
Microform reader-printers	> Median	20	5	5	3	2
	<= Median	21	34	10	14	4
AV equipment	> Median	20	6	2	3	5
	<= Median	28	40	12	19	6

Test Statistics

	OPAC terminals	CD-ROM workstations	Printers	Microform Equipment	AV equipment
N	117	176	160	118	141
Median	3.00	3.00	3.00	3.00	3.00
Chi-Square	14.944	17.940	2.169	13.797	15.210
df	4	4	4	4	4
Asymp. Sig.	.005	.001	.705	.008	.004

9.5 Adequacy of Physical Facilities

9.5.1 University Putra Malaysia (UPM)

Table 9.14 presents assessment of the UPM respondents about the adequacy of library physical facilities. Over one-half of the respondents considered library seating capacity, study carrels, book shelves, display area, furniture, air-conditioning and library open space either as 'adequate' or 'very adequate'. A split response was received for audio-visual viewing rooms and leisure reading area whereas nearly 35 percent of the respondents showed dissatisfaction over the adequacy of individual study rooms and group discussion rooms.

Table 9.14
Adequacy of Library Physical Facilities at UPM

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Library seating capacity	56	11 (19.6%)	24 (42.9%)	14 (25.0%)	5 (8.9%)	2 (3.6%)
Study carrels	55	8 (14.5%)	20 (36.4%)	19 (34.5%)	6 (10.9%)	2 (3.6%)
Individual study rooms	53	3 (5.7%)	12 (22.6%)	20 (37.7%)	12 (22.6%)	6 (11.3%)
Group discussion rooms	52	3 (5.8%)	8 (15.4%)	23 (44.2%)	14 (26.9%)	4 (7.7%)
Type and location of book shelves	59	6 (10.2%)	30 (50.8%)	17 (28.8%)	3 (5.1%)	3 (5.1%)
AV viewing/ listening rooms	50	3 (6.0%)	13 (26.0%)	21 (42.0%)	12 (24.0%)	1 (2.0%)
Easy/ leisure reading lounge	57	5 (8.8%)	19 (33.3%)	17 (29.8%)	15 (26.3%)	1 (1.8%)
Library display area	58	5 (8.6%)	24 (41.4%)	20 (34.5%)	8 (13.8%)	1 (1.7%)
Furniture and fixtures	57	6 (10.5%)	14 (24.6%)	27 (47.4%)	8 (14.0%)	2 (3.5%)
Lighting	58	11 (19.0%)	24 (41.4%)	14 (24.1%)	6 (10.3%)	3 (5.2%)
Air-conditioning	59	15 (25.4%)	24 (40.7%)	14 (23.7%)	4 (6.8%)	2 (3.4%)
Library open space	58	4 (6.9%)	26 (44.8%)	13 (22.4%)	12 (20.7%)	3 (5.2%)

9.5.2 Malaysian Agric. Research and Development Institute (MARDI)

Over one-half of the MARDI respondents assessed library seating capacity, study carrels, bookshelves, lighting, and air-conditioning either as 'adequate' or 'very adequate' (Table 9.15). A split response was received for the adequacy of library physical facilities such as leisure reading lounge, display area, furniture and fixtures, and library area. The MARDI participants showed dissatisfaction over the adequacy of individual study rooms and group discussion rooms.

Table 9.15
Adequacy of Library Physical Facilities at MARDI

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Library seating capacity	87	15 (17.2%)	41 (47.1%)	18 (12.6%)	11 (12.6%)	2 (2.3%)
Study carrels	76	9 (11.8%)	34 (44.7%)	22 (28.9%)	9 (11.8%)	2 (2.6%)
Individual study rooms	59	4 (6.8%)	16 (27.1%)	12 (20.3%)	21 (35.6%)	6 (10.2%)
Group discussion rooms	55	1 (1.8%)	7 (12.7%)	11 (20.0%)	26 (47.3%)	10 (18.2%)
Type and location of book shelves	86	8 (9.3%)	36 (41.9%)	30 (34.9%)	10 (11.6%)	2 (2.3%)
AV viewing/ listening rooms	47	1 (2.1%)	4 (8.5%)	12 (25.5%)	21 (44.7%)	9 (19.1%)
Easy/ leisure reading lounge	72	2 (2.8%)	27 (37.5%)	23 (31.9%)	12 (16.7%)	8 (11.1%)
Library display area	83	3 (3.6%)	23 (27.7%)	30 (36.1%)	19 (22.9%)	8 (9.6%)
Furniture and fixtures	85	1 (1.2%)	28 (32.9%)	35 (41.2%)	17 (20.0%)	4 (4.7%)
Lighting	87	5 (5.7%)	44 (50.6%)	20 (23.0%)	13 (14.9%)	5 (5.7%)
Air-conditioning	87	17 (19.5%)	57 (65.5%)	10 (11.5%)	3 (3.4%)	-
Library open space	80	2 (2.5%)	29 (36.3%)	33 (41.3%)	10 (12.5%)	6 (7.5%)

9.5.3 Palm Oil Research Institute of Malaysia (PORIM)

PORIM library received low assessment for the adequacy of most physical facilities, except lighting and air-conditioning (Table 9.16). A mixed response was received for library furniture & fixtures and leisure reading lounge. It received the lowest assessment for the adequacy of group study rooms where one hundered percent respondents considered them as 'inadequate' or 'very inadequate'. Other library physical facilities receiving low adequacy assessment were individual study rooms, AV lisenting/viewing rooms, study carrels, book shelves, and library open space.

Table 9.16
Adequacy of Library Physical Facilities at PORIM

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Library seating capacity	22	-	5 (22.7%)	5 (22.7%)	8 (36.4%)	4 (18.2%)
Study carrels	21	-	2 (9.5%)	6 (28.6%)	9 (42.9%)	4 (19.0%)
Individual study rooms	11	-	1 (9.1%)	1 (9.1%)	3 (27.3%)	6 (54.5%)
Group discussion rooms	10	-	-	-	3 (30.0%)	7 (70.0%)
Type and location of book shelves	23	-	3 (13.0%)	6 (26.1%)	12 (52.2%)	2 (8.7%)
AV viewing/ listening rooms	15	-	-	4 (26.7%)	4 (26.7%)	7 (46.7%)

Table 9.16 (Continued)

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Easy/ leisure reading lounge	20	-	3 (15.0%)	12 (60.0%)	1 (5.0%)	4 (20.0%)
Library display area	21	-	4 (19.0%)	6 (28.6%)	9 (42.9%)	2 (9.5%)
Furniture and fixtures	23	-	4 (17.4%)	11 (47.8%)	6 (26.1%)	2 (8.7%)
Lighting	23	-	15 (65.2%)	8 (34.8%)	-	-
Air-conditioning	23	2 (8.7%)	15 (65.2%)	6 (26.1%)	-	-
Library open space	21	-	1(4.8%)	8 (38.1%)	9 (42.9%)	3 (14.3%)

9.5.4 Rubber Research Institute of Malaysia (RRIM)

Over 81 percent of the RRIM respondents considered library seating capacity as 'adequate' or 'very adequate' (Table 9.17). Other library physical facilities receiving the same adequacy assessment from more than 60 percent of the respondents were: display area, furniture and fixtures, lighting, book shelves and leisure reading lounge. However, over one-half of the RRIM respondents considered individual study rooms, group discussion rooms and AV lisenting/viewing facilities either as 'inadequate' or 'very inadequate'.

Table 9.17
Adequacy of Library Physical Facilities at RRIM

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Library seating capacity	32	9 (28.1%)	17 (53.1%)	5 (15.6%)	1 (3.1%)	-
Study carrels	27	2 (7.4%)	13 (48.1%)	9 (33.3%)	3 (11.1%)	-
Individual study rooms	20	1 (5.0%)	4 (20.0%)	4 (20.0%)	10 (50.0%)	1 (5.0%)
Group discussion rooms	19	-	2 (10.5%)	5 (26.3%)	10 (52.6%)	2 (10.5%)
Type and location of book shelves	31	2 (8.3%)	18 (58.1%)	10 (32.3%)	1 (3.2%)	-
AV viewing/ listening rooms	21	-	3 (14.3%)	7 (33.3%)	9 (42.9%)	2 (9.5%)
Easy/ leisure reading lounge	29	2 (6.9%)	17 (58.6%)	5 (17.2%)	4 (13.8%)	1 (3.4%)
Library display area	31	2 (6.5%)	21 (67.7%)	7 (22.6%)	1 (3.2%)	-
Furniture and fixtures	32	2 (6.3%)	20 (62.5%)	9 (28.1%)	1 (3.1%)	-
Lighting	32	3 (9.4%)	19 (59.4%)	9 (28.1%)	1 (3.1%)	-
Air-conditioning	32	4 (12.5%)	20 (62.5%)	7 (21.9%)	-	1 (3.1%)
Library open space	31	2 (6.5%)	12 (38.7%)	11 (35.5%)	6 (19.4%)	-

9.5.5 Forest Research Institute of Malaysia (FRIM)

Table 9.18 provides an assessment of the adequacy of physical facilities at the FRIM library. It was found that over 60 percent of the FRIM respondents rated most of their library physical facilities either as 'adequate' or 'very adequate'. Only a few facilities such as individual study rooms, group discussion rooms and AV listening/viewing rooms received comparatively low adequacy assessment.

Table 9.18
Adequacy of Library Physical Facilities at FRIM

Library Facility	N	Very Adequate	Adequate	Somewhat Adequate	Inadequate	Very Inadequate
Library seating capacity	30	9 (30.0%)	13 (43.3%)	5 (16.7%)	2 (6.7%)	1 (3.3%)
Study carrels	20	4 (20.0%)	5 (25.0%)	5 (25.0%)	5 (25.0%)	1 (5.0%)
Individual study rooms	9	-	2 (22.2%)	1 (11.1%)	3 (33.3%)	3 (33.3%)
Group discussion rooms	17	-	6 (35.3%)	6 (35.3%)	3 (17.6%)	2 (11.8%)
Type and location of book shelves	30	8 (26.7%)	19 (63.3%)	2 (6.7%)	-	1 (3.3%)
AV viewing/ listening rooms	13	-	7 (53.8%)	2 (15.4%)	2 (15.4%)	2 (15.4%)
Easy/ leisure reading lounge	27	3 (11.1%)	15 (55.6%)	7 (25.9%)	-	2 (7.4%)
Library display area	28	7 (25.0%)	16 (57.1%)	4 (14.3%)	-	1 (3.6%)
Furniture and fixtures	30	2 (6.7%)	20 (66.7%)	6 (20.0%)	1 (3.3%)	1 (3.3%)
Lighting	30	8 (26.7%)	19 (63.3%)	2 (6.7%)	-	1 (3.3%)
Air-conditioning	30	12 (40.0%)	13 (43.3%)	3 (10.0%)	1 (3.3%)	1 (3.3%)
Library open space	30	8 (26.7%)	19 (63.3%)	2 (6.7%)	-	1 (3.3%)

Some respondents, in response to an open-ended option for this question, provided their assessment about certain other library physical facilities. One respondnet from UPM complained about the inadequacy of parking space close to the library. Another UPM respondents felt that library audio-visual display room was inadequate for teaching purposes. One MARDI respondent put forward an interesting complaint that 'I am not happy with the noise level of library staff'.

It appeared that, on the whole, participants from FRIM, RRIM and UPM felt that various physical facilities provided by their library were adequate. PORIM respondents were generally dissatisfied with physical facilities of their library and awarded the lowest assessment to almost all items under this category (PORIM library has now moved to its new premises with improved physical

facilities). The Median test showed significant differences among the participating libraries for their physical facilities, except individual study rooms and library seating capacity (Table 9.19).

Table 9.19
Adequacy of Library Physical Facilities at the Participating Libraries

Frequencies

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Library seating	> Median	11	15	0	9	9
	<= Median	45	72	22	23	21
Type & location book shelves	> Median	6	8	0	2	8
	<= Median	53	78	23	29	22
Study carrels	> Median	28	43	2	15	9
	<= Median	27	33	19	12	11
Individual study rooms	> Median	15	20	1	5	2
	<= Median	38	39	10	15	7
Group discussion rooms	> Median	34	19	0	7	12
	<= Median	18	36	10	12	5
AV viewing rooms	> Median	16	5	0	3	7
	<= Median	34	42	15	18	6
Leisure reading lounge	> Median	24	29	3	19	18
	<= Median	33	43	17	10	9
Library display area	> Median	29	26	4	23	23
	<= Median	29	57	17	8	5
Furniture and fixtures	> Median	20	29	4	22	22
	<= Median	37	56	19	10	8
Lighting	> Median	11	5	0	3	8
	<= Median	47	82	23	29	22
Air-conditioning	> Median	15	17	2	4	12
	<= Median	44	70	21	28	18
Library open space	> Median	30	31	1	14	27
	<= Median	28	49	20	17	3

Test Statistics

	Library seating	Type & location book shelves	Study carrels	Individual study rooms	Group discussion rooms	AV viewing rooms
N	227	229	199	152	153	146
Median	4.00	4.00	3.00	3.00	2.00	3.00
Chi-Square	9.276	11.740	15.513	3.184	23.929	19.537
df	4	4	4	4	4	4
Asymp. Sig.	.055	.019	.004	.528	.000	.001

	Leisure reading lounge	Library display area	Furniture and fixtures	Lighting	Air conditioning	Library open space
N	205	221	227	230	231	220
Median	3.00	3.00	3.00	4.00	4.00	3.00
Chi-Square	18.131	38.002	30.306	15.622	10.535	40.071
df	4	4	4	4	4	4
Asymp. Sig.	.001	.000	.000	.004	.032	.000

The adequacy of library collections, equipment and other physical facilities are summarised as follows:

1. Although considerable variation was observed for the adequacy of library collections at the participating institutions, nevertheless a median score of 3 and above for all types of collections indicated that these libraries were meeting the information needs of their users adequately.

2. It was observed that the involvement of library users in the selection of library materials might result in higher satisfaction with their library collections.

3. Respondents from two libraries, i.e., UPM and FRIM, were generally satisfied with their library equipment whereas respondents from the other three libraries expressed their dissatisfaction.

4. It appeared that generally respondents from all the participating institutions, except PORIM, considered the physical facilities of their library as adequate. However, participants from all institutions

expressed their dissatisfaction over the availability of individual study rooms and group discussion rooms.

9.6 Summary

A considerable variation was observed among the participating libraries for the adequacy of their collections. The UPM library was considered strong in books, abstracting and indexing sources, AV materials and CD-ROM databases. The RRIM library was considered better for its research reports, books, reference materials, and serials. The PORIM library was ranked high for its research reports, reference collection, and abstracting and indexing sources. Serials and CD-ROM databases were considered adequate by the FRIM respondents. For most of the collections, the MARDI library received comparatively low appraisal from its respondents. However for all types of library collections, the median values were either 3 or 4, indicating that collections of the participating libraries were 'somewhat adequate' or better in meeting the information needs of their users. It was also found that those respondents who were involved in the selection of materials gave better assessment to their library collections. On the whole, participants were generally satisfied with library physical facilities but felt that equipment made available to them was inadequate. The next chapter will present data on the overall assessment of the participants about the effectiveness of their library in meeting their information needs. It will also cover the use of various information services by the respondents and their assessment about the adequacy of library promotional activities.

10. Library Effectiveness, Adequacy and Use of Library Services

10.1 Introduction

This study investigates several possible factors which are considered important in determining the effectiveness of libraries participating in this study. However, it was considered desirable to seek the overall assessment of the participants of their library effectiveness in meeting their information needs. The data on overall assessment is also cross-tabulated with several other variables to investigate what factors contribute positively in shaping the perception of library effectiveness. This chapter also explores the assessment of respondents about the adequacy of promotional activities undertaken by their library for introducing new materials, services and facilities to their users. Finally, data on the use of various information services by the respondents is presented.

10.2 Library Effectiveness

Table 10.1 presents the overall assessment of respondents of the effectiveness of their library in meeting their information needs. Nearly 67 and 62 percent of the respondents from FRIM and UPM respectively assessed their library as 'effective' or 'very effective'. The same level of appraisal was given to RRIM library by 42.4 percent of its respondents. On the contrary, 34.6 percent of the MARDI respondents assessed their library as 'ineffective' or 'very ineffective'. The Median test showed high significant differences among the participating libraries in meeting the information needs of their users.

Table 10.1
Overall Assessment of Library Effectiveness
N=234

Library	N	Very Effective	Effective	Somewhat Effective	Ineffective	Very Ineffective
UPM	60	8 (13.3%)	29 (48.3%)	17 (28.3%)	6 (10.0%)	-
MARDI	87	-	17 (19.5%)	39 (44.8%)	27 (31.0%)	4 (4.6%)
PORIM	24	-	6 (25.0%)	15 (62.5%)	3 (12.5%)	-
RRIM	33	-	14 (42.4%)	17 (51.5%)	2 (6.1%)	-
FRIM	30	5 (16.7%)	15 (50.0%)	8 (26.7%)	1 (3.3%)	1 (3.3%)
	234	13 (5.6%)	81 (34.6%)	96 (41.0%)	39 (16.7%)	5 (2.1%)

Median Test **Frequencies**

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
Overall assessment	> Median	37	17	6	14	20
	<= Median	23	70	18	19	10

N=234 Median=3 Chi-Square=38.074 *df*=4 *p*=.000

10.2.1 Respondents' Ability to Keep in Touch with Scientific Literature and Perception of Library Effectiveness

Of the 131 respondents who felt that they were able to keep in touch with scientific literature, 71 (54.2%) perceived their library as 'effective' or 'very effective' in meeting their information needs (Table 10.2). Only 6.9 percent of the respondents who were keeping in touch with scientific literature assessed their library as 'ineffective' or 'very ineffective'.

Table 10.2
Ability to Keep in Touch with Literature and Perception of Library Effectiveness
N=230

Library Effectiveness	Keeping in Touch	Not Keeping in Touch
Very Effective	13 (9.9%)	-
Effective	58 (44.3%)	23 (23.2%)
Somewhat Effective	51 (38.9%)	43 (43.4%)
Ineffective	8 (6.1%)	29 (29.3%)
Very Ineffective	1 (0.8%)	4 (4.0%)
Total	**131 (100%)**	**99 (100%)**

Chi-square=38.823, *df*=4, *p*=.000

On the contrary, of the 99 respondents who expressed their inability to keep in touch with scientific literature, only 23 (23.2%) perceived their library as 'effective' in meeting their information needs as compared to 33 (33.3%) respondents who felt that their library was 'ineffective' or 'very ineffective'. The

Chi-square test also showed high significant differences between both categories of respondents for their perception of library effectiveness. It appeared that those respondents who were able to keep in touch with scientific literature gave credit to their library in meeting their information needs.

10.2.2 Adequacy of Library Collections and Perception of Library Effectiveness

The assessment given by respondents of the adequacy of their library collections was cross-tabulated with their perceptions of library effectiveness to investigate if relationship existed between them. For this purpose, the Kendall's tau-b test was used and data for both the variables were collapsed to remove over 50 percent of the cells having an expected count of less than 5. A positive relationship was found between the assessment of participants of the adequacy of various library materials and their perception of library effectiveness (Table 10.3). It appeared that those respondents who consider their library collections as adequate are more likely to perceive their library as effective in meeting their information needs.

Table 10.3
Adequacy of Library Collections and Perception of Library Effectiveness

Type of Material	N	Chi-Square	Kendall's tau-b
Books	229	X^2=45.645 df=4, p=.000	K. tau-b=.391 p= .000
Serials	231	X^2=55.605 df=4, p=.000	K. tau-b=.438 p=.000
Research reports/ monographs, etc.	225	X^2=49.413 df=4, p=.000	K. tau-b=.394 p=.000
Reference materials	223	X^2=37.770 df=4, p=.000	K. tau-b=.361 p=.000
Abstracts and indexes	223	X^2=34.317 df=4, p=.000	K. tau-b=.309 p=.000
Audio-visual materials	186	X^2=30.724 df=4, p=.000	K. tau-b=.348 p=.000
CD-ROM databases	195	X^2=15.024 df=4, p=.005	K. tau-b=.226 p=.000

10.2.3 Involvement of Respondents in the Selection of Library Materials and Perception of Library Effectiveness

Of the 143 respondents who were consulted by their library for selecting library materials, 68 (47.5%) perceived their library as 'effective' or 'very effective' in meeting their information needs (Table 10.4). Another 58 (40.6%) of the participants who were consulted, assessed their library as 'somewhat effective'. Of the 87 respondents who were not consulted for the selection of materials, only 17 (32.2%) perceived their library as 'effective' or 'very effective' in meeting their information needs. The Chi-square test, after data collapsing to remove 3 (30%) of the cells having an expected count of less than 5, showed high significant differences between both categories of respondents for their assessment about library effectiveness. It appears that the involvement of library users in the selection of library materials is likely to result in developing library collections that are more relevant to their information needs. Such consultations could also create a feeling of being involved leading to enhanced perception of library effectiveness.

Table 10.4
Involvement in the Selection of Library Materials and Perception of Library Effectiveness
N=230

Library Effectiveness	Involved in the Selection	Not Involved in the Selection
Very Effective/ Effective	68 (47.5%)	25 (32.2%)
Somewhat Effective	58 (40.6%)	37 (42.5%)
Ineffective/ Very Ineffective	17 (11.9%)	25 (32.2%)
Total	**143 (100%)**	**87 (100%)**

Chi-square=13.195, *df*=2, *p*=.001

10.2.4 Adequacy of IT-based Library Equipment and Perception of Library Effectiveness

The Kendall's tau-b test was run to investigate if any relationship existed between assessment of the adequacy of library equipment and the perception of library effectiveness. For this purpose data were collapsed for both the variables as all types of library equipment had more than 20 percent of the cells with an expected count of less than 5. A positive relationship was found between the assessment of respondents of the adequacy of library equipment and perception

of library effectiveness. It appeared that the availability of appropriate type of library equipment in adequate numbers contributed in shaping the opinion of participants of the effectiveness of their library.

Table 10.5
Adequacy of Library Equipment and Perception of Library Effectiveness

Library Equipment	N	Chi-Square	Kendall's tau-b
OPAC Terminals	117	X^2=30.514 df=4, p=.000	K. tau-b=.447 p= .000
CD-ROM Workstations	176	X^2=28.617 df=4, p=.000	K. tau-b=..351 p= .000
Printers	160	X^2=12.916 df=4, p=.012	K. tau-b=.232 p= .001
Microform Reader-Printers	118	X^2=21.038 df=4, p=.000	K. tau-b=.354 p= .000
AV equipment	141	X^2=33.630 df=4, p=.000	K. tau-b=.416 p= .000

10.2.5 Adequacy of Library Physical Facilities and Perception of Library Effectiveness

The assessment provided by respondents of the adequacy of library physical facilities was cross-tabulated with their perception of library effectiveness to investigate if any relationship existed between them (Table 10.6). For this purpose the Kendall's tau-b test was used and data for both the variables were collapsed to remove over 20 percent of the cells having an expected count of less than 5. A positive relationship was found between the adequacy of library physical facilities and the perception of library effectiveness. It appears that users satisfied with library physical facilities are more likely to perceive their library as effective in meeting their information needs.

Table 10.6
Adequacy of Library Physical Facilities and Perception of Library Effectiveness

Physical Facilities	N	Chi-Square	Kendall's tau-b
Library Seating	227	X^2=15.516 *df*=4, *p*=.004	K. tau-b=.232 *p*=.000
Book Selves	229	X^2=36.080 *df*=4, *p*=.000	K. tau-b=.333 *p*=.000
Study Carrels	199	X^2=15.398 *df*=4, *p*=.004	K. tau-b=.182 *p*=.002
Individual Study Rooms	152	X^2=10.950 *df*=4, *p*=.027	K. tau-b=.204 *p*=.004
Group Discussion Rooms	152	X^2=18.694 *df*=4, *p*=.001	K. tau-b=.277 *p*=.000
AV Viewing Rooms	146	X^2=15.553 *df*=4, *p*=.004	K. tau-b=.287 *p*=.000
Leisure Reading Lounge	205	X^2=10.694 *df*=4, *p*=.030	K. tau-b=.205 *p*=.001
Library Display Area	221	X^2=37.873 *df*=4, *p*=.000	K. tau-b=.344 *p*=.000
Furniture and Fixtures	227	X^2=22.050 *df*=4, *p*=.000	K. tau-b=.274 *p*=.000
Lighting	230	X^2=9.895 *df*=4, *p*=.042	K. tau-b=.153 *p*=.011
Air-Conditioning	231	X^2=2.646 *df*=4, *p*=.619	K. tau-b=-.018 *p*=.770
Library Open Space	220	X^2=13.872 *df*=4, *p*=.008	K. tau-b=.218 *p*=.000

10.2.6 Library Use Skills of Respondents and Perception of Library Effectiveness

Table 10.7 shows the relationship between the library use skills of respondents and their perception of library effectiveness. It was found that of the 65 respondents with 'very good' or 'excellent' library use skills, 33 (50.8%) perceived their library as 'effective' or 'very effective' in meeting their information needs. Whereas, 40.4 percent of the participants with 'fair' or 'poor' library use skills considered their library as 'effective' or 'very effective'. However the Kendall's tau-b test, after data collapsing for both the variables to remove over 15 (60%) of the cells with an expected count of less than 5, showed no relationship between library use skills of the respondents and their perception of library effectiveness.

Table 10.7
Library Use Skills of Respondents and Perception of Library Effectiveness
N=231

Library Effectiveness	*Library Use Skills*		
	Excellent / Very Good	Good	Fair / Poor
Very Effective/ Effective	33 (50.8%)	42 (35.3%)	19 (40.4%)
Somewhat Effective	21 (32.3%)	54 (45.4%)	18 (38.3%)
Ineffective/ Very ineffective	11 (16.9%)	23 (19.3%)	10 (21.3%)
Total	**65 (100%)**	**119 (100%)**	**47 (100%)**

Chi-square=4.597, *df*=4, *p*=.331
Kendall's tau-b=.075, *p*=.220

10.2.7 Participation in User Education Programmes and Perception of Library Effectiveness

It was found that nearly 60 percent of the respondents who had participated in user education programmes considered their library as 'effective' or 'very effective' in meeting their information needs (Table 10.8). On the contrary, only 38.2 percent of the respondents who did not attend any user education programme assessed their library as 'effective' or 'very effective'. The Chi-square test, after data collapsing to remove 4 (40%) of the cells having an expected count of less than 5, showed significant differences between both categories of respondents for their assessment of library effectiveness.

Table 10.8
Participation in User Education Programmes and Perception of Library Effectiveness
N=233

Library Effectiveness	Training Attended	Training Not Attended
Very Effective/ Effective	16 (59.3%)	78 (38.2%)
Somewhat Effective	10 (37.0%)	83 (40.7%)
Ineffective/ Very Ineffective	1 (3.7%)	43 (21.1%)
Total	**27 (100%)**	**204 (100%)**

Chi-square=6.448, *df*=2, *p*=.040

It appears that participation in user education programmes might have contributed in enhancing the perception of respondents of their library effectiveness. After such training, these respondents might have started using

library collections and facilities more effectively resulting in their enhanced satisfaction.

10.2.8 Frequency of Library Visits and Perception of Library Effectiveness

The relationship between frequency of library visits and perception of the respondents of their library effectiveness is presented in Table 10.9. Those respondents who were visiting their library more frequently gave slightly better assessment to their library in meeting their information needs. However the Chi-square test, after data collapsing to remove 20 (66.7%) of the cells having an expected count of less than 5, showed no significant difference of library visits on the perception of respondents of their library effectiveness.

Table 10.9
Frequency of Library Visits and Perception of Library Effectiveness
N=233

Library Effectiveness	*Frequency of Library Visits*		
	Once or Twice a Week	Once or Twice a Month	Several Times a Year
Very Effective/ Effective	44 (43.1%)	32 (40.5%)	18 (34.6%)
Somewhat Effective	43 (42.2%)	32 (40.5%)	21 (40.4%)
Ineffective/ Very Ineffective	15 (14.7%)	15 (19.0%)	13 (25.0%)
Total	**102 (100%)**	**79 (100%)**	**52 (100%)**

Chi-square=2.657, *df*=4, *p*=.617

10.2.9 Location of the Library and Perception of Library Effectiveness

It was found that of the 193 respondents considering location of their library as convenient, 86 (44.6%) perceived their library as 'effective' or 'very effective'. On the contrary, only 20 percent of the respondents considering location of their library as inconvenient gave the same assessment to their library. The Chi-square test, after data collapsing to remove 3 (30%) of the cells having an expected count of less than 5, showed high significant differences between both categories of respondents for their perception of library effectiveness.

Table 10.10
Library Effectiveness and Location of Library
N=233

Library Effectiveness	*Library Location*	
	Convenient	Inconvenient
Very Effective/ Effective	86 (44.6%)	8 (20.0%)
Somewhat Effective	78 (40.4%)	18 (45.0%)
Ineffective/ Very Ineffective	29 (15.0%)	14 (35.0%)
Total	**193 (100%)**	**40 (100%)**

Chi-square=12.286, *df*=2, *p*=.000

It means that the location of a library is likely to contribute to users' satisfaction and their perception of library effectiveness. It was also found earlier (chapter 8.3.3.2) that those respondents who felt the location of their library to be 'convenient' were visiting it more frequently. It appeared that a conveniently located library is likely to encourage its users to visit it more frequently, resulting in a better perception of library effectiveness.

The perceptions of respondents of the effectiveness of their library in meeting their information needs and its relationship with certain other factors is summarised below:

1. Respondents from the surveyed institutions provided different assessments to their library in effectively meeting their information needs. The FRIM library obtained the highest assessment for its effectiveness while the MARDI library received the lowest.

2. It was found that libraries having adequate collections, equipment and library physical facilities were considered more effective.

3. Libraries involving respondents in the selection of library materials received better assessment for effectively meeting the information needs of their users.

4. Those respondents who were keeping in touch with scientific literature gave better assessment to their library.

5. Conveniently located libraries were considered more effective in meeting the information needs of their users.

6. Those respondents who had participated in user education programmes gave slightly better assessments to their library.

7. No relationship was found between frequency of library visits and library use skills of the respondents with their perception of the effectiveness of their library.

10.3 Notification about Newly Received Materials

Respondents were asked if their library notified them about the arrival of new materials in their subject areas. On the whole, a spilt response was received and about 50 percent of the participants reported that they were getting such notifications. However, a breakdown of respondents by their institutional affiliation, presented in Table 10.11, provides more insight for this variable. It was found that 84.2 percent of the RRIM participants were getting notifications for new materials received by their library. Similarly, 66.7 percent of the FRIM respondents were also getting such notifications. On the contrary, 73.9 percent of the PORIM and 60.9 percent of the MARDI respondents were not getting information about the latest materials received by their library. The Chi-square test showed high significant differences among the participating libraries for notifing the newly received materials to their users.

Table 10.11
Notifications about the Newly Arrived Materials
N=233

Institution	N	Notifications Received	Notifications Not Received
UPM	60	29 (48.3%)	31 (51.7%)
MARDI	87	34 (39.1%)	53 (60.9%)
PORIM	23	6 (26.1%)	17 (73.9%)
RRIM	33	28 (84.2%)	5 (15.2%)
FRIM	30	20 (66.7%)	10 (33.3%)
Total	**233**	**117 (50.2%)**	**116 (49.8%)**

Chi-square=28.837, *df*=4, *p*=.000

10.3.1 Notification about New Arrivals and Perception of Library Effectiveness

A positive relationship was found between fresh arrival notifications received by the participants and their perception of library effectiveness. Of the 117 respondents who received such notifications, 70 (59.8%) considered their library as 'effective' or 'very effective' in meeting their information needs (Table 10.12). Another one-third of the respondents in this category assessed their library as 'somewhat effective'.

Table 10.12
Notification about Newly Arrived Materials and Assessment of Library Effectiveness
N=233

Library Effectiveness	Notifications Received	Notifications Not Received
Very Effective/ Effective	70 (59.8%)	23 (19.9%)
Somewhat Effective	39 (33.3%)	57 (49.1%)
Ineffective/ Very Ineffective	8 (6.9%)	36 (31.0%)
Total	**117 (100%)**	**116 (100%)**

Chi-square=44.942, *df*=2, *p*=.000

On the contrary, of the 116 participants who did not receive notifications about new library materials, only 23 (19.9%) considered their library as 'effective' or 'very effective'. Thirty-six (31.0%) such respondents rated their library as 'ineffective' or 'very ineffective'. The Chi-square test, after data collapsing to remove 3 (30%) of the cells having an expected count of less than 5, showed high significant differences between both categories of participants for their assessment of library effectiveness. It appeared that those library users who receive notification of new library materials are more likely to perceive their library as effective in meeting their information needs.

10.3.2 Notification about New Arrivals and Respondents' Ability to Keep in Touch with Scientific Literature

Table 10.13 shows a relationship between receiving of new arrival notifications and the ability of respondents to keep in touch with scientific literature. Over 70 percent of the respondents getting these notifications reported that they were keeping in touch with scientific literature. On the contrary, over 56 percent of

the respondents not receiving such notifications felt that they were unable to keep in touch with the latest scientific literature. The Chi-square test also showed high significant differences between both categories of respondents for their ability to keep in touch with scientific literature. It appeared that those users who receive notification about the arrival of new library materials are more likely to keep themselves up-to-date about latest scientific developments.

Table 10.13
Notification about New Library Materials and Respondents' Ability to Keep in Touch with Scientific Literature
N=229

Ability to Keep in Touch with Scientific Literature	Notifications Received (N=117)	Notifications Not Received (N=112)
Keeping in Touch	82 (70.1%)	49 (43.8%)
Not Keeping in Touch	35 (29.9%)	63 (56.2%)

Chi-square=16.212, *df*=1, *p*=.000

It may be concluded that there was a positive relationship between the availability of new arrival service and users' satisfaction and their perception of library effectiveness in meeting their information needs. Similarly, those users who received notification about the arrival of new library materials felt that they were keeping in touch with scientific literature produced in their disciplines.

10.4 Adequacy of Library Promotional Activities

The opinion of respondents was sought about the adequacy of promotional activities undertaken by their library for introducing and popularising information services, library facilities and materials. A split response was received where about one-half of the respondents felt that their library was adequately promoting information services and facilities, while the remaining 50 percent disagreed with it.

Seventy percent of the participants from FRIM reported that their library was adequately promoting its services and facilities (Table 10.14). Nearly 65 percent of the respondents each from UPM and RRIM were satisfied with the promotional activities of their library. On the contrary, nearly 78 percent of the MARDI respondents felt that the promotional activities undertaken by their

library were inadequate. The Chi-square test showed high significant differences among respondents from the participating institutions in their satisfaction with the promotional activities undertaken by their library.

Table 10.14
Adequacy of Library Promotional Activities
N=229

Institution	N	Adequate Promotion	Inadequate Promotion
UPM	60	39 (65.0%)	21 (35.0%)
MARDI	86	19 (22.1%)	67 (77.9%)
PORIM	22	12 (54.5%)	10 (45.5%)
RRIM	31	20 (64.5%)	11 (35.5%)
FRIM	30	21 (70.0%)	9 (30.0%)
Total	**229**	**111 (48.5%)**	**118 (51.5%)**

Chi-square=39.608, *df*=4, *p*=.000

10.4.1 Adequacy of Promotional Activities and Respondents' Ability to Keep in Touch with Scientific Literature

Of the 110 respondents who considered promotional activities undertaken by their library as adequate, 84 (76.4%) reported that they were keeping in touch with scientific literature (Table 10.15). On the contrary, of the 115 respondents who perceived the promotional activities of their library as 'inadequate', 69 (60.0%) expressed their inability in keeping in touch with scientific literature. The Chi-square test also showed high significant differences between both categories of respondents for their ability to keep in touch with current scientific literature. It appeared that library promotional activities are likely to create awareness among library users and encourage them to use their library collections, services and facilities.

Table 10.15
Adequacy of Promotional Activities and Respondents' Ability to Keep in Touch with Latest Scientific Literature
N=225

Ability to Keep in Touch with Scientific Literature	Adequate Promotion	Inadequate Promotion
Keeping in Touch	84 (76.4%)	46 (40.0%)
Not Keeping in Touch	26 (23.6%)	69 (60.0%)
Total	**110 (100%)**	**115 (100%)**

Chi-square=30.475, *df*=1, *p*=.000

10.4.2 Adequacy of Promotional Activities and Perception about Library Effectiveness

A positive relationship was found between the adequacy of promotional activities and perception of respondents of the effectiveness of their library. Of the 111 respondents who considered library promotional activities as 'adequate', 73 (65.8%) perceived their library as 'effective' or 'very effective' in meeting their information needs (Table 10.16). Only three (2.7%) respondents in this category considered their library as 'ineffective' or 'very ineffective'.

On the contrary, of the 118 respondents who considered the promotional activities of their library as 'inadequate', only 19 (16.1%) considered their library as 'effective' or 'very effective' while 41 (34.7%) respondents perceived their library as 'ineffective' or 'very ineffective'. The Chi-square test, after data collapsing to remove 3 (30%) of the cells having an expected count of less than 5, also demonstrated high significant differences between both categories of respondents for their perception of library effectiveness. It appears that those patrons who get adequate information about library services and facilities are more likely to perceive their library as effective in meeting their information needs.

Table 10.16
Adequacy of Promotional Activities and Respondents' Assessment of Library Effectiveness
N=229

Library Effectiveness	Adequate Promotion	Inadequate Promotion
Very Effective/ Effective	73 (65.8%)	19 (16.1%)
Somewhat Effective	35 (31.5%)	58 (49.2%)
Ineffective/ Very Ineffective	3 (2.7%)	41 (34.7%)
Total	**111 (100%)**	**118 (100%)**

Chi-square=70.053, *df*=2, *p*=.000

It may be concluded that library promotional activities have a positive relationship with the ability of users to keep in touch with the needed information. Adequate promotional activities are likely to help library users to know about various information sources, services and facilities available to them thus shaping a positive perception towards library effectiveness.

10.5 Availability of Needed Materials

Respondents were asked as to how frequently they received the needed articles and other materials from their own library collections. Nearly 47 percent of the respondents from FRIM and 45 percent from UPM reported that they were either 'frequently' or 'always' getting the required materials from their library (Table 10.17). On the contrary, 55 percent of the MARDI and 41.7 percent of the PORIM respondents reported that they were 'occasionally' or 'hardly ever' getting the needed materials from their library. The Chi-square test, after data collapsing to remove 8 (32%) of the cells having an expected count of less than 5, showed high significant differences among respondents from the participating institutions for their ability to get the needed materials from their library collections.

Table 10.17
Availability of Needed Materials from Library Collections
N=232

Availability of Materials	UPM	MARDI	PORIM	RRIM	FRIM
Always/ Frequently	26 (44.8%)	19 (22.0%)	6 (25.0%)	11 (33.3%)	14 (46.7%)
Most of the Time	17 (29.3%)	20 (23.0%)	8 (33.3%)	13 (39.4%)	8 (26.6%)
Occasionally/ Hardly Ever	15 (25.9%)	48 (55.0%)	10 (41.7%)	9 (27.3%)	8 (26.6%)
Total	**58 (100%)**	**87 (100%)**	**24 (100%)**	**33 (100%)**	**30 (100%)**

Chi-square=21.347, *df*=8, *p*=.006

10.5.1 Availability of Materials and Assessment about the Adequacy of Library Collections

Responses given by the participants for the availability of needed materials was cross-tabulated with their assessment of the adequacy of library collections to investigate if any relationship existed between them (Table 10.18). For this purpose the Kendall's tau-b test was used and data for both the variables were collapsed to remove over 11 (44%) of the cells having an expected count of less than 5. A positive relationship was found between the assessment for the availability of needed materials and perception of the adequacy of library collections.

Table 10.18
Availability of Needed Materials and the Adequacy of Library Collections

Type of Material	N	Chi-Square	Kendall's tau-b
Books	227	X^2=27.115 df=4, p=.000	K. tau-b=.279 p= .000
Serials	229	X^2=46.606 df=4, p=.000	K. tau-b=.375 p= .000
Research reports, monographs, etc.	224	X^2=24.469 df=4, p=.000	K. tau-b=.261 p= .000
Reference materials	221	X^2=27.644 df=4, p=.000	K. tau-b=.305 p= .000
Abstracts and indexes	222	X^2=40.864 df=4, p=.000	K. tau-b=.371 p= .000

10.5.2 Relationship between the Availability of Needed Materials and Perception of Library Effectiveness

Table 10.19 presents the relationship between the availability of library materials and the perception of respondents of the effectiveness of library in meeting their information needs. Out of the 76 respondents who were 'always' or 'frequently' getting the needed materials, 50 (65.8%) perceived their library as 'effective' or 'very effective' in meeting their information needs. Perception of library effectiveness declined with the decrease in the availability of needed materials. A majority of the respondents who were getting the required materials infrequently perceived their library as 'ineffective' or 'very ineffective'. The Kendall's tau-b test, after data collapsing to remove 14 (56%) of the cells having an expected count of less than 5, also showed a positive relationship between the availability of needed materials and the perception of library effectiveness.

Table 10.19
Availability of Needed Materials and the Assessment of Library Effectiveness
N=232

Library Effectiveness	*Availability of Materials*		
	Always/ Frequently	Most of the Time	Occasionally/ Hardly Ever
Very Effective/ Effective	50 (65.8%)	34 (51.5%)	10 (11.1%)
Somewhat Effective	20 (26.3%)	31 (47.0%)	44 (48.9%)
Ineffective/ Very Ineffective	6 (7.9%)	1 (1.5%)	36 (40.0%)
Total	**76 (100%)**	**66 (100%)**	**90 (100%)**

Chi-square=76.433, df=4, p=.000
Kendall's tau-b=.472, p=.000

10.6 Document Delivery and Interlibrary Loan Requests

Respondents were asked as to how often they requested their library to acquire materials from other sources that were not available in their own library collections. Out of the 33 respondents from RRIM, 31 (94.0%) disclosed that they were 'occasionally' or 'hardly ever' requesting their library to acquire the unavailable materials from other sources (Table 10.20). Seventy-seven percent of the MARDI respondents were also in this category. The number of respondents from UPM, PORIM and FRIM who were 'occasionally' or 'hardly ever' requesting their library to acquire unavailable materials ranged from 66 to 68 percent. However, the Chi-square test showed no significant differences among respondents from different institutions for making document delivery and interlibrary loan requests. For running this test, data for the categories 'always', 'frequently' and 'most of the time' were merged to remove 14 (56%) of the cells having an expected count of less than 5.

Table 10.20
Use of Documents Delivery and Interlibrary Loaning Services
N=224

Request Frequency	UPM	MARDI	PORIM	RRIM	FRIM
Always/ Frequently/ Most of the Time	19 (31.7%)	20 (23.0%)	8 (33.3%)	2 (6.0%)	10 (33.3%)
Occasionally	36 (60.0%)	55 (63.2%)	13 (54.2%)	22 (66.7%)	17 (56.7%)
Hardly Ever	5 (8.3%)	12 (13.8%)	3 (12.5%)	9 (27.3%)	3 (10.0%)
Total	**60 (100%)**	**87 (100%)**	**24 (100%)**	**33 (100%)**	**20 (100%)**

Chi-square=13.939, df=8, p=.083

The data analysis clearly revealed that a majority of the respondents were not benefiting from the document delivery and interlibrary loan services offered by their library. In fact, on average, only 1.25 interlibrary loan and document delivery requests were made per scientist per annum from the research institutions (chapter 5.5.3). During interviews it transpired that most of the interviewees were aware of such services but were using these infrequently. A majority of them pointed-out that they would only request their library to acquire unavailable materials if these publications were crucial for them. They also mentioned that usually, they prefer to request materials from their overseas professional colleagues and former academic supervisors. They felt that this

channel was often more economical and less time consuming for acquiring the needed materials.

10.6.1 Problems Associated with Using Document Delivery Service

Respondents were asked to indicate problems encountered by them in using the document delivery service. The most serious problem, as identified by 129 (55.1%) of the respondents, was long response time in getting the requested materials (Table 10.21). Another 44 (18.8%) respondents reported that it was the high cost that discouraged them from using this service. The next two reasons for not using the document delivery service were also related to money - "no money available in the research budget for reprint procurement" was mentioned by 36 (15.4%) respondents and "do not want to spend money from my own pocket" by 24 (10.3%) respondents. Eleven participants, mostly from MARDI, disclosed that it was the discouraging attitude of library staff that hampered them from using the document delivery service.

Table 10.21
Problems Associated with Using the Document Delivery Service
(Multiple Response)
N=171

Problem (Ranked)	UPM (N=49)	MARDI (N=70)	PORIM (N=18)	RRIM (N=15)	FRIM (N=19)	Total
Long response time	38	52	15	11	13	129
Very expensive to request	26	8	4	3	3	44
No money in the research budget to buy reprints	14	17	-	5	-	36
Don't want to spend money from my own pocket	12	10	1	-	1	24
Service available to only senior scientists	6	3	-	2	1	12
Librarian's attitude discouraging	2	7	-	1	1	11

It may be concluded that the long response time and non-availability of funds were the major problems that were hindering respondents from using the document delivery service.

10.7 Summary

Respondents from the participating institutions provided different overall effectiveness assessment to their libraries, highest to the FRIM library and lowest to the MARDI library. The libraries having adequate collections, equipment and physical facilities were considered more effective. Those respondents who were able to keep in touch with scientific literature considered their library as more effective. Other factors having a positive relationship with the perception of library effectiveness were: involvement of users in the selection of library materials, convenient library location, participation in user education programmes, receiving notification about the arrival of new materials, adequate library promotion, and the availability of needed materials in the library. It was also found that a majority of the respondents were not frequently using the document delivery service. Reasons given for it were long response time, high cost, and non-availability of funds for this purpose.

The next chapter will provide data on certain other factors associated with information access and use. It will also cover several aspects related to library staff and user relations. Finally, it will present suggestions from the respondents for improving the effectiveness of Malaysian agricultural libraries.

11. Factors Associated with Information Access and Use

11.1 Introduction

The previous chapter presented perceptions of the respondents of the overall effectiveness of their library, adequacy of library promotion, and availability and use of various library services. This chapter presents data on certain other factors that are expected to play a role in effective information access and use by the respondents. It explores the allocation of funds for literature procurement in research budgets and its relationship with the use of fee-based information services. Different aspects related to staff-user relations are also covered. Finally, this chapter presents suggestions made by the respondents for improving the effectiveness of Malaysian agricultural libraries.

11.2 Funds for Literature Procurement

Respondents were asked if they requested money for literature procurement while preparing the budget for their research proposals. Only 82 (36.0%) of the respondents reported that they requested money for this purpose (Table 11.1). It was found that of the 59 respondents from UPM, 38 (64.4%) requested money for literature procurement in their research budget. Similarly, over 36 percent of the respondents from FRIM and 33 percent from MARDI were requesting money for literature procurement. On the contrary, 95.7 percent of the PORIM and 87.5 percent of the RRIM respondents were not asking money for literature procurement in their research proposals. One possible reason for not keeping money for literature procurement by the respondents from PORIM and RRIM might be the fact that all library services including online database searching and document delivery were available free of charge to these scientists.

Table 11.1
Requesting Budget for Literature Procurement

Library	N	Provided Budget	Did Not Provide Budget
UPM	59	38 (64.4%)	21 (35.6%)
MARDI	84	28 (33.3%)	56 (66.7%)
PORIM	23	1 (4.3%)	22 (95.7%)
RRIM	32	4 (12.5%)	28 (87.5%)
FRIM	30	11 (36.7%)	19 (63.3%)
Total	**228**	**82 (36.0%)**	**146 (64.0%)**

11.2.1 Relationship between Budget Allocation and Requests for Literature Procurement

Table 11.2 shows the relationship between budget allocation and literature procurement requests made by the respondents. It was found that those respondents who provided money for literature procurement in their research budget made more document delivery requests. On the contrary, over 82 percent of the respondents not requesting funds for literature procurement were 'occasionally' or 'hardly ever' making such requests. The Chi-square test also showed high significant differences between both categories of respondents in making requests for literature procurement. It appeared that those scientists who provided budget for literature procurement in their research proposals were more likely to make document delivery requests.

Table 11.2
Budget Allocation and Requests for Literature Procurement
N=228

Request for Document Procurement	Provided Budget	Did Not Provide Budget
Always	6 (7.3%)	3 (2.1%)
Frequently	13 (15.9%)	15 (10.3%)
Most of the Time	12 (14.6%)	8 (5.5%)
Occasionally	44 (53.7%)	96 (65.8%)
Hardly Ever	7 (8.5%)	24 (16.4%)
Total	**82 (100%)**	**146 (100%)**

Chi-square=13.693, df=4, p=.008

11.3 Abandoning Research Projects

In order to indirectly estimate the adequacy of collections of the participating libraries, respondents were asked if they had ever abandoned a research project due to non-availability of information. It was found that only 23 (9.9 %) of the respondents had abandoned their research projects due to literature shortage (Table 11.3). A further analysis of these respondents indicated that they were spread over all the institutions, departments or subject areas.

Table 11.3
Abandoning Research Projects due to Non-availability of Information
N=233

Institution	Research Abandoned	Research not Abandoned	Total
UPM	6 (10.2%)	53 (89.8%)	59 (100%)
MARDI	6 (6.9%)	81 (93.1%)	87 (100%)
PORIM	3 (12.5%)	21 (87.5%)	24 (100%)
RRIM	2 (6.1%)	31 (93.9%)	33 (100%)
FRIM	6 (20.0%)	24 (80.0%)	30 (100%)
Total	**23 (9.9%)**	**210 (90.1%)**	**233 (100%)**

It appeared that, in general, the collections of the participating libraries were not acutely deficient to force respondents to abandon their research projects. However, in certain subject areas the library collections might be inadequate to support a specialised research activity. It may be concluded that the participating libraries were providing adequate information support to their scientists to undertake and implement their research projects.

11.3.1 Relationship between Abandoning Research Projects and Certain Related Factors

An analysis of those respondents who abandoned their research projects due to literature shortage revealed that only 30.4 percent of them perceived their library as 'effective' or 'very effective' whereas the same percentage of the participants (30.4%) assessed their library as 'ineffective' or 'very ineffective' (Table 11.4). It appeared that those respondents who abandoned their research projects considered their library as comparatively less effective in meeting their information needs.

Table 11.4
Abandoned Research Projects and Assessment of Library Effectiveness
N=233

Library Effectiveness	Research Abandoned	Research Not Abandoned
Very Effective/ Effective	7 (30.4%)	87 (41.4%)
Somewhat Effective	9 (39.1%)	86 (41.0%)
Ineffective/ Very Effective	7 (30.4%)	37 (17.6%)
Total	**23 (100%)**	**210 (100%)**

Of the 23 respondents who cancelled their research projects, 15 (65.2%) were not receiving information about the new materials acquired by their library. Similarly, 14 (60.9%) of these respondents also felt that promotional activities undertaken by their library were inadequate.

A further analysis of the 23 respondents who abandoned their research projects revealed that 14 (60.9%) were experiencing long delays in getting articles and other materials through document delivery and inter-library loan service. Exactly the same number of respondents (14 or 60.9%) reported that they were not providing money for literature procurement in their research proposals.

11.4 Library Staff

This section deals with various aspects related to user and library staff relations. Assistance sought by respondents from library staff for using various library services and facilities is discussed. Problems encountered by respondents in communicating with non-subject specialist librarians are also explored. Finally assessment of the participants about personal characteristics and attitude of library staff towards their users is presented.

11.4.1 Type of Assistance Sought

Table 11.5 presents data on the type of assistance sought by respondents from their library staff. It was found that 39 (19.4%) of the respondents 'always' or 'frequently' sought assistance for using library equipment. The same level of assistance was sought by 38 respondents for using CD-ROM facility and by 37

respondents for finding the needed documents. It appeared that most of the respondents were comfortable in using the OPAC as only 78 respondents sought assistance for this purpose occasionally or more.

Table 11.5
Assistance Sought for Using Library Resources and Facilities

Type of Assistance	N	Always	Frequently	Most of the Time	Occasionally	Hardly Ever
For Using Library Equipment	201	15 (7.5%)	24 (11.9%)	25 (12.4%)	97 (48.3%)	40 (19.9%)
For Using CD-ROM Facility	234	14 (7.5%)	24 (12.9%)	36 (19.4%)	67 (36.0%)	45 (24.2%)
For Finding Documents	231	5 (2.2%)	32 (13.9%)	19 (8.2%)	149 (64.5%)	26 (11.3%)
To Know Location of a Service	230	5 (1.7%)	22 (9.6%)	41 (17.8%)	123 (53.5%)	40 (17.4%)
For Using OPAC	126	1 (0.8%)	6 (4.8%)	18 (14.3%)	53 (42.1%)	48 (38.1%)

11.4.2 Type of assistance sought and Institutional Affiliation of Respondents

Based on Median test, it was found that the UPM respondents mostly approached their library staff for seeking assistance in using various library equipment and CD-ROM searching facility (Table 11.6). Almost the same pattern was observed for MARDI where most of the respondents sought assistance for using CD-ROM facility and library equipment. The FRIM and RRIM respondents, in addition to seeking help for using library equipment, sought assistance from their library staff for knowing the location of various library services and facilities. However, the Median test showed significant differences among respondents from different institutions for only two types of assistance, i.e., 'knowing location of a service' and 'using CD-ROM search facility'.

Table 11.6
Type of Assistance Sought and Institutional Affiliation of Respondents

Frequencies

		Institution				
		UPM	MARDI	PORIM	RRIM	FRIM
For finding documents	> Median	12	16	6	9	13
	<= Median	47	69	18	24	17
Locate a service	> Median	11	25	7	9	15
	<= Median	48	59	17	24	15
Lit searching CD-ROM and online	> Median	22	35	2	2	13
	<= Median	34	35	11	16	16
Use of OPAC	> Median	12	4	5	1	3
	<= Median	28	28	13	15	17
Use of library equipment	> Median	20	33	5	14	14
	<= Median	36	49	19	18	15

Test Statistics

	Finding Documents	Locate a Service	Using CD-ROM	Using OPAC	Using Equipment
N	231	230	186	126	223
Median	2.00	2.00	2.00	2.00	2.00
Chi-Square	7.975	9.543	12.771	6.546	4.992
df	4	4	4	4	4
p	.093	.049	.012	.162	.288

On the whole, it was observed that respondents from almost all institutions required assistance for using library equipment and CD-ROM searching facility. They also often sought assistance for finding the needed materials and locating library services and facilities. Only a limited number of respondents asked for assistance in searching OPAC. It appeared that most of the respondents were capable of searching their OPAC independently. However, frequent assistance sought by respondents for various purposes highlighted the need for more intensive user education programmes to enable them to use library collections, services and facilities more efficiently.

11.4.3 Relationship between Type of Assistance Sought and Perception of Library Effectiveness

The type of assistance sought by respondents was cross-tabulated with their perception of library effectiveness to investigate if relationship existed between them. For this purpose the Kendall's tau-b test was used and data for both the

variables were collapsed to remove over 12 (48%) of the cells with an expected count of less than 5 (Table 11.7). No relationship was found between assistance sought for using various library services and facilities and perception of library effectiveness.

Table 11.7
Type of Assistance Sought and Perception of Library Effectiveness

Type of Assistance	N	Chi-Square	Kendall's tau-b
For finding documents	231	X^2=9.338 *Df*=4, *p*=.053	K. tau-b=.140 *p*= .020
To know the location of a service	230	X^2=4.578 *Df*=4, *p*=.333	K. tau-b=.023 *p*= .698
For using CD-ROM service	186	X^2=2.176 *Df*=4, *p*=.703	K. tau-b=.040 *p*= .561
For using OPAC	126	X^2=4.880 *Df*=4, *p*=.300	K. tau-b=.171 *p*= .028
For using library equipment	223	X^2=10.771 *Df*=4, *p*=.096	K. tau-b=.056 *p*= .363

11.4.4 Relationship between Assistance Sought and the Library Use Skills of Respondents

The Kendall's tau-b test was used to find out if any relationship existed between assistance sought by the respondents and their level of library use skills (Table 11.8). For this purpose data for both the variables were collapsed to remove over 11 (44%) of the cells having an expected count of less than 5. No relationship was found between assistance sought and the library use skills of the respondents. It appeared that respondents irrespective of their level of library use skills sought assistance from library staff for using various library services and facilities.

Table 11.8
Type of Assistance Sought and Library Use Skills of Respondents

Type of Assistance	N	Chi-Square	Kendall's tau-b
For finding documents	228	X^2=4.887 *Df*=4, *p*=..299	K. tau-b=.078 *p*= .172
To know the location of a service	227	X^2=2.049 *Df*=4, *p*=.727	K. tau-b=-.006 *p*= .920
For using CD-ROM service	184	X^2=5.065 *Df*=4, *p*=.281	K. tau-b=.111 *p*= .095
For using OPAC	124	X^2=8.594 *Df*=4, *p*=.072	K. tau-b=.206 *p*= .007
For using library equipment	220	X^2=7.683 *Df*=4, *p*=.262	K. tau-b=.046 *p*= .453

11.4.5 Communication Problems with Non-Subject Specialists

Respondents were asked if they encountered any problems in explaining their information needs to those library staff who lacked subject background. On the whole, 59 (28.5%) of the respondents replied in the affirmative (Table 11.9). Out of the 77 respondents from MARDI, 30 (39.0%) were facing communication problems with non-subject specialist librarians. Over 27 percent of the UPM and 22.2 percent of the FRIM respondents were also facing such communication problems. The percentage of respondents facing communication problems from RRIM and PORIM was 18.8 and 15.0 percent respectively.

Table 11.9
Communication Problems with Non-Subject Specialist Library Staff

Library	N	Communication Problems Faced	No Communication Problems Faced
UPM	51	14 (27.5%)	37 (72.5%)
MARDI	77	30 (39.0%)	47 (61.0%)
PORIM	20	3 (15.0%)	17 (85.0%)
RRIM	32	6 (18.8%)	26 (81.3%)
FRIM	27	6 (22.2%)	21 (77.8%)
Total	**207**	**59 (28.5%)**	**148 (71.5%)**

11.4.5.1 Relationship between Communication Problems and Perception of Library Effectiveness

Table 11.10 provides data on the relationship between communication problems encountered by the respondents and their perception of library effectiveness. It was found that over 85 percent of the respondents who were not facing communication problems perceived their library either as 'effective' or 'very effective'. On the contrary, 40 percent of the respondents who were facing difficulties in explaining their information needs to non-subject specialist librarians, perceived their library as 'ineffective' or 'very ineffective'. The Chi-square test, after data collapsing to remove 3 (30%) of the cells having an expected count of less than 5, showed high significant differences between both categories of respondents for communication problems faced by them. It appeared that the availability of subject specialists in agricultural libraries is

likely to improve communication with scientists, thus enhancing the chances to effectively meet their information needs.

Table 11.10
Communication Problems and Perception of Library Effectiveness
N=207

Library Effectiveness	Communication Problem Faced	No Communication Problems Faced	Total
Very Effective/ Effective	12 (14.6%)	70 (85.4%)	82 (100%)
Somewhat Effective	31 (36.5%)	54 (63.5%)	85 (100%)
Ineffective/ Very Ineffective	16 (40.0%)	24 (60.0%)	40 (100%)

Chi-square=12.982, *df*=2, *p*=.002

11.4.6 Personal Characteristics of Library Staff

Opinion of respondents was sought regarding personal characteristics and attitude of library staff towards their users. Out of the 57 UPM respondents, 41 (71.9%) felt that most of their library staff were adequately trained and knowledgeable (Table 11.11). Nearly 71 percent of the PORIM, 68 percent of the RRIM, and 55.2 percent of the FRIM respondents also agreed with this statement. On the contrary, only 46.4 percent of the MARDI respondents felt that most of their library staff were adequately trained and knowledgeable.

All respondents from PORIM agreed that "most of the library staff was friendly, warm, and supportive". The percentage of respondents agreeable with this statement was 93.1 percent from FRIM, 87.9 percent from RRIM and 83.1 percent from UPM. The lowest number of respondents (77.9%) acceding to this statement was from MARDI.

Over 96 percent of the FRIM respondents felt that "most of their library staff was easily accessible". Similarly, 91.7 percent of the PORIM and 87.5 percent of the RRIM respondents agreed with this statement. The lowest percentage of respondents (62.4%) who agreed with this statement was affiliated with MARDI.

Table 11.11
Personal Characteristics of Library Staff

Staff Characteristics	UPM	MARDI	PORIM	RRIM	FRIM	X^2
Most of the library staff properly trained and knowledgeable	41 (71.9%) (N=57)	39 (46.4%) (N=84)	17 (70.8%) (N=24)	21 (67.7%) (N=31)	16 (55.2%) (N=29)	X^2=11.99 df=4 p=.017
Most of the library staff friendly, warm and supportive	49 (83.1%) (N=59)	67 (77.9%) (N=86)	24 (100.0%) (N=24)	29 (87.9%) (N=33)	27 (93.1%) (N=29)	X^2=9.43 df=4 p=.051
Most of the library staff easily accessible	47 (81.0%) (N=58)	53 (62.4%) (N=85)	22 (91.7%) (N=24)	28 (87.5%) (N=32)	28 (96.6%) (N=29)	X^2=22.60 df=4 p=.000
Most of the staff prompt in providing the required information within the expected time period	41 (71.9%) (N=57)	41 (50.0%) (N=82)	22 (91.7%) (N=24)	27 (84.4%) (N=32)	26 (89.7%) (N=29)	X^2=29.62 df=4 p=.000

Almost the same response pattern was observed for the statement that "most of the library staff was prompt in providing the required information within the expected time period". The percentage of respondents who agreed to this statement was 91.7 percent from PORIM, 89.7 percent from FRIM and 84.4 percent from RRIM. On the contrary, only one-half of the MARDI respondents agreed with the statement dealing with staff promptness. The Chi-square tests also showed significant differences among respondents from different institutions for their assessment of the personal characteristics of their library staff.

11.4.6.1 Relationship between Personal Characteristics of Library Staff and Perception of Library Effectiveness

Table 11.12 shows the relationship between personal characteristics of library staff and perception of respondents of their library effectiveness. It was found that one-half of the respondents who considered their library staff as properly trained and knowledgeable perceived their library as 'effective' or 'very effective' in meeting their information needs. Another 53 (39.6%) of such respondents assessed their library as 'somewhat effective'. On the contrary, only 14 (10.5%) of the respondents who considered their library staff as properly trained and knowledgeable perceived their library as 'ineffective' or 'very ineffective'. Almost the same trend was observed for other personal characteristics and attitudes of library staff where respondents giving higher appraisal to their library staff reported that their information needs were

effectively met. It appeared that positive personal characteristics and attitudes of library staff were likely to contribute in shaping the opinion of library users about the effectiveness of their library.

Table 11.12
Personal Characteristics of Library Staff and Perception of Library Effectiveness

Staff Characteristics	N	*Library Effectiveness*				
		Very Effective	Effective	Somewhat Effective	Ineffective	Very Ineffective
Most of the library staff properly trained and knowledgeable	134	13 (9.7%)	54 (40.3%)	53 (39.6%)	12 (9.0%)	2 (1.5%)
Most of the library staff friendly, warm and supportive	190	13 (6.8%)	74 (38.9%)	72 (37.9%)	28 (14.7%)	3 (1.6%)
Most of the library staff easily accessible	175	13 (7.4%)	73 (41.7%)	62 (35.4%)	25 (14.3%)	2 (1.1%)
Staff prompt in providing the requir-ed information	157	13 (8.3%)	70 (44.6%)	52 (33.1%)	20 (12.7%)	2 (1.3%)

11.5 Suggestions by Respondents for Improving Effectiveness of Malaysian Agricultural Libraries

Table 11.13 presents various suggestions offered by the respondents for improving the effectiveness of Malaysian agricultural libraries. An overwhelming majority (195 or 84.8%) of the respondents supported the proposal that "Malaysian agricultural libraries should be linked through a computer network". Currently, only OPAC and some in-house databases of the UPM and PORIM libraries are accessible through the Internet. Two other suggestions receiving strong support from the respondents were related to the procurement of more scientific journals, books, and other library materials. One hundred sixty-eight (73.0%) of the respondents agreed with the suggestion that "card holder of one agricultural library should be allowed to borrow materials from other local agricultural libraries". Two other suggestions receiving support of nearly 73 percent of the respondents were related to access to more electronic information sources and the Internet. The suggestion that received the least support from the respondents (56.1%) was related to the provision of more user education programmes.

It appeared that the following three areas were considered more important by the respondents for improving the effectiveness of Malaysian agricultural libraries:

1. Networking of libraries;
2. improvement of library collections; and
3. access to more electronic information sources and services.

In response to an open-ended question, respondents offered several suggestions for improving the effectiveness of their library. One respondent from UPM suggested that inter-library loan requests should be promptly handled. Another UPM respondent desired that the long time lag in reshelving used books should be reduced.

Twelve respondents from MARDI provided a variety of suggestions for improving the effectiveness of their library. Some of them offered more than one suggestion. Seven MARDI respondents wished to see improvement in the qualification and attitude of the library staff. One of them remarked that "staff attitude need to be changed - [they should be] more service oriented". Another MARDI respondent commented that "all library staff should be trained in TQC [Total Quality Control] to be more efficient and courteous in handling library users". Four respondents desired that their library staff should be properly trained to provide better service and introduce new technologies in the MARDI library. "Library staff should be properly trained and knowledgeable about their duties", one respondent suggested. Another MARDI participant desired that staff with agricultural background should be employed in the library.

Three MARDI respondents suggested that their library should organise training courses for its users as well as adequately promote library resources and facilities. It was also recommended that more space should be provided to the library. However, considering the fact that MARDI library was not getting

Table 11.13
Suggestions for Improving Library Effectiveness
(Multiple Response)

Suggestions (Ranked)	UPM (N= 58)	MARDI (N=87)	PORIM (N=24)	RRIM (N=33)	FRIM (N=28)	Total (N=230)
Malaysian agricultural libraries should be linked through a computer network	44 (75.9%)	79 (90.8%)	15 (62.5%)	27 (81.8%)	25 (89.3%)	195 (84.8%)
More scientific journals should be procured	44 (75.9%)	73 (83.9%)	21 (87.5%)	18 (54.5%)	20 (71.4%)	176 (76.5%)
More books and other types of library materials should be procured	40 (69.0%)	73 (83.9%)	19 (79.2%)	23 (69.7%)	19 (67.9%)	174 (75.7%)
Card holder of one agricultural library should be allowed to borrow materials from other agricultural libraries	45 (77.6%)	68 (78.2%)	16 (66.7%)	19 (57.6%)	20 (71.4%)	168 (73.0%)
Access to more electronic information sources should be provided	33 (56.9%)	76 (87.4%)	17 (70.8%)	23 (69.7%)	19 (67.9%)	168 (73.0%)
Access to the Internet should be improved/ expanded	35 (60.3%)	75 (86.2%)	15 (62.5%)	27 (81.8%)	15 (53.6%)	167 (72.6%)
Library should create in-house databases in specialised disciplines	32 (55.2%)	63 (72.4%)	12 (50.0%)	20 (60.6%)	16 (57.1%)	143 (62.2%)
Access to local online information data-bases and services should be provided/ expanded	32 (55.2%)	57 (65.5%)	12 (50.0%)	22 (66.7%)	17 (60.7%)	140 (60.1%)
Add latest library equipment	28 (48.3%)	63 (72.4%)	18 (75.0%)	18 (54.5%)	11 (39.3%)	138 (60.0%)
Library should organise more user-education programmes	29 (50.0%)	54 (62.1%)	12 (50.0%)	18 (54.5%)	16 (57.1%)	129 (56.1%)
Library environment and physical facilities should be improved	22 (37.9%)	47 (54.0%)	19 (79.2%)	16 (48.5%)	6 (21.4%)	110 (47.8%)

adequate budget, three respondents recommended to their management to provide more money for improving library collections and facilities.

Five respondents working in MARDI out-stations expressed their concern about the lack of proper library facilities at their premises. Most of these out-stations do not have proper library facilities and their staff was obliged to use their central library, located at MARDI headquarters in Serdang. Users from these out-stations either have to personally visit their central library or have to write for getting the needed materials. Some of them have to travel more than 400 kilometres to visit their central library. Three participants from these out-stations recommended that a small library may be established at their station, housing core journals and other frequently needed materials.

Two respondents each from PORIM and FRIM offered suggestions for improving the effectiveness of their library. Both the PORIM respondents recommended providing more library space and adequate training to library staff. Respondents from FRIM wanted their library to acquire more audio-visual equipment and to offer more user education programmes.

11.6 Summary

Only 36 percent of the participants requested money for literature procurement in their research proposals. It was found that those respondents who provided money for literature procurement, made more document delivery requests. Regarding the type of assistance sought by the respondents from their library staff, it was found that participants from almost all institutions needed assistance for using library equipment and the CD-ROM searching facility. Nearly 29 percent of the respondents revealed that they faced problems in communicating with non-subject specialist librarians. Respondents felt that for enhancing library effectiveness, the Malaysian agricultural libraries should concentrate on three major areas, i.e., networking of libraries, improving library collections, and access to a variety of electronic information sources and services. The next chapter will present a summary of the study, key findings and their discussion, and conclusions. It will also identify areas where further research can be undertaken.

12. Summary, Conclusions and Recommendations

12.1 Summary

This study was aimed at exploring the information needs and seeking behaviour of agricultural scientists in Malaysia and how effective their libraries were in meeting these needs. Bell (1986b) suggested that information services in developing countries should not be evaluated as a piecemeal, rather, the full range of information services and operations should be taken into account for a more reliable evaluation. Following Bell's suggestion, this study investigated some major factors that were considered important in satisfying the information needs of agricultural scientists in Malaysia.

Data for the study was collected through two questionnaires – one for *user survey* and another for *library survey*. The *user survey* questionnaire was designed for collecting data from the respondents about their information needs and seeking behaviour, assessment of the adequacy of library collections, services and facilities, and their overall perception of library effectiveness. The *library survey* questionnaire was used for collecting data from the participating libraries about their manpower, budget, collections, physical facilities, and library services. It also collected data on resource sharing transactions and perception of library chiefs of resource sharing activities. Data collected through this questionnaire served as background information for the study and helped develop a better understanding about responses received through the *user survey*. It also collected data for answering research questions 6 to 8.

Libraries of five major agricultural institutions in Malaysia participated in this study. These institutions are considered the most reputable and well-established among the science and technology institutions in Malaysia. It was estimated that over 90 percent of the Malaysian agricultural scientists work in these institutions. All agricultural scientists, with at least a bachelor's degree in science or its equivalent, were included in the population. For the UPM, only the academic staff associated with agriculture-related disciplines was covered.

The population of the study comprised 1,328 individuals. Proportionate stratified random sampling technique was used to generate random samples. Each institution constituted a stratum and a sample size of 25 percent was used. A total of 332 questionnaires were distributed and 236 filled-in questionnaires were received back. The overall response rate for the survey was 71.1 percent, which is considered satisfactory for this type of study (Bright, 1991). Two questionnaires were unusable. Therefore, the data for 234 (70.5%) respondents was used in the analysis.

Follow-up interviews were conducted with 60 respondents who consented to it. The purpose of these interviews was to seek clarification for certain trends emerging as a result of data analysis. Another objective was to seek opinion on other pertinent aspects not fully covered in the questionnaire. Fifteen additional interviews were conducted during November/December 1999 to find out the information needs of the respondents. Chief librarians and some senior library professionals from the participating libraries were also interviewed.

12.2 Findings

Based on the data collected through questionnaires and interviews, the following key findings are reported. These findings have been consolidated according to the area covered by each research question.

Information Sources Preferred by Malaysian Agricultural Scientists

1. Research and review articles were the most preferred sources for getting up-to-date information on current scientific developments. Many earlier studies also reported the heavy dependence of scientists on these two information sources (Sam, 1996; Folster, 1995; Hart, 1993; Mwila, 1993; Gould, 1990; Frank 1987; Nkereuwen, 1984; Bozimo, 1980).

2. It was found that interaction with professional colleagues was considered another important source for information exchange, endorsing the findings of several previous studies ((Njongmeta & Ehikhamenor, 1998; Omekwu, 1998; Nweke, 1995; Verhoeven et al. 1995; Ballantyne, 1993; Eyzaguirre, 1993; Cabrajec and Dukic, 1991; Norpishah & Aun, 1989; Frank, 1987).

The participants also directly requested their colleagues from other local and overseas institutions for providing copies of documents not available in their libraries. Gooch (1994) and Bozimo (1980) also observed this phenomenon in Vietnam and Nigeria respectively.

3. Over 60 percent of the respondents had at least 50 books in their personal collection. Nearly 52 percent of the respondents were receiving personal copies of journals and a majority of them were receiving up to 2 journal titles through different sources. In contrast, Hart (1993) reported that faculty members at a four-year state college in the USA, on average, purchased 16 books per year and subscribed to 4.75 journals. Gravois et al. (1995) found that dental hygienists were, on average, getting 3.7 journal titles.

Information Needs and Library Use Patterns of Malaysian Agricultural Scientists

1. Respondents expressed diverse information needs for performing different tasks. For the identification of research topics, they often needed information on the IRPA research priorities, key research areas as identified by agriculture and other related ministries, and current national agriculture policy. They also needed information on problems faced by the farming community and new procedures and techniques required by the agriculture-based industry.

2. For the project design and implementation, they needed information on methodologies used by similar ongoing and completed projects. For monitoring research progress, research administrators and managers needed information on the current status of different research projects, demographic characteristics of researchers, up-to-date research expenditures, and major project achievements.

3. For the dissemination of research findings, respondents needed certain basic information and facts for presenting their results in research reports, journal articles and conference papers. They also needed information on the potential users of their research findings, e.g. progressive farmers,

agriculture entrepreneurs, etc., for the transfer of new technologies and procedures developed by them.

4. Respondents involved in instruction needed information for developing their course outlines and reading lists. They also needed current information on useful topics to be assigned to the students for their thesis research.

Most of the above findings on the information needs of the respondents were in line with the results of an earlier study by Saunders (1993), investigating the information needs of MARDI scientists.

5. A majority of the respondents personally visited the library when they needed to search OPAC, scan current issues of periodicals or find information on new topics. They sent junior researchers and/or para-professionals for getting photocopies of articles, checking out books or getting information from sources already known to them.

6. On the average, nearly 78 percent of the respondents visited their library at least once a month. It was better than the University of Zambia where 60 percent of the respondents from science faculty visited their library either rarely or only once a month (Mwila, 1993). Similarly, about 84 percent of the petroleum scientists and engineers in Nigeria visited their library only a few times in a year (Nkereuwem, 1984).

7. Libraries were used more extensively during two important stages of research, i.e., proposal development and report writing. Comparatively fewer respondents visited libraries during the actual execution of their research projects.

8. Respondents from research institutions, on average, spent 16 percent of their office time (approximately 7.4 hours per week) on reading and literature searching whereas UPM academicians spent 9.3 percent of their time (4.3 hours per week) for this purpose. This finding was in line with the findings of two earlier studies where FAO scientists, on average, spent seven hours per week (Zammarano, 1979) and Saudi academics spent four hours per week (Al-Shanbari and Meadows, 1995) on reading and literature searching.

9. Forty-three percent of the respondents reported that they were not keeping in touch with the current scientific literature. Gravois et al. (1995) also reported that 59.5 percent of the dental hygienists found difficulty to keep up-to-date with relevant information.

10. A majority of the respondents sought assistance from library staff in using library equipment and CD-ROM searching facility. This finding supported the findings of two earlier studies by Fidzani (1998) and Mannan & Bose (1998), reporting that users needed guidance from the library staff for effectively using library resources, services and facilities.

Use of Information Technology Based Sources and Facilities

1. Use of information technology based information sources and facilities including OPAC, CD-ROM and in-house databases was very low, although a majority of the respondents possessed good computing skills. This finding was in line with many earlier studies reporting limited use of IT-based sources and services by scientists, engineers, technologists and other professionals (Shanmugam, 1999; Curtis & Weller, 1997; Rollins, 1996; Folster, 1995; Verhoeven et al. 1995; Hurd et al. 1992; Wiggins, 1992; Cabrajec & Dukic, 1991; Connelly, 1990).

2. Almost all respondents either had a PC on their desk, or one easily accessible, connected to the Internet. E-mail was the most popular application while other Internet-based sources and facilities were used infrequently. This finding was in line with many studies in developed countries (Abels et al., 1996; Barry, 1996; Shiels, 1996; Rolinson, et al. 1995; Wiggins, 1992) as well as in developing countries (Singh, 1998; Al-Shanbari & Meadows, 1995; Abdullah, 1995; Reid, 1995).

Adequacy of Resources and Facilities of Malaysian Agricultural Libraries

1. A considerable variation was observed among the participating libraries for the adequacy of their collections, which was also previously observed by Syed Salim (1983). Nevertheless these libraries were meeting the information needs of their users to a reasonable level. A relationship was

also found between the involvement of respondents in the selection of materials and their perception of library effectiveness.

2. Generally, respondents from all the participating institutions, except PORIM, considered physical facilities of their library as adequate.

3. Respondents from two libraries, i.e., UPM and FRIM, were generally satisfied with their library equipment whereas respondents from the other three libraries expressed their dissatisfaction.

Effectiveness of Malaysian Agricultural Libraries in Meeting the Information Needs of their Users

1. Participants from four out of the five institutions were generally satisfied with their library in meeting their information needs. Libraries with adequate collections, equipment and physical facilities were considered more effective.

2. Slightly over one-half of the participants were receiving notification about current materials received by their library and they perceived their library as effective in meeting their information needs. Similarly, nearly 50 percent of the respondents assessed library promotional activities as adequate. A direct relationship was found between the adequacy of library promotional activities and the ability of the participants to keep in touch with current scientific literature and their perception of library effectiveness.

Status of Resource Sharing among Malaysian Agricultural Libraries

1. From 1995 to 1997 libraries participating in this study received, on average, 2,661 interlibrary loan and document delivery requests annually. Nearly 85 percent of these requests were made to the UPM library. Similarly, on the average, these libraries made 3,155 such requests annually to other Malaysian libraries, 52.7 percent of which were made by the UPM library.

2. On average, 822 document delivery requests were made annually by the participating libraries to overseas libraries and information agencies, predominantly to the BLDSC. On the contrary, only 92 requests were

received annually by these libraries from overseas. A one-way flow of information is quite evident from these figures, although some of these libraries had the world's best collections in natural rubber and palm oil. Bell (1986a) noted that the one-way flow of information, from developed to developing countries, is resulting in more financial burden on libraries in developing countries and that there was no evidence of any change in this situation.

3. It was found that, in spite of several common factors such as climate, crops, pests and diseases, etc., resource sharing among agricultural libraries in ASEAN countries was minimal.

4. On average, 1.25 interlibrary loan and document delivery requests (both local and overseas) were made per scientist per annum from the research institutions. It was very low considering that, on average, 26 items were requested per UK researcher annually (Wood, 1988), and five interlibrary loan requests per semester made by the faculty members at a four-year state college in the U.S. (Hart, 1993).

5. Of the total 8,831 documents acquired through the interlibrary loan and document delivery service, 6,517 (73.8%) items were received from local libraries. This figure was higher than the IFLA recommendation that 70 percent of the document delivery requirements should be satisfied at the national level (Wood, 1988).

6. Access to OPACs of local libraries through the Internet, and telephonic and e-mail enquiries were the most popular methods for document identification while making local interlibrary loan or document delivery requests. Agricultural and academic libraries were more frequently used for this purpose. Edoka (1991) also reported that Taiwanese libraries, besides using union lists, frequently made telephonic inquiries for identifying the needed documents.

7. A relationship was found between the availability of funds in research projects for literature procurement and the number of document delivery

requests made. Bozimo (1980) also reported that individuals with budget for literature procurement were more likely to make document delivery requests.

Perceptions of Library Chiefs of Resource Sharing

1. Out of the five library chiefs of the participating institutions, three were not satisfied with the current level of resource sharing among Malaysian agricultural libraries. They considered that the absence of a resource agreement, lack of consciousness among professionals, absence of proper planning, and absence of adequate communication among agricultural libraries as the major reasons for it. All the five library chiefs expressed their willingness to participate, if a resource sharing scheme was developed. However, they felt that the participating libraries should have the prerogative to decide their level of co-operation and with which libraries to share their resources. It appeared that these libraries, as previously noted by Syed Salim (1984), were in favour of a "loose network". Edoka (1991) also reported that several libraries in Taiwan, instead of a written agreement, preferred to share their resources on a "gentleman's agreement" basis.

2. Most of the library chiefs felt that resource sharing should be limited to interlibrary lending and document delivery service. They were not supportive of any co-operative acquisition and processing scheme. It was interesting to note that on the one hand, these library chiefs showed resistance and reservations in committing themselves to a full-range of resource sharing activities, while on the other hand, they also blamed the fact that "attitude of library staff was the most important obstacle in the success of any resource sharing scheme".

   Some earlier studies have also reported such resistance from librarians. Bozimo (1980) expressed this situation in these words "... actual data on interlending activities discount much of the rhetoric that is usually associated with official pronouncements on co-operation" (p. 174). Reddy (1987) claimed that often proclamation about library co-operation is only confined to 'lip-service'. Bozimo also reported that academic librarians in

Nigeria were emphatically against a centralised acquisition and processing scheme.

Measures to Improve Resource Sharing among Malaysian Agricultural Libraries

Surveyed libraries suggested the following measures for improving resource sharing among agricultural libraries in Malaysia:

1. A formal resource sharing agreement should be developed.
2. A union list of serial holdings for agricultural libraries should be developed and distributed on disk, CD-ROM and also made accessible through the Internet. Alternatively, each library should put its serial holdings information on the Net.
3. Libraries should develop in-house databases in their areas of specialisation such as publications and research reports produced by their scientists, on-going and completed research projects, new products and techniques developed, etc. They should also make these databases accessible to other libraries.
4. Libraries of some public organisations, after attaining the corporate status, have started charging higher rates for the document delivery service than recommended by the National Library of Malaysia. These libraries need to reconsider and standardise their rates to encourage local resource sharing.

Miscellaneous Findings

1. Most of the operations and services were automated at those libraries (UPM, FRIM and PORIM) where the average computing skills of the library staff was 'very good'. These operations and services were performed manually at those libraries (MARDI and RRIM) where staff members possessed comparatively low computing skills.
2. Libraries with automated operations and services were perceived comparatively more effective than those libraries that were operating manually.

3. Libraries using a variety of user education and promotion methods were considered more effective than those libraries that were using only a few of these methods.

4. No relationship was found between staff-user ratio and the perception of participants of their library effectiveness. It appeared that those libraries where each library professional was serving less number of scientists are not necessarily considered more effective.

12.3 Discussion

12.3.1 Information Needs

It was found that in addition to printed, electronic and other information sources, traditionally acquired by agricultural libraries, scientists also needed several other types of information for effectively performing their duties. For the identification and implementation of their research projects, in addition to current research articles, they needed information on methodologies used by other similar projects, scientists working on these projects, IRPA priority research areas, key research areas outlined in 5-year research plans of the Ministry of Agriculture and other related ministries, current national agriculture policy, etc. In addition, they also needed information on problems faced by farmers and new technologies required by the agriculture-based industries. Research managers, for the purpose of approving and monitoring research projects, needed information on ongoing and completed projects in various research divisions and other sister organisations. They also needed information on the current project implementation status, up-to-date project expenditures, demographic characteristics of researchers, major project achievements, technologies developed and transferred to target groups, etc. Obviously, most of these information needs cannot be effectively satisfied through traditional information sources. Libraries of almost all the participating institutions have developed certain in-house databases, particularly by UPM and PORIM libraries. Project monitoring and evaluation units of the participating institutions have also made isolated efforts for automating their project-related information. Some research divisions, such as Food Technology and Horticulture divisions at

MARDI, have developed several databases for their own use. Some of these databases have not been professionally developed due to the lack of experience and are accessible to only a limited number of scientists. During interviews, scientists from all participating institutions expressed a need for such specialised databases, particularly on ongoing and completed research projects, scientists working in different subject areas, specialised equipment available at different institutions, agro-based industries and their products, approved government vendors for the supply of equipment, chemical and other supplies, etc. There is a need that agricultural libraries should co-operate and work jointly to develop such databases and make them accessible through the Internet. Availability of such centralised databases would facilitate scientists to quickly access up-to-date information without wasting their precious time. Similarly, such databases may also help save money by avoiding duplication of research efforts on already solved problems.

12.3.2 Library Co-operation

It appeared that journals were the most preferred source for getting current information by the participants. Three out of the five libraries participating in this study were getting 70-86 percent of their serials through exchange and gifts. It is possible that all these titles might not be directly related to the subject interest of their users. The financial crisis has aggravated this situation and these libraries, facing considerable budget cuts, were obliged to cancel most of the titles subscribed by them. Over 52 percent depreciation in the Malaysian currency has further reduced the purchasing power of these libraries. They may also experience constraints in placing orders to commercial document delivery services due to their exorbitant prices.

Under these circumstances, the best strategy for Malaysian agricultural libraries would be to intensify their mutual co-operation. Currently these activities are mostly confined to interlibrary lending and document delivery service. However, one major bottleneck in this regard is the lack of bibliographic tools for the identification of needed materials. While most libraries in principle agree to a formal resource sharing scheme, in practice they like operating in a 'loose

network' situation. It appeared that they feel more comfortable sharing their resources and facilities with only a few 'known-ones'. An important factor in determining with whom to co-operate was informal interpersonal contacts among librarians.

There is no forum available for regular consultation among agricultural libraries, as *PERPUN* is for Malaysian academic libraries. A Memorandum of Understanding signed by some agricultural and non-agricultural libraries located in the Bangi/Serdang area is almost stagnant and no deliberations have taken place among these libraries for a long time. It is also regrettable that although most agricultural libraries were severely affected by the financial crisis, there was no consultation among them as how to overcome this problem. They have strived to develop their own isolated strategies and plans for survival. This scenario highlights the necessity for establishing a formal set-up to facilitate and monitor library co-operation and for developing a common cohesive strategy during such crises. It appeared, and most of the participating libraries agreed, that considering the collection size, facilities and available manpower, the UPM library was the most suitable candidate for co-ordinating a resource sharing scheme for agricultural libraries in Malaysia.

Knowledge about each other's holdings is a pre-requisite for any effective resource sharing scheme. Development and regular updating of a centralised union list of serials is a tedious, time consuming and laborious work needing firm commitment from all participating libraries. However, information technology can solve some of these problems and individual libraries may provide access to their holdings through the Internet. Currently OPACs of only two Malaysian agricultural libraries are accessible through the Internet. Other libraries, in spite of the financial crisis, need to seriously consider this option.
It was observed that the participating libraries were not excited about co-operative collection development and processing. An important factor that might have made this option less attractive and feasible was the highly specialised research at certain institutions, such as palm oil at PORIM, natural rubber at RRIM and forestry at FRIM. Although there might be a certain degree of overlap, its magnitude would not justify participation in a co-operative

collection development scheme. Similarly, some libraries may not be in a position to guarantee continuation of journal subscriptions due to their unpredictable financial situation. Moreover, some of these institutions are also undergoing organisational restructuring with possible change in their mission, goals and objectives. It is likely that their libraries will also be required to review their collection development policies, subscriptions to journals, user services and facilities. In such a scenario, perhaps co-operative collection development is not a feasible option at the moment.

12.3.3 Resource Sharing among ASEAN Countries

It was deplorable to note that although ASEAN was reasonably successful in enhancing co-operation among its member countries in the areas of trade, politics, defence, tourism, social and culture exchanges, etc., very limited library co-operation existed among them. It was particularly unfortunate for agricultural libraries as these countries have several common factors such as climate, crops, pests and diseases, social infrastructure, etc. Some elements hindering library resource sharing in the ASEAN region were language problems, disparity in telecommunication sophistication, slow and unreliable postal services, professional isolation, lack of adequately trained library manpower, inadequate, outdated and irrelevant collections, and the lack of bibliographic identification tools. Internet access was also not available to most of the agricultural libraries in the region, as some of them were located in remote and isolated areas.

Another possible reason for limited resource sharing among ASEAN countries might be due to the fact that most libraries during the economic boom were perhaps too busy in strengthening their collections, constructing new buildings, installing library automation systems, embarking on IT-based projects, subscribing to new serials, sending staff for overseas visits and training, etc. They might also felt comfortable placing document delivery orders with more reliable and efficient services such as BLDSC. Lately very little attention has been given to the conceptualisation, development, implementation and promotion of library co-operation schemes among these countries.

Whatever limited co-operation that existed among agricultural libraries in the ASEAN region was mainly due to inter-personal relationships. During discussions with library professionals it was also learnt that earlier, several international donors were involved in developing regional information systems. However, they stopped taking interest in the region due to higher economic growth and moved to other more deserving regions of the world. These systems could not be fully developed and/or sustained due to lack of leadership and initiative. Libraries in the ASEAN countries should make concerted efforts for improving co-operation among themselves.

12.3.4 Use of IT-based Information Sources and Services

The study found that the use of IT-based information sources and services was very limited. It was particularly frustrating, as most of the participants were computer literate and regularly using computers for office management and supporting their research activities. Adequate promotion and user education may improve the use of IT-based information sources and services. Similarly, although the use of Internet by the respondents was mainly limited to e-mail, some libraries reported a misperception developed by their management. Their management felt that as a huge amount of free information was accessible through the Internet, thus, there was no justification for the library to ask for additional budget and resources. In certain situations, they even questioned the utility of a traditional library. While libraries need to make concerted efforts to popularise the use of Internet-based sources and applications, they also need to educate their management to rectify this misperception.

12.3.5 Fee-based Information Services

It was also found that a majority of the library users would only pay for a service or materials if they were left with no other choice. Although some of them provide money for literature procurement in their research projects, they often reappropriate it for other purposes. There is a need to make these scientists realise that in order for their library to sustain its activities and services, it needs to generate adequate revenue. Management can also help libraries by not allowing reappropriation of money earmarked for literature procurement.

12.4 Conclusions

Due to the diversification policy of the Malaysian government, a shift from agriculture-based to industrial-based economy was evident during the previous and the current decades. The financial crisis of 1997, however, exposed the weakness of this policy as food imports steadily increased from RM 3.5 billion in 1985 to RM 10.0 billion in 1997. The immediate response of the government was to revert to boosting agricultural production. There were certain other factors that also resulted in renewed interest in agriculture. It was realised that industrial growth without food security was vulnerable to external pressures. The problem of food shortage in North Korea was a case in point. Another realisation was that the major food exporting countries in the region such as China, the Philippines, Thailand, Myanmar, Vietnam, India, etc. were themselves striving for rapid industrialisation and were also facing higher population growth rate. It was felt that in the future these countries might not be in a position to export food to the current magnitude.

High quality research is a pre-requisite for actualising government efforts to make Malaysia self-sufficient in food production. Sustained growth in agriculture cannot be achieved without strengthening research activities and improved access to information. Most of the libraries participating in this study were severely affected by the financial crisis of 1997. Agricultural research institutions are also undergoing organisational restructuring and attaining corporate status with the expectation of generating their own revenues. Libraries of these institutions have to compete with other departments for resources and as a result they are likely to continue operating under financial pressures. This situation warrants that these libraries should critically review their resources, service and facilities and develop appropriate strategies for surviving in the fast changing environment.

The purpose of this study was to investigate the information needs and seeking behaviour of Malaysian agricultural scientists and their perception of the effectiveness of their library. It was found that scientists preferred to use primary sources of information, particularly serials literature. However, a majority of serials received by most of the participating libraries were either

through exchange or gifts. Often core journals cannot be acquired through these channels. Similarly, titles received through exchange or gifts may not be directly related to the subject interests of scientists. It was also noted that interlibrary loan and document delivery requests made by Malaysian agricultural scientists were significantly lower than those made by scientists in developed countries. It might be due to the lack of knowledge about this facility, higher cost, or unavailability of funds in research projects for literature procurement. Many respondents resorted to their colleagues in local and overseas institutions for getting copies of the needed materials. Libraries need to strengthen their resource sharing activities at the local and regional levels for reducing the turnaround time as well as making this service more affordable.

It was also noted that scientists and research managers needed a variety of information for the identification of topics for their research projects, selection of appropriate methodologies and experimental designs, information related to project implementation, monitoring and evaluation, etc. Often such information cannot be obtained from traditional information sources collected by libraries. Some participating libraries have developed certain in-house databases to satisfy these specialised information needs. However, instead of making individual half-hearted efforts and to avoid duplication, it would be more appropriate if Malaysian agricultural libraries pool their resources and expertise to develop joint databases in the key information areas.

Some of the participating libraries were opting for electronic journals. This option is particularly attractive for institutions with a network of out-stations, often functioning without a library. Access to electronic journals may resolve some of their literature related problems. However, these libraries should take a serious note that a majority of the respondents were not frequently using IT-based information sources and services. They need to strengthen their user education activities to expose scientists to the potentials of electronic information sources as well as other services and facilities available to them.

It may be concluded that, at the time of this study, agricultural libraries in Malaysia were partially successful in meeting the information needs of their scientists, although a disparity among them was quite evident. Library

collections considered reasonable at this time may quickly become inadequate due to lack of funds for literature procurement in future. The economic crisis and depreciated currency have obliged these libraries to drastically reduce their serial subscriptions and procurement of other materials, stop several user services, reduce the number of CD-ROM databases, and curtail some other facilities. Although interest in the agricultural sector has been revived, it seems that the Malaysian government is still heavily depending on the industrial sector to bring the economy out of the current financial crisis and provide a stimulus for future growth. However, it is expected that the agricultural sector will remain important from the food security point of view but with much less contribution to the overall national economy. This may lead to a situation where the agriculture sector has to strongly compete with other sectors for funds and resources. The agricultural research institutions and their libraries might also feel this pressure. Therefore, agricultural libraries in Malaysian need to appreciate this situation and develop appropriate strategies for surviving in the rapidly changing environment.

12.5 Recommendations

Based on the findings of this study, the following recommendations are made:

1. Agricultural libraries in Malaysia should consider developing a formal library co-operation scheme for regular consultation and implementing a variety of resource sharing activities such as interlibrary loaning, reciprocal borrowing privileges, joint staff training and seminars, compilation of different directories and inventories, etc. The UPM library, having the needed resources and expertise, may accept the responsibility to co-ordinate these activities. Participating libraries should also meet regularly, at least once in a quarter, to discuss issues of mutual interest.

2. Agricultural libraries should jointly develop various databases such as research projects database (on going and completed projects); a database of scientific personnel; a database of research reports, articles and conference papers produced by scientists of the participating institutions; a database of upcoming events (workshops, seminars, conferences, etc.). A database on

new technologies developed by various institutions for commercialisation may also be developed along with an inventory of their potential clients (progressive farmers, plantation estates, agriculture-based industries), etc. These databases should be made available to all scientists through the Internet. The UPM library should co-ordinate development of these databases and all other agricultural institutions and agencies should actively participate in this activity by providing up-to-date information. Some libraries which have developed their own specialised databases, such as databases on palm oil developed by PORIM, should continue this activity with online access to scientists from other institutions.

3. Most libraries have now ceased developing and distributing printed lists of their serial holdings. These libraries should give priority to making their holdings information accessible through the Internet with hyperlinks to other related sites. Availability of holdings information through the Internet is expected to encourage resource sharing among local libraries as well as help reduce the response time.

4. A majority of the agricultural libraries are located in the Klang Valley, within a radius of about 25 kilometres. Similar to academic libraries in this area, they may also initiate a 'van service' to collect and return materials for resource sharing. Each participating institution should be responsible to make its vehicle available once in a week on rotation basis. This way, the turnaround time could be significantly reduced with less chances of materials being lost or damaged.

5. Due to the financial crisis, it might be difficult for some institutions, particularly MARDI, to establish well-stocked libraries at their out-stations. However, in order to improve information access to scientists working at these out-stations, libraries may consider imitating the UPM model by subscribing to full-text electronic journals. However, adequate promotion and user education would be required to maximise the use of these journals.

6. Library co-operation among ASEAN countries should be enhanced. Malaysian agricultural libraries, particularly the UPM library in consultation

with Agricultural Information Bank for Asia (AIBA), the Philippines, should take the initiative and call a meeting of all major agricultural libraries in the ASEAN region to discuss various measures and strategies for improving library co-operation. Institutions involved in research on a single commodity or discipline such as PORIM, RRIM and FRIM should consider evolving their own specialised library networks at the regional level.

7. Intensive user education programmes and promotional activities should be undertaken for popularising library resources and facilities. Libraries should also promote a culture of paying for library services and materials to reduce their financial burdens. For this purpose they should persuade scientists to provide adequate money for literature procurement in their research proposals.

8. Efforts should be made to employ more subject specialists in agricultural libraries to improve communication with scientists. Individuals with science background should be encouraged and given additional incentives to join the library profession. In the near future, most agricultural research institutions are expected to become corporate agencies, which may result in surplus scientific staff. Management of these institutions should be asked to consider putting one or two such individuals in the library after adequate library training. The existing library staff without subject background should also be encouraged and provided with opportunities to enhance their subject knowledge.

9. Concerted efforts are required to educate the management about the changing information scenario and potentials, opportunities and limitations of new information tools such as the Internet. These efforts may help eliminate some of the misperceptions developed by the management.

12.6 Future Research

As no previous research on this topic was conducted in Malaysia, the scope of this study was kept broad to include all major factors that might have some relationship with information access and use by agricultural scientists. Future researchers may like to focus on some of these factors separately.

This study focused on agricultural scientists. It would be useful if a similar study is designed for two other categories of agricultural information users, i.e., extension workers and farmers. This study may also be replicated for scientists in other disciplines, engineers, medical practitioners, and other professionals. It would help in understanding variations and similarities in the information needs and seeking behaviour of professionals from different scientific disciplines. This study may also be replicated in other developing countries having somewhat similar conditions, particularly in Southeast Asian nations.

Some Malaysian libraries have already started subscribing to electronic journals. It would be interesting to study their acceptability by scientists in a developing country. Similarly, the impact of information technology on the information needs and seeking behaviour of scientists can be further investigated.

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Appendix

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Effectiveness of Agricultural Libraries in Meeting the Information Needs of Agricultural Scientists in Malaysia

Library User Survey

This survey is being conducted to collect data for doctoral research undertaken by one of the lecturers of the Department of Library and Information Science, IIUM. Kindly answer **all** questions as each question is important for the researcher to arrive at reliable conclusions. If any question is ambiguous or you need further clarification, please contact Shaheen Majid: Tel. (03) 790-3609; e-mail: shaheen@its.iiu.my.

All responses will be kept anonymous and confidential.

A. Personal Profile

1. Name of the Institution: ----------

2. Present position/job title: ----------

3. To which of the following age group do you belong?

   - ☐ 30 or below
   - ☐ 31-40
   - ☐ 41-50
   - ☐ 51 and above

4. Gender

   - ☐ Male
   - ☐ Female

5. Please indicate your **highest academic** qualification

Degree	Year	Institution
Ph.D		
M.Phil		
M.Sc		
Post-graduate Diploma		
B.Sc.		
Diploma		
Other (*please specify*):		

6. Field of specialization: ----------

7. Length of experience [years]

8. How many publications have you produced during the last five years?

Journal articles	
Conference papers	
Books	
Reports	
Compilations, manuals, reviews, etc.	
Other publications (*please specify*):	

9. Approximately what percentage of your office time do you devote to the following activities? (*Total should add up to 100%*)

Teaching and related jobs	%
Research and development	%
Literature searching and reading	%
Management and supervision	%
Other (*please specify*)	%

10. How will you describe your computing skills (word processing, statistical analysis, spreadsheet, etc.)

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

B. Library and Information Use

11. How do you get information from your library? (*Please check one response for each method*).

Method	Always	Frequently	Occasionally	Never
Going to library yourself				
Sending your junior professional colleague				
Sending para-professional/support staff				
Calling the librarian				
Writing to the librarian				
Other (*please specify*):				

12. Do you feel that the location of your library is convenient for you to visit?

- ☐ Yes
- ☐ No

13. On the average, how frequently do you visit your library?

- ☐ Almost daily
- ☐ About once or twice a week
- ☐ About once or twice a month
- ☐ Several times a year
- ☐ About once or twice a year
- ☐ Rarely

14. Beside your own library, what other libraries do you use? (*Please use back of the page, if required*).

Library	Always	Frequently	Occasionally

15. What are the occasions when you use your library **more extensively** to get information in your subject area? (*Please check all that apply*).

- ☐ While preparing research proposals
- ☐ While conducting actual research
- ☐ While writing research reports/articles
- ☐ While preparing for class lectures
- ☐ While preparing for job/promotion interviews
- ☐ While submitting future research plans
- ☐ While going to attend technical meetings/conferences/seminars
- ☐ While scrutinizing research proposals submitted by other scientists
- ☐ During off-season of your research crop(s)
- ☐ Other occasion(s) (*please specify*): .....

16. Do you feel that you are able to keep in touch, as much as you would like, with information generated in your area of interest?

- ☐ Yes
- ☐ No

If "no", is this because of: (*Please check all that apply*)

- ☐ Too busy in research/field work
- ☐ Too many meetings and administrative work
- ☐ Not sure where to look for information
- ☐ Information not readily available
- ☐ Deficient library collection and services
- ☐ Other reason(s)? (*please specify*) .....

17. What is the approximate size of your **personal collection** for the following types of publications?

Articles	
Journal issues	
Conference proceedings	
Books	
Reports, monographs, manuals, etc.	
Others (*please specify*) :	

18. How many scientific journals do you scan regularly? ☐

19. Do you get your personal copies of scientific journals?

☐ Yes
☐ No

If "yes", please indicate the number of journal titles received by you through the following modes:

* Through personal subscriptions ☐
* As a member of professional association(s) ☐
* Others (*please specify*): ..... ☐

20. How will you describe your literature searching and library use skills?

☐ Excellent
☐ Very good
☐ Good
☐ Fair
☐ Poor

21. Have you participated in training workshops/briefings organized by your library during the last three years?

☐ Yes
☐ No

If "yes", (a) Please indicate the number of library workshop(s)/briefing(s) you have attended during the last three years. ☐

(b) How effective were this/these workshop(s)/briefing(s) in improving your literature searching and library use skills?

☐ Very effective
☐ Effective
☐ Somewhat effective
☐ Ineffective
☐ Very ineffective

22. How important is each of the following sources to keep yourself up-to-date about current developments related to your work? (*Please circle one number for each source*).

Scale:
1. Not important
2. Sometimes important
3. Important
4. Very important
5. Extremely important

Information Sources	Importance				
Books	1	2	3	4	5
Journal articles	1	2	3	4	5
Review articles	1	2	3	4	5
Indexing and abstracting journals	1	2	3	4	5
Newsletters	1	2	3	4	5

Information Sources	Importance				
Sources of current contents	1	2	3	4	5
Bibliographies	1	2	3	4	5
Research reports/patents/fact books, etc.	1	2	3	4	5
Conference abstracts/ proceedings	1	2	3	4	5
Theses/ dissertations	1	2	3	4	5
Professional meetings/talks/workshops	1	2	3	4	5
Interaction with professional colleagues	1	2	3	4	5
Other (*please specify*):	1	2	3	4	5

23. How frequently do you use the following information technology (IT) based library sources and facilities? (*Please circle one number on each line*).

Scale: 1. Not at all
2. Less frequently
3. Quite frequently
4. Frequently
5. Very frequently
NA. Not available

IT-Based Sources and Facilities	Use Frequency					
Automated library catalogue (OPAC)	1	2	3	4	5	NA
In-house information databases	1	2	3	4	5	NA
CD-ROM databases and products	1	2	3	4	5	NA
Online local and international databases and sources	1	2	3	4	5	NA
Microform (microfiche and microfilm) collection	1	2	3	4	5	NA
Audio-visual and multimedia collection	1	2	3	4	5	NA
Other IT based sources & facilities (*please specify*):	1	2	3	4	5	

24. Do you have access to INTERNET through your library or parent institution?

☐ Yes
☐ No

If "yes", which of the following INTERNET services do you use? (*Please check all that apply*).

☐ Electronic mail (e-mail)
☐ Electronic bulletin boards and discussion groups
☐ File transfer using "ftp"
☐ Internet-based electronic information sources (electronic journals, content pages, etc.)
☐ Access to library catalogues of local/foreign universities and research institutions
☐ Access to online information services (DIALOG, BRS, Data Star, etc.)
☐ Institution related information for local and foreign universities/institutions
☐ Other Internet sources and services (*please specify*): .....

C. Adequacy of Library Resources

25. How adequate, in your opinion, are the following library collections of your library in meeting your information needs? (*Please circle one number on each line*).

Scale: 1. Very inadequate
2. Inadequate
3. Somewhat adequate
4. Adequate
5. Very adequate
NA. Not available

Collection Type	Adequacy					
Books	1	2	3	4	5	NA
Scientific journals	1	2	3	4	5	NA
Research reports/monographs/manuals, etc.	1	2	3	4	5	NA
Reference materials (bibliographies, fact books, yearbooks, directories, etc.)	1	2	3	4	5	NA
Abstracts and indexes	1	2	3	4	5	NA
Audio-visual materials	1	2	3	4	5	NA
CD-ROM databases	1	2	3	4	5	NA
Other materials (*please specify*):	1	2	3	4	5	

26. Does your library seek your opinion while selecting books, journals, and other materials in your area of interest?

☐ Yes
☐ No

27. How adequate is the available equipment (number of units and models) in your library? (*Please circle on number on each line*).

Scale: 1. Very inadequate
2. Inadequate
3. Somewhat Adequate
4. Adequate
5. Very adequate
NA. Not available

Library Equipment	Adequacy					
OPAC (automated library catalogue) terminals	1	2	3	4	5	NA
CD-ROM workstations	1	2	3	4	5	NA
Printers attached to CD-ROM/ OPAC terminals	1	2	3	4	5	NA
Microform reader-printers	1	2	3	4	5	NA
AV equipment (TV, video players, etc.)	1	2	3	4	5	NA
Other library equipment (*please specify*):	1	2	3	4	5	

28. How adequate, in your opinion, are the following physical facilities of your library? (*Please circle one number on each line*).

Scale: 1. Very inadequate
2. Inadequate
3. Somewhat Adequate
4. Adequate
5. Very adequate
NA. Not available

Library Facility	Adequacy					
Library seating capacity	1	2	3	4	5	NA
Type and location of book shelves	1	2	3	4	5	NA
Study carrels	1	2	3	4	5	NA
Individual study rooms	1	2	3	4	5	NA
Group discussion rooms	1	2	3	4	5	NA
AV viewing/listening rooms	1	2	3	4	5	NA
Easy/leisure reading lounge	1	2	3	4	5	NA
Library display area	1	2	3	4	5	NA
Furniture and fixtures	1	2	3	4	5	NA
Lighting	1	2	3	4	5	NA
Air-conditioning	1	2	3	4	5	NA
Library open space	1	2	3	4	5	NA
Other physical facilities (*please specify*):	1	2	3	4	5	

D. Effectiveness of Information Services

29. What is your overall assessment about the effectiveness of your library in meeting your information needs? (*Please check only one response*).

- ☐ Very effective
- ☐ Effective
- ☐ Somewhat effective
- ☐ Ineffective
- ☐ Very ineffective

30. Does your library inform you about the latest publications/articles in your subject area that have been received by the library?

- ☐ Yes
- ☐ No

31. Do you feel that your library is properly and adequately promoting new information services and materials to its readers?

- ☐ Yes
- ☐ No

32. Do you get most of the articles/documents required by you from your library collection? (*Please check only one response*).

- ☐ Always
- ☐ Frequently
- ☐ Most of the time
- ☐ Occasionally
- ☐ Hardly ever

33. How often do you request your library to get articles/reprints/documents for you from other libraries/ agencies that are not available in your library? (*Please check only one response*).

- ☐ Always
- ☐ Frequently
- ☐ Most of the time
- ☐ Occasionally
- ☐ Hardly ever

34. Has it ever happened that you had to abandon a research project due to lack of information on that topic in your library?

- ☐ Yes
- ☐ No

35. Do you face any of the following problems in getting literature through the document supply service (service that acquires articles/documents from other sources/ agencies) of your library? (*Please check all that apply*).

- ☐ Long response time to get the requested literature
- ☐ Very expensive to request
- ☐ Service available to only privileged/ senior scientists
- ☐ No money in the unit/departmental research budget to buy reprints
- ☐ Librarian's attitude discouraging
- ☐ Don't want to spend money from my own pocket
- ☐ Other problem(s). (*Please specify*):

.....

36. Do you usually request money for the procurement of scientific literature while preparing budget for your research proposals?

- ☐ Yes
- ☐ No

If "yes", what percentage of your research budget do you normally request for the procurement of scientific literature?

☐

F. Library Staff

37. How frequently do you seek assistance from the library staff for the use of following services/ facilities? (*Please circle one number on each line*).

Scale: 1. Hardly ever 4. Frequently
2. Occasionally 5. Always
3. Most of the time NA. Not applicable (no assistance required)

Information Service/ Facility	Frequency					
For finding documents	1	2	3	4	5	NA
To know the location of a service	1	2	3	4	5	NA
Computerized literature searching (CD-ROM and online)	1	2	3	4	5	NA
Use of automated library catalogue (OPAC)	1	2	3	4	5	NA
Use of library equipment (photocopiers, microform equipment, AV equipment, etc.)	1	2	3	4	5	NA
Other (*please specify*):	1	2	3	4	5	NA

38. Do you feel any difficulty in describing/explaining your information needs to library staff who lack science background?

- ☐ Yes
- ☐ No

39. How will you describe the attitude of your library staff by responding to the following statements?

Staff Attitude	True	False
1. Most of the library staff is properly trained and knowledgeable	☐	☐
2. Most of the library staff is friendly, helpful, warm, and supportive towards library users	☐	☐
3. Most of the library staff is easily accessible	☐	☐
4. Most of the library staff is prompt and provide the required information within the expected time period	☐	☐

G. Suggestions

40. In your opinion, which of the following steps/measures are necessary to improve the effectiveness of your institutional library? (*Please check only those that are relevant to your institution*).

- ☐ More scientific journals should be procured
- ☐ More books, reports, reference, and other types of library materials should be procured
- ☐ Library environment and physical facilities should be improved
- ☐ Access to more electronic information sources (CD-ROM and online) should be provided
- ☐ Access to Internet should be provided/expanded
- ☐ Library should create local databases in specialized disciplines of national importance
- ☐ Access to local online information sources like NSTP Online, Bernama, Civil Service Link, SIRIM, etc. should be provided/expanded
- ☐ All agricultural libraries in Malaysia should be linked through a computer network
- ☐ Card holder of one agricultural library should be allowed to borrow materials from other agricultural libraries on the same library card
- ☐ Library should organize more user education programmes
- ☐ Library needs to add latest library equipment

Other suggestions: (*Please use back of this page or an extra sheet, if more space is required*).

---

41. Any other comments that you would like to offer on the subject of the study:
(*Please use back of this page or an extra sheet, if more space is required*).

THANK YOU VERY MUCH FOR YOUR KIND PARTICIPATION

Interview Request

It would be greatly appreciated if you kindly agree to make yourself available for a short interview (15-20 minutes) with the researcher. The purpose of this interview is to develop a better understanding of the information needs of agricultural scientists and methods used by them to acquire scientific information. This interview will also help the researcher to get respondent's opinion on other pertinent aspects not covered in the questionnaire. If agreeable, please provide the following information to make an appointment with you:

Name/designation: .....

Telephone: .....Fax: ..... e-mail: .....

Department of Library and Information Science
International Islamic University Malaysia
P.O. Box 70, Jalan Sultan
46700 Petaling Jaya, Selangor

Effectiveness of Agricultural Libraries in Meeting the Information Needs of Agricultural Scientists in Malaysia

Library Survey

This survey is being conducted to collect data for doctoral research undertaken by one of the lecturers of the Department of Library and Information Science, IIUM. Kindly **answer all questions** as each question is important for the researcher to arrive at reliable conclusions. If any question is ambiguous or you need further clarification, please contact Shaheen Majid: Tel. (03) 790-3609; e-mail: shaheen@iiu.edu.my.

Name of the Library and institution: ----------

A. Library Staff

1. What is the number of staff in your library for the following categories?

a. Library Professionals and Subject Specialists

Highest Professional/ Subject Qualification	Number
MLIS	
ALA	
Post-graduate ITM Diploma	
3-year/4-year ITM Diploma	
Subject specialist (*Please indicate highest qualification(s)*):	
Others (*Please specify*):	

b. Para-professional and support staff

Category	Number
Para-professionals	
Support/ clerical staff	
Other (*Please specify*):	

2. Do you feel that your library is under-staffed?

☐ Yes
☐ No

If "yes", how many additional staff members are required for each category? (*Please indicate number in each box*).

Library professionals	
Subject specialists	
Para-professionals	
Clerical/support staff	

3. Do you feel that your library can get approval for additional staff positions, if not already approved?

   ☐ Yes
   ☐ No

4. Does your library face problems in the recruitment and retention of well-trained library professionals?

   ☐ Yes
   ☐ No

   If "yes", what are the possible reasons? (*Please check all that apply*)
   - ☐ Limited number of well-trained library professionals available in the country
   - ☐ Rapid turn-over
   - ☐ Unattractive salary structure
   - ☐ Limited career development opportunities
   - ☐ Other (*Please specify*): .....

5. How will you describe the computer literacy level of an average librarian in your library?

   ☐ Excellent
   ☐ Very Good
   ☐ Good
   ☐ Fair
   ☐ Poor

6. Does your library sponsor your staff to participate in continuing professional development programmes?

   ☐ Yes
   ☐ No

   If "yes", how frequently does your library nominate library staff to participate in the following continuing professional development programmes? (*Please check all that apply*).

Professional Development Programmes	Very Frequently	Frequently	Less Frequently
In-house training courses/workshops			
In-land training courses/workshops			
Overseas training courses/workshops			
In-land conferences			
Overseas conferences			
Staff attachment with local libraries			
Staff attachment with overseas libraries			
Visits to other libraries and organizations			
Other activities (*Please specify*):			

B. Library Users

7. What is the total number of your present library users?

8. Do you allow users from other institutions to use your library resources and services?

- ☐ Yes
- ☐ No

If "yes", what library resources and services they are allowed to use? (*Please check all that apply*).

- ☐ In-house use of library collection
- ☐ Borrowing materials
- ☐ Use of CD-ROM databases
- ☐ Use of OPAC and in-house databases
- ☐ Use of library equipment (photocopiers, AV equipment, etc.)
- ☐ Other (*Please specify*): .....

9. Does your library provide user-education for the effective use of library resources and services?

- ☐ Yes
- ☐ No

If "yes", which of the following user-education methods are being used by your library? (*Please check all that apply*).

- ☐ Demonstrations and library orientation programmes
- ☐ Lectures and briefings
- ☐ Workshops to teach different library use skills
- ☐ Self-instruction through computer assisted learning, audiovisual aids, etc.
- ☐ Posters, pamphlets, leaflets, guidebooks, etc.
- ☐ On-site briefing/ assistance by library staff for individual users
- ☐ Displays and exhibitions
- ☐ Other user-education related activities (*Please specify*): .....

C. Library Budget

10. What was your budgetary allocation for collection development for the following years?

1996	RM
1995	RM
1994	RM

11. Does your library face problems in getting required budget for the following categories? (*Please check one response for each category*).

Budget Category	Yes	No
Staff salaries and associated benefits		
Books and non-book materials		
Serial subscriptions		
CD-ROM databases, and access to other online and electronic sources		
AV materials		

Budget Category	Yes	No
Library equipment and supplies		
Staff training and professional development		
Library building maintenance and furnishing		
Other (*Please specify*):		

12. Has your library experienced any budget cuts during the last three years?

☐ Yes
☐ No

If "yes", please indicate the year and magnitude of the budget cur.

.....

.....

D. Library Resources

13. What is the collection size of your library for the following categories (*Please include all formats like print, microform, electronic, etc.*)?

Category	Collection Size
Book and non-book materials including theses, pamphlets, manuals, fact books, maps, etc.	
Serial titles received* Through subscriptions Through exchange Through gifts	
Abstracts and indexes (printed)	
CD-ROM Databases**	
Research Reports	
AV materials	
Other (*Please specify*):	

* ***Please attach a list of serials currently received by your library.***
** ***Please attach a list of CD-ROM databases procured/ subscribed by your library.***

14. What was the average annual addition of documents (books, reports, non-book materials, etc.) in your library during the last three years?

1995	
1994	
1993	

15. What classification scheme and list of subject headings does your library use?

Classification Scheme: .....

Subject Headings List: .....

16. How does your library perform the following library activities/services? (*Please check the relevant column for each activity*).

Activity	Manual	Auto-mated	Mixed	Package Used (if automated)	Not Applicable
Acquisition					
Cataloguing					
Circulation					
Serials management					
Management information					
Budgeting and fiscal management					
In-house databases	//////////		//////////		
Library house keeping jobs					
Inter-library loan					
Document delivery service					
Bibliography compilation					
Current awareness services like SDI, content pages, etc.					
Other (*Please specify*):					

17. Please indicate which of the following equipment is held in your library for staff and patron use? (*Please check all that apply*).

Equipment	No. of Units	
	For Staff Use	For Patron Use
Photocopiers		
Microfiche/film readers		
Microfiche/film reader printers		
Video display units		
Audio listening units		
Slide/ overhead projectors		
CD-ROM workstations		
Microcomputers for public use (word processing, spreadsheets, graphics, etc.)		
Printers (for computers/CD-ROM workstations)		
Other equipment (*Please specify*):		

18. What is the seating capacity of your library?

19. What is the total covered area of your library?

Square feet

E. Library Services

20. Which of the following services does your library provide? (*Please check all that apply*).

- ☐ CD-ROM based literature searching
- ☐ Access to local online sources like NSTP Online, Civil Service Link, SIRIM Link, etc.
- ☐ Access to international online information retrieval services like DIALOG, BRS, etc.
- ☐ Compiling bibliographies on demand
- ☐ SDI (Selective Dissemination of Information)
- ☐ Content page service
- ☐ Document delivery service
- ☐ Inter-library loan
- ☐ Abstracting service
- ☐ Translation service
- ☐ Other library services (*Please specify*): .....

21. Does your library maintain an Online Public Access Catalogue (OPAC)?

☐ Yes
☐ No

If "yes", how many OPAC terminals are provided for users?

[ ]

22. Does your library have access to JARING/ Internet?

☐ Yes
☐ No

If "yes",

a) How many library computers are connected to JARING/ Internet?

[ ]

b) For what library functions and services does your library use JARING/ Internet? (*Please check all that apply*).

☐ Bibliographic verification (for acquisition and cataloguing)
☐ Document ordering to booksellers, jobbers, publishers, etc.
☐ Cataloguing and classification
☐ Access to OPACs of other Malaysian and overseas libraries
☐ Access to online services like DIALOG, Data Star, etc.
☐ Document delivery requests made to individual libraries or commercial document delivery agencies
☐ E-mail messaging
☐ Other (*Please specify*): .....

23. Has your library mounted any application (database(s), home pages, etc.) on JARING/ Internet?

☐ Yes
☐ No

If "yes", please specify: .....

F. Inter-library Loaning (ILL)

24. How frequently does your library use the following sources for requesting documents through the inter-library loan (ILL) service? (*Please check one response for each source*).

Source	Very Frequently	Frequently	Less Frequently	Not at all
Agricultural libraries in your city or in close geographical vicinity				
Other libraries in your city or in close geographical vicinity				
Agricultural libraries in other parts of Malaysia				
Other libraries in other parts of Malaysia				
National Library of Malaysia				
Other (*Please specify*):				

25. How many documents were **requested/ supplied** by your library during 1995 under the **ILL service?**

No. of documents **requested by your library** from other libraries	
No. of documents received	

No. of documents **requested by other libraries** from your library	
No. of documents supplied by your library	

26. How does your library identify which library might be having a document that has been requested by user and is not available in your collection? (*Please check all that apply*).

- ☐ Through online access to OPACs of other Malaysian libraries
- ☐ Through Union Catalogue of monographs
- ☐ Through library specific printed/ microfiche catalogues
- ☐ Through telephonic query
- ☐ Other sources (*Please specify*): .....

G. Document Delivery Service (DDS)

27. Does your library request other libraries for the supply of photocopies of documents/ articles not available in your own library?

- ☐ Yes
- ☐ No

If "yes", how frequently does your library request following types of libraries/ agencies for the supply of photocopies of documents/ articles? (*Please check one response for each category*).

Malaysian

Library Type/ Agencies	Very Frequently	Frequently	Less Frequently	Not at all
Agricultural libraries in Malaysia				
S&T libraries in Malaysia				
Academic libraries in Malaysia				
National Library of Malaysia				
Other Malaysian libraries (*Please specify*):				

International

Agency	Very Frequently	Frequently	Not Frequently	Not at all
British Library Document Supply Centre (BLDSC)				
National Agriculture Library (NAL), USA				
CISRO, Australia				
International Agric. Institutions (IRRI, ICRISAT, ICARDA, ILARD, etc.)				
Internet Based Document Delivery Services Like "Uncover", "ARTTEL", etc.				
Agriculture and S&T libraries in the ASEAN countries				
Agriculture and S&T libraries in other countries				
Other international agencies/ libraries/ information centres (*Please specify*):				

28. Does your library receive requests from other libraries for the supply of photocopies of documents/ articles?

- ☐ Yes
- ☐ No

If "yes", who are the major requesters? (*Please check all that apply*).

- ☐ Agricultural libraries in Malaysia
- ☐ S&T libraries in Malaysia
- ☐ Other Malaysian libraries (*Please specify type of libraries*): .....
- ☐ International agricultural institutions (IRRI, ICRISAT, ICARDA, ILARD, etc.)
- ☐ Agriculture and S&T libraries in the ASEAN countries
- ☐ Agriculture and S&T libraries in other countries
- ☐ International agencies/ libraries/ information centres
- ☐ Other (*Please specify*): .....

29. Which of the following statement(s) represent charging policy of your library for users of the document delivery service? (*Please check all that apply*).

- ☐ Library **does not charge its users at all** for the document delivery service
- ☐ Library does not charge if document supplied was from its **own collection**
- ☐ User will **only be charged** if payment was made for his/her document(s)
- ☐ Requesters can get **certain number** of documents free of charge
- ☐ Some **special category** of users need not pay
- ☐ Library charges **all requesters for all documents** procured for them
- ☐ Other (*Please specify*): .....

30. Does your library charge other Malaysian libraries for the supply of documents requested by them?

- ☐ Yes
- ☐ No
- ☐ Have mutual arrangement (formal or informal) with other libraries for free copies
- ☐ Other (*Please specify*): .....

31. Do other Malaysian libraries charge you for documents requested by your library from them?

- ☐ Yes
- ☐ No
- ☐ Have mutual arrangement (formal or informal) with other libraries for free copies
- ☐ Other (*Please specify*): .....

32. How many document delivery requests were ***received*** **by your library** during the previous year and number of documents supplied by your library?

Requester	No. of Requests Received	No. of Documents Supplied
Document delivery requests from Malaysian libraries and information agencies		
Document delivery requests from overseas libraries and information agencies		
Other (*Please specify*):		

33. How many document delivery requests were ***made*** **by your library** during the previous year?

Source	No. of Requests Sent	No. of Documents Received	Average Response Time (in days)
Document delivery requests made to **Malaysian** libraries and information agencies			
Document delivery requests made to **overseas** libraries and information agencies			
Other (*Please specify*):			

34. On an average, how many days does your library take to supply documents requested by other libraries?

days

35. How frequently does your library use the following **methods for requesting photocopies** of documents from Malaysian and foreign libraries/agencies? (*Please check one response for each method*).

Requests Made to Malaysian Libraries

Method	Frequently	Less Frequently	Not at all
Telephone			
Normal mail service			
Fax			
Telex			
E-mail/ Internet			
Other (*Please specify*):			

Requests Made to Foreign Libraries/Agencies

Method	Frequently	Less Frequently	Not at all
Telephone			
Normal mail service			
Fax			
Telex			
E-mail/ Internet			
Other (*Please specify*):			

36. How frequently does your library use the following methods for the **supply of documents** requested by other Malaysian libraries? (*Please check one response for each method*).

Method	Frequently	Less Frequently	Not at all
Normal mail service			
Fax			
Courier Service			
Other (*Please specify*):			

37. How frequently does your library use the following tools for the identification of periodicals available in other Malaysian libraries? (*Please check one response for each item*).

Tool	Frequently	Less Frequently	Not Available
Union List of Serials			
Serial Lists of Individual Libraries			
Telephonic query (to check which library has the desired periodical issue)			
Other (*Please specify*):			

38. What type of union list of serials, in your opinion, is more useful for agricultural libraries in Malaysia for resource sharing? (*Please check only one response*).
    - ☐ Union list of serials at national level for **all libraries and for all subjects**
    - ☐ Union list of serials at national level for all **S&T libraries**
    - ☐ Union list of serials at national level for all **agricultural libraries**
    - ☐ Union list of serials for **S&T and agricultural libraries** at regional level
    - ☐ Union list of serials for **agricultural libraries** at regional level
    - ☐ Serial holding lists developed by **individual libraries**
    - ☐ Other (*Please specify*): .....

39. What medium, in your opinion, is more useful for developing a union list of serials for agricultural libraries in Malaysia?
    - ☐ Printed lists
    - ☐ Diskettes
    - ☐ CD-ROM
    - ☐ Online access to serials collections of all agricultural libraries at a centralized location
    - ☐ Online access to serial holdings of individual libraries
    - ☐ Other (*Please specify*): .....

40. If a union list of serials for agricultural libraries in Malaysia is compiled, will your library actively participate by regularly providing data about journal issues received by your library?
    - ☐ Yes
    - ☐ No

H. Perceptions about Resource Sharing

41. Do you personally feel satisfied with the level of cooperation that currently exists among agricultural libraries in Malaysia?
    - ☐ Yes
    - ☐ No

    If "**no**", what are the possible reasons for that? (*Please check all that apply*).
    - ☐ Lack of consciousness among professionals
    - ☐ Absence of resource sharing agreement
    - ☐ Absence of proper planning
    - ☐ Absence of institutional leadership
    - ☐ Absence of adequate communication among agricultural libraries
    - ☐ Inadequate library resources (collection/equipment)
    - ☐ Inadequate financial resources
    - ☐ Inadequate manpower resources
    - ☐ Human factors (personality conflicts; professional jealousy; resistance to change, etc.)
    - ☐ Other (*Please specify*): .....

42. If a resource sharing scheme is developed for agricultural libraries in Malaysia, would your library like to join such a scheme?

- ☐ Yes
- ☐ No

43. Do you agree or disagree that once a resource sharing scheme is worked out, all agricultural libraries in Malaysia should be required to participate in it?

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

44. Do you agree or disagree that instead of entering into contractual agreement for resource sharing scheme, each library should have the option to decide about the level of its participation and with whom to share its resources?

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

45. Do you agree or disagree that all agricultural libraries in Malaysia should consult each other before subscribing to periodicals to avoid duplication and to procure new journal titles?

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

46. Do you agree or disagree that library membership card issued by one agricultural library should be valid for borrowing from all other agricultural libraries in Malaysia?

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

47. Which library, in your opinion, should be responsible to coordinate a resource sharing scheme for agricultural libraries in Malaysia?

Preference 1. _____

Preference 2. _____

48. Do you agree or disagree with the following **Resource Sharing** related statements. (*Please check one response for each statement*).

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Each agricultural library in Malaysia should be assigned a discipline to build comprehensive collection in that particular area					
Resource sharing scheme will help resolve some of the existing problems faced by agricultural libraries in Malaysia					
Resource sharing scheme will result in increased user satisfaction					
Resource sharing scheme will result in increased use of library materials					
Participation in resource sharing scheme will ultimately enhance the image of libraries due to access to more information					
A national resource sharing scheme will result in saving of money being spent on document procurement from foreign sources					
Participation in resource sharing scheme may help libraries to ask for more funds					
Participation in a resource sharing scheme will result in increased work load for library staff					
Lending of materials to other libraries will deprive your own library users					
A resource sharing scheme shall only be successful if more manpower and resources are provided to participating libraries					
Participation in a resource sharing scheme will result in less control on library collection					
Some member libraries do not fulfill their resource sharing obligations					
Attitude of library staff is the most important obstacle in the success of any resource sharing scheme					
Resource sharing schemes are usually more suitable for large libraries than small/medium sized libraries					
Most libraries usually request more than what they are ready to share					

49. Please list three measures to improve library cooperation among agricultural libraries in Malaysia.

a. ----------

b. ----------

c. ----------

50. Any other comments that you would like to make on any of the aspects covered in this study.

THANK YOU VERY MUCH FOR YOUR KIND PARTICIPATION

APPENDIX C

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام أنتارابغسا ملايسيا

OFFICE OF THE DEPUTY RECTOR (ACADEMIC)

Our Reference: IIU.DR(A)/1.1/244/2 Jld. 3

Date:

10 November 1995

Dear Dr. Yusof,

Subject: DOCTORAL RESEARCH ON AGRICULTURAL LIBRARIES IN MALAYSIA

With reference to the above subject, I wish to inform your goodself that Mr. Shaheen Majid, one of our lecturers in the Department of Library and Information Science, has enrolled himself with the City University, London, for his doctoral studies. The topic of his research is **Effectiveness of Agricultural Libraries in Meeting Information Needs of Agricultural Scientists in Malaysia.** The purpose of the study is to investigate the information seeking habits of agricultural scientists in Malaysia and the effectiveness of agricultural libraries in meeting their information needs. Mailed questionnaires, followed by an interview with selected respondents, will be used to collect data for the study.

Studies of this nature are crucial for the improvement of Malaysian S&T information provision, particularly considering rapid developments in information technology. We need to develop a better understanding of the information needs of our scientists and how they perceive the effectiveness of existing information resources and services. A systematic analysis can provide essential insight to S&T libraries in overcoming deficiencies and improving their resources and services. This study appears to be well-timed in our context and the findings will, hopefully, be instrumental in improving the agricultural information infra-structure in Malaysia.

The validity of the study largely depends on the reliability of data the researcher will be able to collect. I earnestly wish to seek your kind indulgence and permission for Mr. Shaheen Majid to get input from the scientists and library staff of your institution. I will very much appreciate it if he could be allowed to approach your scientists and library staff for the collection of data.

Hoping for an early reply and thanking you for your kind cooperation.

Yours sincerely,

PROF. M. KAMAL HASSAN
Deputy Rector (Academic Affairs)

APPENDIX D

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام انتارابغسا ملسيا

Our Reference
(Rujukan Kami)
118

Date
(Tarikh)
11 December 1995

Professor Dr. Abu Khair Mohamad Mohsin

Dear Professor Dr. Abu Khair

Subject: EFFECTIVENESS OF AGRICULTURAL LIBRARIES IN MEETING THE INFORMATION NEEDS OF AGRICULTURAL SCIENTISTS IN MALAYSIA

I am working on my Ph.D. in library and information science as a candidate at the City University, London. The topic of my research is **Effectiveness of Agricultural Libraries in Meeting the Information Needs of Agricultural Scientists in Malaysia**. The purpose of this study is to investigate information seeking habits of agricultural scientists in Malaysia and the effectiveness of agricultural libraries in meeting their information needs. This study is crucial in developing an understanding of information needs and expectations of agricultural scientists in Malaysia. Results of this study would help libraries in developing appropriate strategies to effectively meet their information needs. This study becomes all the more important in the face of rapid developments in information technology and its use in libraries.

The **Deputy Vice-Chancellor (Academic Affairs)**, Professor Dr. Mohamed Bin Suleiman, has very kindly allowed me to collect data from the academic staff of the UPM (copy enclosed). I have the honour to inform you that you have been picked as one of the respondents for this study. A questionnaire is being sent to you with the request that you may kindly fill it out and return it to me using the enclosed self-addressed and stamped envelope. The questionnaire will take from 20-25 minutes to complete.

The validity of this study depends on the reliability of data and I earnestly wish to get your kind cooperation in this regard. I will appreciate it if you kindly return the filled-in questionnaire within two weeks of its receipt.

Thank you for your kind cooperation.

Yours sincerely,

Shaheen Majid
Assistant Professor
Department of Library and Information Science

APPENDIX E

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيرسيتي إسلام انتارابغسا ملايسيا

Our Reference
(Rujukan Kami)

37
Dr. Norhayati bte. Moris

Date
(Tarikh)

2 February 1996

Dear Dr. Norhayati,

Subject: **EFFECTIVENESS OF AGRICULTURAL LIBRARIES IN MEETING THE INFORMATION NEEDS OF AGRICULTURAL SCIENTISTS IN MALAYSIA**

I wish to draw your kind attention to my letter of 27 December 1995 accompanied by a questionnaire on the subject cited above. Unfortunately I have not received your response as of this moment. As was stated in my previous letter, the purpose of this doctoral research is to investigate information seeking habits of agricultural scientists in Malaysia and the effectiveness of agricultural libraries in meeting their information needs. No detailed study on this topic has been undertaken in Malaysia. It is expected that the results of this study will be useful for the agricultural libraries in Malaysia in developing a better understanding of the information needs of their users in order to improve their services.

Being a researcher yourself, you are in a better position to appreciate that validity of the findings of such a study largely depend on your response. I will be immensely obliged if you kindly spare a bit of your valuable time and return the filled-in questionnaire at your early convenience. I will be quite pleased to supply another copy of this questionnaire, should there be a need. If you have already returned the questionnaire, please accept my sincere gratitude and ignore this reminder.

Thank you very much for kind cooperation.

Yours sincerely,

Shaneen Majid
Assistant Professor
Department of Library and Information Science

Tel: (03) 790-3609
e-mail: shaheen@its.iiu.my

APPENDIX F

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيرسيتي إسلام أنتارابغسا ملايسيا

Our Reference:
(Rujukan Kami)

Date:
(Tarikh)
29 January 1996

Puan Kamariah Bte. Abdul Hamid

Dear Puan Kamariah,

Subject: **EFFECTIVENESS OF AGRICULTURAL LIBRARIES IN MEETING THE INFORMATION NEEDS OF AGRICULTURAL SCIENTISTS IN MALAYSIA**

I am working on my Ph.D. in library and information science as a candidate at the City University, London. The topic of my research is **Effectiveness of Agricultural Libraries in Meeting the Information Needs of Agricultural Scientists in Malaysia.** The purpose of this study is to investigate information seeking habits of agricultural scientists in Malaysia and the effectiveness of agricultural libraries in meeting their information needs. This study is crucial in developing an understanding of information needs and expectations of agricultural scientists in Malaysia. Results of this study would help libraries in developing appropriate strategies to effectively meet their information needs. This study becomes all the more important in the face of rapid developments in information technology and its use in libraries.

The Deputy Vice-Chancellor (Academic Affairs), Professor Dr. Mohammed Bin Suleiman, has very kindly allowed me to collect data from the research and library staff of the UPM (copy enclosed). A questionnaire has already been sent to the researchers to get their input.

The purpose of this questionnaire is to collection information about the library staff, budget, library resources, services, resource sharing activities, etc. This information will serve as background information for my study. I will appreciate if you could kindly return the filled-in questionnaire within two weeks of its receipt.

Thank you for your kind cooperation.

Yours sincerely,

Shaheen Majid
Assistant Professor
Department of Library and Information Science