ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SCHOOL OF INFORMATION STUDIES FOR AFRICA

A MICRO-ISIS BASED INFORMATION SYSTEM FOR SUPPORTING RESEARCH IN THE INSTITUTE FOR AFRICAN STUDIES, UNIVERSITY OF ZAMBIA.

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN INFORMATION SCIENCE.

BY

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A Micro Isis-Based Information System for Supporting Research in the Institute for African Studies, University of Zambia.

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To My Parents and to

the Soul of My Grandfather

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ABSTRACT

The Institute for African studies (IAS) is an interdisciplinary research unit in the University of Zambia. However, it operates as an independent entity. The Institute undertakes research in the social sciences and the current emphasis is on economic development of the country. A study has been conducted to find out the existing information facilities of the Information and Documentation Unit (IDU) of IAS and also the information needs of the research workers. This study was conducted with a view to proposing a computer-based information system to support research activities at the Institute. The results of the study show that: (a) users are not satisfied with the information services offered; (b) most of the information sources available are outdated; (c) users are not satisfied with the subject descriptors used; (d) users find it difficult to locate and retrieve documents from the collection; and (e) poor staffing. Therefore, a MicroIsis-based information system that will operate in a Local Area Network is proposed. The system in the long run is to be connected to the Wide Area Networks within the country and to the global networks to enable it provide efficient information services. Two prototype databases have been created, (BIAS and FIAS). BIAS database is an integration of bibliographic records of monographs, analytic part from monographs/ collections, and analytic part from serial; and profiles of projects, institutions, experts, and information systems. FIAS is a specialised database containing records on factual information about the exchange rate of the Zambian Kwacha to the US dollar, and about the informal sector. A user interface based on simple menus has been developed to assist users in searching the databases. The system can be implemented after the necessary hardware and software are acquired, additional information professionals are recruited and available professionals are trained to manage the information system. Recommendations have been made for implementation and further improvement of the system.

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ABBREVIATIONS

BIAS - Bibliographic database for the Institute for African Studies

CBU - Copperbelt University

FIAS - Specialised database for the Institute for African Studies

FNDP - Fourth National Development Plan

IA+C - Information Analysis and Consolidation

IAS - Institute for African Studies

IDU - Information and Documentation Unit

ILCA - International Livestock Centre for Africa

ILO - International Labour Organisation

ILRI - International Livestock Research Institute

ISSIAS - Information Support System for the IAS

NGO - Non Governmental Organisations

OAU - Organisation for African Unity

OSSREA - Organisation for Social Science Research in Eastern and Southern Africa

PADIS - Pan African Development Information Systems

PADDEV - PADIS Development Database

R&D - Research and Development

SADC - Southern Africa Development Community

SAREC - Swedish Agency for Research Cooperation

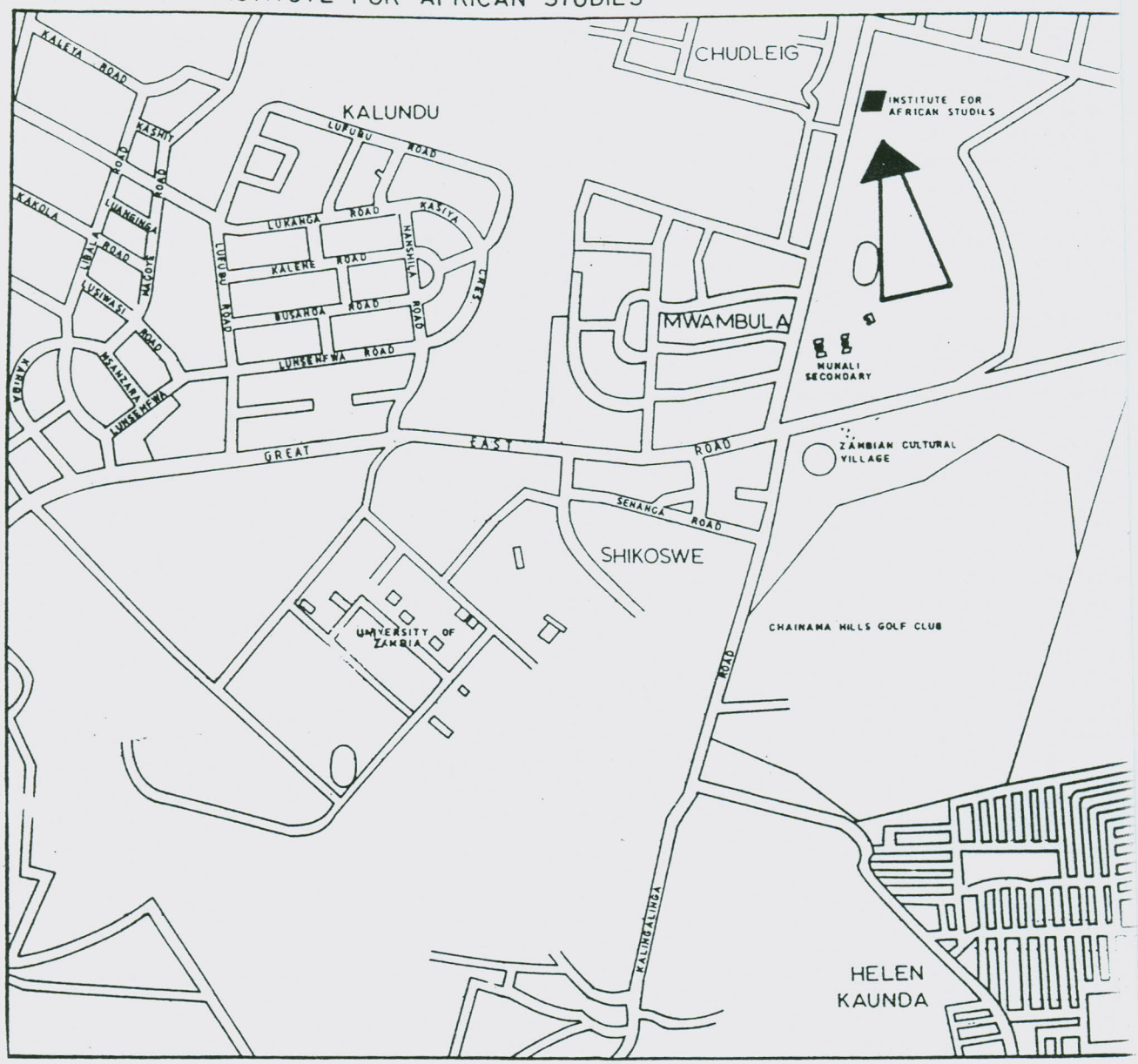
SDI - Selective Dissemination of Information

SISA - System Interface Search Assistance

UNZA - University of Zambia

UNECA - United Nations Economic Commission for Africa

LOCATION OF INSTITUTE FOR AFRICAN STUDIES



CHAPTER 1

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

The importance of information in national development has received wide acclaim throughout the world. The developed countries long recognised the role that information plays in development efforts. Hence, developed countries today, are said to have moved from industrial to post-industrial age or what is popularly referred to as 'information age' where the only unique resource input into socio-economic development process is knowledge or information.

The information age is characterised by the revolution in information and information technology applications. There is continuous research into the methods of handling information as well as the creation and improvement of tools that assist in the generation, collection, processing, organization, and communication of this precious resource. Africa still lags behind both in the handling of information using the new technologies and in the actual utilisation of information in development activities.

Most African countries, including Zambia, are in the process of transforming their social, economic and political conditions. Shortly after gaining political independence in the sixties, the newly formed governments embarked on development strategies that were envisaged to lead to self-sufficiency and self-reliance.

However, in recent years there have been changes, the single party governments have been dismantled and multiparty politics have been reintroduced as in the case of Zambia. With multiparty political structures came the liberalization and privatization of the economic structures. This shift in the approach to socio-economic development with emphasis on restructuring both the political and economic institutions is not without effect on the social and economic welfare of the African people. These developments pose new challenges to the information professional and the research community in the social sciences in Zambia.

The shift in development strategy "... has not been effectively matched by the data and information systems in many of the developing countries..." (Neelameghan, 1992). As a result there is high demand for information by governments as they seek to improve the living conditions of their nationals. Akhigbe (1992) underlining this point states that "policy makers in many African countries have become acutely aware of and are articulating the benefits of proper management of their resources ... including information for sustainable economic development ...".

Researchers have a responsibility of carrying out studies whose findings should influence policies and enable planners and decision-makers come up with decisions and policies based on sound and timely facts. According to Gluckman (Colson 1977) "accurate knowledge can serve the implementation of a policy and point out its effects; ... knowledge will alter a policy where it does not accord with the facts". Making a point on the need for research Bloom (1988) argues that "Africa, a rapidly changing continent, has an even greater need of social scientists to look into the desperately urgent economic, political and social problems that government cannot even begin to solve without adequate statistics and policy

analysis". The National Research Council (US) report maintains that many of the economic development problems facing African countries have scientific and technological components that will require solutions to be developed in Africa by African Scientists (National Research... 1990).

Research is one of the most important development activities. Like any other development activity, it should be supported by efficient information services. The nature of research work requires a wide range of reading materials and sound theoretical orientation. Research activity is information intensive. It involves information input at all levels of the research process. In the absence of information, unnecessary duplication of research work may take place. This is expensive in terms of resources spent on rediscovering the same facts.

A wealth of information and findings are continuously being generated through research, in the world in general. Information needs proper management and should be disseminated to decision makers, researchers, and society as a whole for development and for the benefit of further research to be conducted. Research information need to be processed and repackaged in a format and suitable for each different user group.

In Africa in general, and Zambia in particular, the progress of social science research is being hampered by several factors, one of which is access to information. In Zambia, social science research activity is carried out by research workers affiliated to the research units of the University of Zambia such as the Institute for African Studies. Others include individual research workers or teams, belonging to the teaching staff of the University of Zambia and Copperbelt University and those belonging to Zambian government departments

and other agencies like NGOs, external donor agencies including foreign research institutes. The provision of relevant information to support research is threatened by various factors some of which are discussed below.

Many libraries and documentation centres in Africa and elsewhere have experienced budget cuts from their organisations. However, it should be noted that any action oriented towards acquisition of information and information sources either through purchase, exchange or gratis involves some financial expenditure. Some of the expenditure may include postage for communication purposes and/ or travel (locally or otherwise) expenses incurred in searching for relevant information. Therefore, information costs money regardless of the mode of acquisition. The inadequate funding causes imbalance in the acquisition and provision of relevant information for research.

The phenomenon of information explosion is one of the major barriers that has affected access to relevant information. Individual researchers find it difficult to keep abreast of new concepts, methods, theories and findings, even in their narrow fields of specialization, let alone in adjacent fields.

The acceleration in the production of social science information can be attributed to the rise in the number of scientists involved in research. This is also true in the case of Africa where the development of scientists can be traced back to the time when most of the countries gained political freedom, for instance Zambia had about a hundred graduates at the time of independence, 1964. Twenty years later both, Copperbelt University and University of

Zambia had 1,696 and 4,965 registered students, respectively (The World of Learning 1994).

The information overload has also been brought about by the emergence of new areas of human activity in the field of research. Tovmosyan (1985) explains that this process is predetermined by the following phenomena:

> *"first, the qualitative and quantitative deepening and expansion of research within one discipline and, as a consequence, the branching off and independent functioning of new specialist disciplines which have taken place. Second, a number of new disciplines have made their appearance at the fringes of two or, in some cases, several fields of science".*

This development of new disciplines entails more information being generated at a faster rate rendering difficulties in accessing some of the pertinent information to a particular development activity or research problem.

In general, the situation is heightened by the multiple sources of information in the world through which the social science information is interspersed. Searching for a piece of information will imply consulting several sources on various disciplines within the social sciences due to the interdisciplinary nature of the field. The situation is quite pathetic in Africa in that there are inadequate sources of information, and bibliographic control is still in a poor state.

Management of information as a resource in many African countries is still inadequate. The reason for poor management of information and information systems could be attributed to ill equipped information personnel (Mchombu, 1992). Indeed, there are many problems, technical as well as managerial, hampering access to information in Africa.

Information provision is also affected by the fact that most social science information is recorded in unpublished literature, popularly known as 'grey literature'. In Africa, where bibliographic control is poor even for published materials, it is quite difficult to locate and extract the valuable information contained in this medium. Grey literature in most cases is not listed in many indexing and abstracting services and other bibliographic tools such as national bibliographies and international databases. The reason for this could be poor publicity of the existence of this source, poor bibliographic control and format among other factors (Zulu, 1993).

The nature of social science terms also hampers access to information, specially when it comes to retrieval systems. Foskett (1974), for example, points out that " the many definitions that have been given to some terms like 'sociology' show that we have here to contend with a far greater variety of terminology and far less agreement on definition". Illustrating on this point, he further states that "the same thing may be identified by different terms, and the same term may mean many different things" (Foskett 1974).

Vinogradov (1985) suggests that the key to solving the problems of access to information in the social sciences lies in the effective organisation of an information system. Information support systems that provide services for social science research is essential. Indeed, for the

Institute for African Studies to meet the information requirements of multidisciplinary research activities, there is need to redesign the Information and Documentation Unit. An effective Information and Documentation Unit would be able to meet the challenges posed by the dynamic research programmes of the Institute.

The efficiency and effectiveness of an information system calls for the application of computer and telecommunication technologies in the accessing (remote data storage), acquisition, processing, organisation and communication of information. Information technology is one facility that information systems can not afford to ignore in this era of information revolution.

The combination of computer and telecommunication technologies facilitate access to information. Information Technology is being applied in the acquisition, processing, storage, retrieval and in the transfer of information. Research work benefits from the application of information technology. Some of the information technologies which could be applied to the management of information in a research setting include data processing, computer networking, telematics, electro-optics and electronic publishing.

The ease with which users interact with the computer is critical to access to information. User-interface and/or search-interface is of great importance in assisting users in their interaction with the computer, specially in the process of information retrieval from databases. In Micro CDS/ISIS software, for instance, the advanced Pascal programming facility can be used in writing a user-interface that can help the researchers in the interaction with computers.

realised the value of computer and telecommunication technologies in handling information effectively and efficiently.

1.3 OBJECTIVES

1.3.1 General Objective

The general objective of this study is to come up with proposals and recommendations for the design of a Micro-ISIS based information system for supporting research in the Institute for African Studies.

1.3.2 Specific Objectives

The specific objectives of this study are:

- To investigate the selection, acquisition, processing, organisation and dissemination of information activities of the existing documentation system of the Institute for African Studies, University of Zambia.
- To identify the information needs of the researchers and their information seeking behaviour at the Institute for African Studies, and information flow pattern among the researchers through a survey.
- To propose ways of facilitating cooperation in terms of information resource sharing among the researchers and information systems.
- To create bibliographic databases and designing prototype specialised databases of

factual information and profiles of core concepts going with the study of African studies.

- To develop an interface to assist users in searching the databases.

1.4 SCOPE AND LIMITATIONS OF THE STUDY

The study focused on the IDU of the IAS. In this connection, the research workers' information needs were investigated through a survey that sought to obtain information on the use of the IDU, information seeking and flow pattern among the researchers and the techniques of and tools used by the IDU in handling and communicatin information. In addition to the IAS researchers, other users of the IDU were also approached to fill in the questionnaires and to express their information requirements through discussions.

It was brought to the attention of the researcher that the IDU serves two other research units apart from the IAS towards the end of the survey. It is of significance to this study that research workers from these units should have been included in the survey but could not due to time constraint. Admittedly, this is a limitation of this study.

1.5 METHODOLOGY

1.5.1 Data Collection

Data for this study was primarily collected through questionnaire survey, interview and observation techniques. Additional information was collected from secondary sources such

as annual reports of the Institute for African Studies, published materials and other papers such as workshop and conference proceedings concerning the Institute. Information was also obtained through informal discussions with some of the research workers at the Institute and other academic staff at the main campus, University of Zambia who use the Information and Documentation Unit.

1.5.1.1 *Literature Survey*

The method of literature survey was used to collect relevant pieces of information from different documentary sources. But, for the purpose of using those pieces of information in relevant chapters, the technique of "Information Analysis and Consolidation" (IA+C) was used.

1.5.1.2 *Questionnaire*

A structured questionnaire targeted at the researchers and other users was distributed to solicit information on the needs and information seeking behaviour of the research workers. The user study was particularly useful in that limitations of the existing information system were identified and made use of, for the improvement and development of new information services. Additional information was obtained through informal discussions with the research workers.

1.5.1.3 Interview

An interview was held with the Head of the IDU who spared some time to answer questions although he was on leave at the time of the survey. Information pertaining to the selection, acquisition, processing, organisation and dissemination of information and information on the services offered and use of computers by the IDU was collected through the interview. The interview was conducted with the help of a question guide and additional questions were asked in relation to the given answers during the interview.

1.5.1.4 *Observation*

The observation technique was used to collect information on the ways of processing and organisation of information. The technique was used to observe how the users approach the information sources in the IDU's collection and how they access the bibliographic records in the database on the computer.

1.5.2 Information Analysis and Consolidation (IA+C)

Data collected through the various techniques discussed earlier were analyzed and consolidated for the creation of profile and factual databases. Information for the bibliographic database was obtained from the physical documents such as reports, conference papers and books in the Documentation and Information Unit of the IAS. Profile database contain data on the projects, experts and cooperating research institutions in the country and from the Southern African region. Data for both, profiles and factual databases,

were collected from various sources and underwent a process of analysis, evaluation, and restructuring.

Data collected through the user survey was manually computed and descriptive statistics was used to organise and summarise data in simple frequency tables.

1.5.3 Facilities and Tools for System Development

It may be noted here that, for the purpose of developing the prototype information support system, the following facilities and tools have been used:

1. The network facility available at the School of Information Studies for Africa;
2. The Micro CDS/ISIS software for the creation of the databases;
3. The ABNCD (Abebe et al 1992) integrated database approach; and
4. CDS/ISIS Pascal for developing the interface.

1.6 PROBLEMS EXPERIENCED DURING FIELD WORK

The nature of the work of the researchers at the Institute require them to be out in the field most of the time. This caused some delays in the distribution and collection of completed questionnaires. In addition, the head of the Information and Documentation Unit who was supposed to provide needed information about the existing system was also on leave during the period of the survey. The absence of the assistant to the documentalist most of the time meant that the IDU remained closed during those times, rendering access to the system

impossible. This resulted in some questionnaires not being distributed to users coming from outside the Institute.

1.7 LITERATURE REVIEW

The literature search was carried out to identify documented sources reporting on the findings of studies of information support systems and services for research in the social science research institutes in Africa. The search for papers or reports on information support systems for social science research in Africa, and Zambia in particular did not reveal any such studies.

However, few sources reporting on information support services in general were identified. Walls' paper (1992) on developing dependable information systems in general states that systems are designed to achieve two categories of objectives, viz: functional and performance. Walls explains that the functional objectives are those concerned with what the system does for the user while the performance objectives have to do with how well the activities designed to meet users' needs are performed.

Contemplating on the issue of raising the efficiency of scientific research, Vinogradov (1985) came to the conclusion that (among other things) the most important means of supporting research is provided by handling secondary information. He further argues that research, "which creates new theories and establishes new objectively significant facts, can be regarded as a system of primary information and that secondary scientific information is like a superstructure, a specific contemporary system of 'knowledge about knowledge'".

Vinogradov (1985) observes that due to the rapid quantitative and qualitative growth of knowledge, the need for organising and developing the secondary information system makes itself felt both in the fields of natural and social sciences. He also emphasizes that an information system to be effective should apply the information technology in the handling of information.

In their paper, Allen and Sutton (1993) examine the intellectual organisation of an interdisciplinary research institute (the Beckman Institute at the University of Illinois at Urbana-Champaign). Their objective in this study, they argue, "was to explore a more formal means of identifying the ways in which user communities are organised, and so to provide a set of tools that might be of assistance to librarians who are faced with the task of providing information services to an interdisciplinary research institute".

The paper highlights how the intellectual structure of the library user community was identified through a survey on journal reading patterns. The authors suggest how their findings might be taken into account in designing information services for such a user community.

A paper by Jager (1991) entitled "Researcher as library user: a study of library support for successful research activities" sought to establish the extent to which the library services at the University of Cape Town had supported the research activities of the academicians in the faculties of Arts and Science. Services such as interlibrary lending (ILL), current awareness services, referral services, CD-ROM searches and Online searching to a lesser extent (due to costs involved), explains the author, were identified as having provided

significant service to the respondents. The paper concludes that library services are pertinent in supporting successful research activities and also that the library is of sufficient importance and concern to successful research in an academic institution.

The manual on 'Productive R&D Scientific, Technical and Management Information Systems' prepared by FAMESA (Financial and Administrative Management of Research Projects in Eastern and Southern Africa) provides guidelines to managers of R&D institutions in Africa. The authors are of the idea that the manual should assist managers '... enhance capacity for R&D institutions to organise their information systems as a resource for research, decision-making, dissemination of the research results to users...' (FAMESA, 1992).

The manual outlines quite a number of issues that R&D managers should be familiar with. These include information required in the R&D process, sources of information for R&D and the information technology for research and development. The manual also introduces managers of R&D institutes to the methods of identifying, selecting, acquiring and processing information for R&D. To make managers of R&D appreciate the need for various types of information systems, the manual describes the design and application of these systems in R&D institutions for effective performance of managerial functions.

The strategies and methods for effective communication of research results are discussed. The manual is general in its coverage and does not focus on any specific discipline. It gives training material that could be applied to any type of research institute.

1.8 APPLICATION OF RESULTS

It is envisaged and hoped that the results of the study would be of help to the researchers of the Institute for African Studies and other users. The worksheets for different databases have been designed such that the documentalist can get some help while creating records. The management of the Institute may be prompted to initiate the development of an effective system capable of meeting the researchers' information requirements. The results may be used for the purpose of soliciting for funds to further develop and implement the proposed system.

Other research institutions of similar size may benefit from the results of the study by extrapolating them in designing their information systems for research activities. This development may form the starting point on which a total system suitable for national information network may be initiated. As a result, the exchange of information for national development will be enhanced.

1.9 ORGANIZATION OF THE THESIS

The thesis is organised in seven chapters from the introduction to the conclusion. The first chapter deals with the statement of the problem, justification, objectives, scope and limitations, methodology, problems encountered during field work, literature review, and application of the results of the study. Chapter two gives a brief background of the Republic of Zambia. The third chapter is devoted to the Institute for African Studies and the analysis of the Information and Documentation Unit. The findings of the user survey on the

information needs and information seeking pattern of the research workers at the Institute for African Studies are presented in chapter four. A general overview of information retrieval software and in particular Micro CDS/ISIS is presented in chapter five. Details of the proposed information support system for the Institute for African Studies (ISSIAS) are presented in chapter six. And the last chapter, chapter seven, gives recommendations and conclusion of the study.

CHAPTER 2

THE REPUBLIC OF ZAMBIA

2.1 INTRODUCTION

Zambia, like other countries south of the Sahara, has since independence been striving to improve the living standards of her people. The past decades have experienced development strategies based on trial and error approach. This was not only risky to the nation's progress but also valuable resources were lost. The efforts to develop the country and improve the quality of life of the citizenry is now seen as void if not backed or supported by relevant information.

Information for socio-economic development fall under two broad categories: " the first is that information and data on the human, material, mineral, infrastructural and allied resources of the country; and second is information on domestic as well as foreign political, economic and social conditions" (Adeyemi 1988). This type of information is generated by and can be obtained from various sources within and outside the country.

2.2 RESEARCH AND DEVELOPMENT

Research institutions are some of the generators of information for socio-economic development of a country. Information emanating from research institutions maybe applied in decision- and policy-making and technological development among other uses.

Acknowledging the importance of research in development, the government established the National Council for Scientific Research (NCSR) in 1967 to advise government on scientific and technological research policy. The council is also responsible for coordinating and promoting research activities in Zambia and to relate such to the requirements of the country's development plans.

Social science research is being undertaken by many individuals and institutions in the country. It is concerned with investigating social, economic, political and cultural aspects of the people of Zambia. Problems of social change are the essence of social science research. And society is the centre about which social science revolves. Therefore, it is essential for this study to highlight in brief the social, economic and political issues of the Zambian society.

2.3 **HISTORY**

The historical and archaeological evidence prove the existence of human inhabitants in Zambia as far back as nearly half a million years ago. Archaeological findings also show the existence of iron age people who were farmers as indicated from there iron tools. The present Bantu-speaking people inhabiting the country descended from the groups who migrated from the southern part of the Congo Basin, north of Zambia, from the 16th century. The other groups who invaded the country were the Ngoni and Makololo people who ran away from Shaka Zulu's wars in the south. As a result there is a diversity of ethno-linguistic groups inhabiting the present day Zambia.

Contact with European people began at the end of the 18th century. However, it was until 1924 that the British Colonial Office assumed responsibility for administering the territory. In 1953, the three countries: Northern Rhodesia (Zambia), Southern Rhodesia (Zimbabwe) and Nyasaland (Malawi), all British colonies, were joined to form a Federation. The federation was introduced despite the opposition from the Northern Rhodesia's African population. The federation collapsed in 1963. Northern Rhodesia gained independence in 1964 and the name of the country was changed to Zambia derived from one of its biggest rivers, the Zambezi River.

2.4 **GEOGRAPHY**

Zambia lies in the southern tropics between 8° and 18° south latitude and 20° and 25° east longitude. The country covers an area of 752,614 square kilometres. It is a land-locked country surrounded by eight neighbouring countries. These include Angola, Zaire, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana and Namibia.

The main part of Zambia lie over the Central African plateau with an average altitude of 1,127m above sea level. A range of mountains are found along the north-eastern part of the country where the land rises to about 2000m above sea level. Some of the big rivers that provide the country with marine resources include the Zambezi in the west; Kafue cutting through Copperbelt Province, Central and part of Southern Province; Luangwa in the east; Chambeshi and Luapula rivers in the north. There are quite a number of natural lakes viz: Bangweulu, Mweru, and part of Lake Tanganyika on the border with Tanzania. Lake Kariba on the border with Zimbabwe is one of the biggest man-made lakes in the world and the

largest in Africa. The lake was created to produce hydro-electric power. The Musi-oa-Tunya falls is one of the largest falls in the world and a big tourist attraction of the country. It is about 1.7km wide. Zambia experiences relatively cool temperatures despite it being located in the tropics.

There are three distinct seasons: a cool, dry winter season from May to August, temperature vary from 15.6°C (60°F) to 26.7°C (80°F); a hot dry season from September to October and a warm-wet season from November to April during which both seasons' temperatures vary from 26.7°C (80°F) to 32.2°C (90°F). The annual rainfall is 1,270mm. Highest precipitation is received in the north, Luapula, North-Western, and the Copperbelt and is subject to seasonal variations, it may start as early as October and finish around March/April.

The vegetation is primarily woodland savannah. There is a mixture of various types of trees, tall grass, herbs and deciduous type of woodland covering the plateau.

Zambia is endowed with mineral resources with copper concentrated in the Katanga region, copperbelt, along the border with Zaire. Other minerals include cobalt, zinc, lead, manganese, iron, gold, emeralds, sulphur, building materials and fertiliser minerals.

2.5 **POLITICS**

Zambia's political structure at the time of independence was based on a multiparty system. The 1972 change of constitution abolished the multiparty politics. Zambia then became a single party state until 1991 when the multiparty system was reinstituted.

For administrative purposes, Zambia is divided into nine provinces. The provinces are further sub-divided into 52 districts.

2.6 **ECONOMY**

Zambia has a mixed type of economy. The key productive sectors include the mining sector, manufacturing sector, agriculture sector and the informal sector. The economy has been dominated by parastatal organisations established by the government through new investments and acquisitions from individuals or private organisations. The Zambianisation of private companies was carried out during the period the country became a one party state.

2.6.1 **Mining Sector**

Mining industry is the main economic activity in the country. This sector plays a vital role in economy of Zambia. First, it provides jobs and income opportunities to the people of Zambia and it contributes to government revenue. The revenue from the mining sector is used by government in financing social services among other things. Second, the sector has influenced the establishment of other industries such as manufacturing, construction,

transport and communication. Mining industry provides resources such as raw materials from its products to these sectors.

The mineral resources of Zambia constitute non-fuel minerals and these are: copper, zinc, lead, cobalt, iron ore, manganese, gold, silver, tin, gemstones, building materials and fertiliser. The country possess about 6% of the world's proven reserves of copper ore, about 15% of the world's cobalt reserves and is the world's third largest producer of cobalt (UNECA 1992). Small quantities of other metals like selenium and cadmium are also produced.

The country's economy has been affected by the fluctuating copper prices on the world market and falling copper production levels caused in part by rising production costs. Copper production declined from 587,000 tonnes in 1978 to 426,000 tonnes in 1990 (UNECA 1992). This situation coupled with the rising world oil prices led to the deterioration of the country's infrastructure and people's living conditions. The quality of social services like education and health financed solely by government has declined over the years.

2.6.2 **Manufacturing Sector**

Manufacturing sector is highly dominated by the parastatal companies. Government investment in this sector was done with a hope of providing employment and income to the Zambian people. On the other hand there was great need to substitute some of the imported items that could be manufactured locally. Industries in the manufacturing sector include

consumer goods industries and capital goods industries which have been slow in expansion. Consumer goods industries are involved in food, beverage and tobacco processing. Other industries include textile, apparel and footwear industry; wood and furniture; paper and printing; chemical, plastics, rubber, and petroleum industries and metal industries (ILO 1977).

2.6.3 **Agricultural Sector**

In order to reduce dependence on copper, agriculture was considered the alternative. The agricultural sector is mostly rural based. The sector provides foodstuffs and agricultural raw materials to the rural as well as to the urban consumer and/or urban industries.

There are few commercial farmers in the country who produce products for export. Much of the country's agricultural production is subsistence, produced for consumption and for seed by traditional farmers. Subsistence production accounts for more than 50% of agricultural output. Agriculture products such as tobacco, cotton, sunflower, Sugar, horticultural products, small quantities of coffee, wheat, fish, and forestry products are exported. Crops like maize, paddy rice, sorghum, millet, soybeans and groundnuts are grown for home consumption. Livestock production include beef, dairy and poultry. Beef is exported on a small scale.

Most of Zambia's cultivable land is not utilised. The country has about nine million hectares cultivable land of which only 1.4 million hectares is used (World Bank 1993).

2.6.4 **Informal Sector**

The informal sector in Zambia plays an important part in the economy of the country. This sector is characterised by small-scale, labour-intensive and low-skill nature (ILO 1977). It is unregulated and often harassed by the authorities. Among other things, activities in the informal sector comprise of retail trade, community services, tailoring, pottery, basket making, food manufacturing (i.e. sweets), charcoal burning, wood carvings, furniture making , building and repair activities.

The informal sector in Zambia is dominated by women who own about 65% of the small-scale enterprises and provides 55% of women with employment (ECA and OAU 1987). According to the ECA report (1990) the informal sector in Zambia provided employment for 200,000-300,000 people in the country in 1982. The Fourth National Development Plan (FNDP) estimated that 517,227 people were employed in the informal sector in 1986 compared to 537,929 employers in the formal sector in the same year (FNDP 1992).

The increase in the informal sector can be attributed to the shrinking formal sector. The situation is now aggravated by the public sector reforms and privatisation aggressively embarked upon by the new government since 1991.

2.7 **POPULATION**

The population of Zambia is composed of the diversy ethno-linguistic groups mostly concentrated in provinces. There are 73 officially recognised ethnic groups.The 1969, 1980

and 1990 national censuses recorded total populations of 4.0 million, 5.7 million and 7.8 million respectively (Demographic survey...1992). The annual population growth rate is estimated at 3.2%.

The population density increased from 5.33 people per square kilometre in 1969 to 7.5 in 1980 and 10.4 in 1990. The average density in 1990 ranged from 55 people per square kilometre in Lusaka Province and 50 in Copperbelt Province (both areas are heavily urbanised) to 5 and 3 in Western and North-Western Provinces, respectively. The urban areas are more populated due to the continued migration of people from rural to urban areas.

2.8 **HEALTH and EDUCATION**

Since independence health and education services were provided free of cost to all Zambians. However, due to the fluctuating copper prices coupled with the rising world oil prices it has not been easy for the government to continue offering free services. In the late eighties a strategy was adopted where the public are required to share in the cost of social services.

Government is the major provider of health services. And for the majority of the people who cannot afford the fees charged at private clinics the government is the sole provider of health services. The present government is working at improving the quality of health care through proper management and decentralisation of health centres, encourage private sector involvement, and initiating health insurance and cost-sharing (World Bank 1993).

The country achieved quite a lot in education. By offering free education the majority of Zambians were given an opportunity to go to school. The World Bank memoranda (1993) put the rate of adult illiteracy at 25% in 1990 and primary school enrolment at 95% of school-age group. Government recognises that education is central to economic recovery and has put the revitalisation of the education system high on the reform agenda. Therefore, starting in 1991 government has increased education's budgetary allocation giving priority to primary education (World Bank 1993).

2.9 **INFORMATION/ LIBRARY SERVICES**

Libraries are the common information systems found in Zambia. They fall under the categories of academic and college libraries, public libraries, school libraries and special libraries and documentation centres. There is no national library, instead the functions of the national library are distributed among four institutions (Chisenga 1992). The University of zambia in addition to its academic functions was designated the national reference library. The Zambia Library Service coordinates the provincial libraries. While the NCSR was assigned the documentation function of the national library. The National Archives collects and preserves government documents and it is a depository of all materials published in Zambia. The Livingstone museum which is a national museum, collects all historical relics and artifacts about Zambia. There are smaller council and private archives and museums which supplement the efforts of the national archives and museum.

a. **ACADEMIC LIBRARIES**

Academic libraries include University as well as college libraries. There are twenty-eighty libraries based in training institutes and two University libraries at the University of Zambia (UNZA) and Copperbelt University (CBU).

b. **SCHOOL LIBRARIES**

School libraries are mostly found in secondary schools and it is reported that there are a hundred and sixty of them (Chifwepa 1994). In primary schools, libraries are almost non-existent, except probably for ZCCM and private owned schools.

c. **PUBLIC LIBRARIES**

There are about forty six Public libraries which fall under four categories according to ownership and management (Chifwepa 1994). The Zambia Library Service (ZLS), a department in the Ministry of Education manages and operates twenty libraries of which six are provincial libraries spread in six major cities and towns while fourteen branch libraries are found in sub-centres and rural areas.

The Municipal and City Councils operate library services in places where ZLS has no libraries. The US runs an Information Service in Lusaka and the British Council has two libraries, one in Lusaka and the other in Ndola. Some church organisations also maintain library collections.

In the early years after independence, rural areas were served by mobile libraries. However, due to poor maintenance of vehicles the mobile library service could not continue.

d. **SPECIAL LIBRARIES and DOCUMENTATION CENTRES**

Special libraries and/or documentation centres are managed by parent organisations which they were established to serve. They are found in government ministries and departments, industries and private organizations, and research centres. There are fifty two special libraries in the country (Chifwepa 1992).

e. **THE PRESS**

The state also owns two daily papers and seven vernacular papers produced after every six months. There are other five papers of which one is run by the Church and the rest by private individuals and organizations. The press is a communication channel through which development information can be communicated to the masses.

f. **THE MEDIA**

The Zambia National Broadcasting Corporation runs both Radio and Television. It is a state owned corporation. However, with the recent adopted liberalisation and privatisation strategies, government has registered some private individuals and institutions who wish to establish their own radio and broadcasting stations. The state owned media broadcasts in English the official language, and in seven major vernacular languages. The media enhances dissemination of information for development to a wider audience in the country.

Zambia has two ground satellite stations, Mwembeshi I and II. One receives and transmits messages to and from the satellites over the Indian ocean while the other sends and receives messages to and from the satellite over the Atlantic ocean.

Electronic messages are transmitted across the country and to and from the rest of the world from the University of Zambia which is the country's node. Most of the health centres in the country have access to Healthnet through electronic mail. Zambia has now joined the Internet through UNZA.

CHAPTER 3

THE INSTITUTE FOR AFRICAN STUDIES

3.1 BACKGROUND OF AREA STUDIES

Area Studies, by implication, refer to studies that focus on certain geographical areas, the people of that area and their way of life. The International Encyclopedia of the Social Sciences (1968) state that "the basic concept of Area Studies is that the people of a definable geographic sector, acting in their society and their environment, offer an appropriate unit for scholarly attention".

Tsien and Winger (1966) outline some of the characteristics of Area Studies, by stating that these "encompass several social sciences in a multidisciplinary approach to the understanding of contemporary society in some specific area; encourage field research; and focus attention on the modern period". Area Studies programmes emerged out of the need for knowledge of less known about parts of the world, like Africa, Latin America, and Asia.

The interest in Area Studies such as African Studies in the world in general began long before the second world war. For instance, Great Britain founded the School of Oriental and African Studies around 1916 (International Encyclopedia ...1968). However, the interest intensified during and after the war. The US and UK realised the need for people who were qualified in languages, cultures, and geographical characteristics of the world areas in which their troops had to fight and about which important political and social decisions had to be made (International Encyclopedia... 1968).

In the US, the area studies were created on the basis of knowing 'their enemy'; this was so especially, considering the hostility that developed between the US and the Soviet Union after the war. Great Britain was initially interested in teaching the colonial officers languages of the colonies where they were based or sent on mission. But after 1945, the scope of the area studies programmes in Britain were broadened to include cultural and social studies (International Encyclopedia ...1968). The US too started to consider area studies essential in the training of potential government officials responsible for the administration of technical and educational assistance programmes in various parts of the world (International Encyclopedia... 1968).

However, the introduction of Area Studies programmes was not done with consideration of information resources to support these programmes. Writing on area studies and library resources, Harris (1966) observed that "at the launching of a program of area studies, nearly all libraries face an initial problem of the absence in their collections of the major works on the history and literature of the area in question". This oversight of information resources planning tends to continue even after programmes have long been established.

3.2 **THE INSTITUTE FOR AFRICAN STUDIES (IAS)**

The information presented in this section was collected from documented sources. While the information presented on the Information and Documentation Unit (IDU) was obtained from documented sources, through observation, discussion with IDU staff and through an interview held with the head of IDU.

3.2.1 Historical Background

The Institute for African Studies was established in 1938 in the then Northern Rhodesia (now Zambia) under the name 'Rhodes-Livingstone Institute for Social Research'. The Institute constituted of a museum and a library. It was based in Livingstone the then capital of Northern Rhodesia. It was established as an independent institute to carry out anthropological studies in the three British Central African countries -- Malawi, Zambia and Zimbabwe.

Wilson (1977) mentions that the first objective of the Institute was 'the systematic analysis of urgent social problems', specially connected to the urban mine communities on the Copperbelt. In general, the research interests of the institute in the early days, "were prompted by the problems of adapting the socio-economic conditions of a country like Zambia to the demands of an emerging urban industrial system", observes Van Velsen (IAS Bulletin 1974).

The Institute is believed to be one of the oldest institutes of its kind in Africa and the rest of the world (Van Velsen 1974). In addition, it is reported to have acquired an international reputation that made it a prototype institute from whose experiences the [British] Colonial Social Science Research Council drew knowledge during the council's discussions on the establishment of the Ibadan (Nigeria) and Makerere (Uganda) institutes (Richards 1977).

When the capital was moved to Lusaka from Livingstone, the Institute was also shifted to the new capital. In 1953, the three Central African countries were concentrated into a

federation and then it was decided to move the Institute from Lusaka to the University of Salisbury which was based in Zimbabwe (Fosbrooke 1977).

When Zambia became independent in 1964, the new government claimed the Institute back to where it belonged. The Institute became the first component of the University of Zambia, in 1966, and its name changed from Rhodes-Livingstone Institute to Institute for Social Research. At the same time the Centre for African Studies was created and the two operated as separate institutes but under one director. Later in 1970, the two were merged into the current Institute for African Studies.

From its inception the Aims of the Institute were:

- To analyze scientifically, the social life of modern man in Central Africa;
- To provide accurate scientific information to the governments on the social life of people;
- To disseminate this information as widely as possible to the public.

The research programmes were designed in a way that rendered them relevant to the interests of the people of Central Africa and their governments (Colson 1977). To fulfil the aim of disseminating research results, the Institute organised evening discussions to which the general public were invited to participate. This general public constituted of colonial officers and missionaries. They were also encouraged to use the collection of the Institute library.

Individual writers from the public were invited to publish in the Institute's publications. Research workers published their findings in the institute journal, 'Human Problems in Central Africa', now known as 'African Social Research'. Some research workers published their works as monographs and books. Other publications of the Institute include the Rhodes-Livingstone Communications (now IAS Communications) and various Occasional Papers.

Research workers were recruited from European and American Universities, and South African Universities. The Institute had close ties with University of Manchester where a former Institute director became head of one of the departments there. Occasionally the research workers were invited from the field to the Institute for discussions and to share their experiences and findings with colleagues (Colson 1977).

The Institute was envisaged as a service organization as much as a research institute and that its ultimate goal was the translation of the knowledge gained through research into a form that could be understood by the policy makers and the public, observed Gluckman (Colson 1977). He reiterated that "accurate knowledge can serve the implementation of a policy and point out its effects; ... knowledge must work largely through its effects on public opinion, and this is the value of ... to disseminate information" (Colson 1977).

Whereas the Rhodes-Livingstone Institute was doing research covering the three countries of Central Africa, the Museum contained artifacts only from Zambia. The Museum's collection composed of African arts, crafts and archaeological findings. Individuals and agencies were persuaded to contribute diaries and other records to the Museum archives.

The two were separated in 1948 and the library materials were shared between the two institutions, the Museum and the Rhodes-Livingstone Institute.

According to Colson (1977), the Institute's library, at the time, was one of the few circulating libraries in Central Africa. The library's collection consisted of books and pamphlets dealing with the region. General works on subjects related to the Institute's interests were ordered from overseas. International periodicals were obtained in exchange with the Institute's own publications. Contemplating on the planned establishment of the University of Zambia and commenting on the quality of the library collection, Colson (1977) observed that "the Institute library would form the nucleus of a social science library of a university calibre".

3.2.2 **Type of Research Institute**

3.2.2.1 ***The IAS in the University of Zambia.***

IAS is an independent entity although functioning as a research arm of the School of Humanities and Social Sciences. Since its incorporation into the University, the Institute's research outlook has altered. Moyo (et al 1984) in a report for the reorganisation of the Institute wrote that "the Institute's emphasis has academically ... gradually changed, from the old concentration on social anthropology ...to present focus on interdisciplinary studies directed generally toward a free for all, social science research outlook". Research parameters include theoretical or concepts building and problem solving. The current emphasis is on socio-economic issues pertaining to national development.

In line with the above mentioned gradual academic change, the structure of the Institute has undergone several reorganisation over the years. Following the merger of the Institute for Social Research with the Centre for African studies, a new structure emerged and lasted up to 1983. It consisted of the Central Office headed by the Director. The Central Office has been responsible for the routine administrative functions and coordinate research activities (IAS annual report 1994).

In addition to the Central Office, five research units were established in 1977, viz:

- Technology and Industry Research Unit;
- Manpower Research Unit;
- Community Health Research Unit;
- Urban Community Research unit; and
- Arts and Communications Research Unit.

The organizational structure of the Institute, which was reorganised in 1984, lasted up to December 1989. The structure consisted of two divisions and one centre as shown below:

- The Division for Development Research which became responsible for all the activities that were handled by the Community Health Research Unit, the Manpower Research Unit, and the Technology and Industry Research Unit.

- The Division for Cultural Research which took over the activities formerly carried out by the Arts and Communications Unit and the Urban Community Research Unit.

The Documentation and Reprographic Centre was entirely a new creation and has been responsible for the collection, storage and retrieval of information as well as the actual production of research reports, abstracts, and bibliographies. In addition, the information professionals of the Documentation and Reprographic centre were involved in actual research in the areas of information science.

3.2.3 **Current Organizational and Administrative Structure**

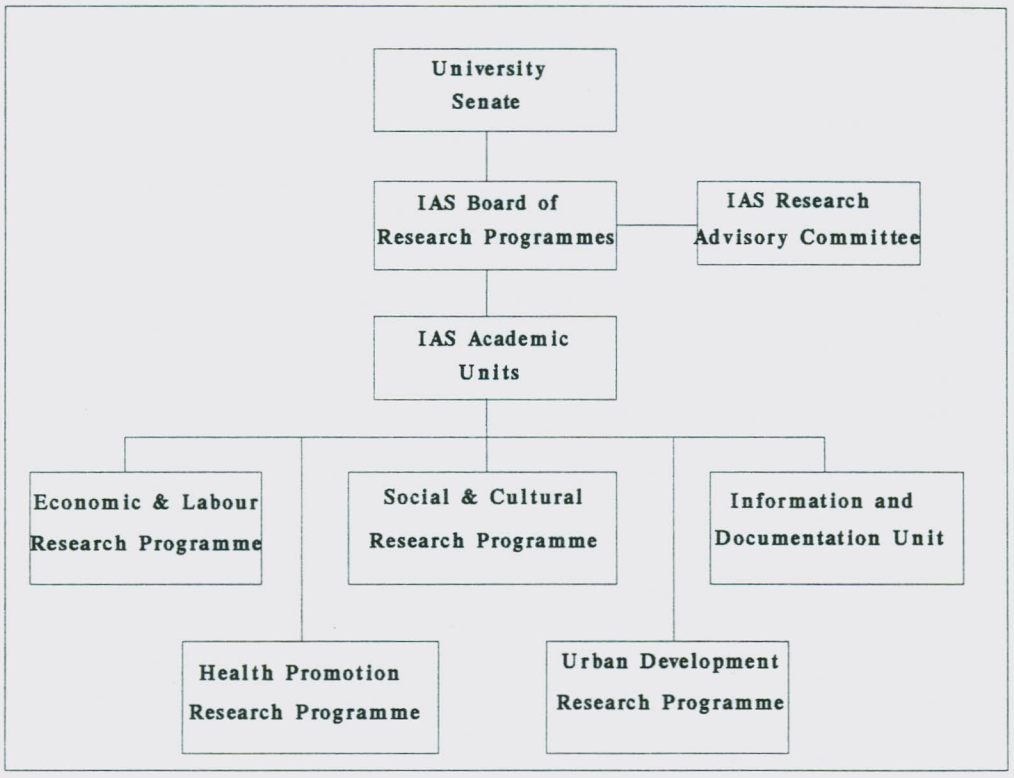
In 1988, the University Senate decided to review the university's teaching and research programmes. The Institute presented to the Senate its proposed organizational, decision-making and advisory structure which was approved and became operational in 1990. The structure consists of decision-making and advisory bodies, four research programmes and one technical unit (Figure 1).

2.3.1 ***Decision-making and Consultative Bodies***

a. **The University Senate**

The IAS is part of the University of Zambia and so it is answerable to the University Senate. The University Senate's Research and Grants Committee is responsible for approving research projects emanating from the Institute as well as from other departments of the University.

Figure 1: Organizational and Administrative Chart of IAS



b. **The IAS Board of Research Programmes (BRPs)**

The BRPs the highest decision-making body within the Institute and it is answerable to the University Senate. It is composed of all IAS academic staff, directors of other research units and heads of departments in the School of the Humanities and Social Sciences including the Head of the Department of Community Medicine, Head of Department of Agricultural Economics, Head of Department of Psychiatry, and Chairman of the Research and Ethical Committee, School of Medicine.

The terms of reference of the IAS BRPs are as follows:

- to consider and coordinate research proposals submitted to it from IAS Programmes Staff meetings;

- to coordinate with other units of the University (through their representation on the Board) to avoid unjustified overlap in research activities;
- to consider ways of responding to the concerns referred to it by the Institute' Research Advisory Committee;
- to refer accepted research proposals to the Senate Research and Grants Committee for approval;
- to consider and approve students' research proposals, including those for research affiliation to the Institute;
- to consider applications by scholars for secondment to the Institute and advise the Appointments Committee of Council of such applications;
- to advise Senate on matters of policy related to the short and long term development of the Institute with particular reference to its research programmes;
- to consider such matters relating to the planning and administration of research at the Institute as shall be referred to it by Senate or the Vice-Chancellor.

c. **The IAS Research Advisory Committee (RA)**

The RAC is a consultative rather than policy-making body and its decisions are, by definition, advisory and, thus not necessarily binding. Membership of the IAS Research Advisory Committee is composed of individuals representing ministries such as Ministry of Agriculture, Food and Fisheries; Ministry of Labour and Community Development; Ministry of Health; Ministry of Education; Ministry of Science and Technology; and representatives from UNICEF; National Council for Scientific Research; Zambia Commission for UNESCO; Dean School of Education; Dean School of Medicine; the University of Zambia Research Secretary; representative from the Private Sector; one

member of the IAS research staff; a distinguished member of Society with no official position in the University (Chairman of RAC); and the IAS Director who is the Secretary of the RAC.

The terms of reference of the IAS RAC include:

- to advise the IAS Board of Research Programmes on priority needs for social and economic research in Zambia;
- to review current research and publication policies of the Institute and consider their relevance to the policies of the government and non-governmental agents of social change in Zambia;
- to discuss the Institute's short- and medium-term plans for research to identify areas of possible collaboration between IAS and the government and non-governmental organizations in Zambia as well as between the Institute and other research organisations in Africa and elsewhere.

3.2.3.2 ***Academic Units***

a. **Economic and Labour Research Programme**

The Economic and Labour Research Programme includes the following fields of research: macro-economic research; sectoral research; project planning, monitoring and evaluation; foreign technical assistance; regional economic cooperation; labour market issues; training needs; and trade union issues.

b. **Urban Development Research Programme**

This programme covers urban planning; housing; urban transport and communications; urban settlement patterns; resettlement policies; water and sanitation systems; and ecological and environmental issues.

c. **Health Promotion Research programme**

This programme is administered in collaboration with the School of Medicine of the University of Zambia. It comprises of:

- Occupational Health and Epidemiological Studies and;
- Primary Health Care which includes the following fields of research: health education; maternal and child care systems; nutrition surveillance; health delivery systems; health service evaluation; health planning; health information systems; community-based rehabilitation for the disabled; traditional health care including psychological factors which influence physical and mental health; and behavioral aspects of HIV and AIDS.

d. **Social and Cultural Research Programme**

Under this programme, the following fields of research are identified: culture and social change; women in development; family patterns; inheritance issues; traditional life studies including folk; langauge studies; arts and aesthetic studies; musicology; and communication studies (e.g Mass Communications).

The Consultative group, on the reorganisation of the Institute in 1989, suggested that researchers from other departments of the University and also from other institutions should be affiliated to undertake research at the IAS (Report on... 1989). However, the University of Zambia policy on deployment of staff provides for adjunct arrangements where teaching staff can do research and researchers can carry out the teaching function.

3.3 **COOPERATION WITH OTHER INSTITUTIONS**

The Institute besides coordination of projects, aims to bring together the many individuals and institutions engaged in relevant fields of research within the country. The Institute also maintains cooperative relations with other institutions from the region, Southern africa. Cooperation agreements extend to institutions outside Africa. Some of the cooperating institutions include the Nordic Research establishment, the Christian Michelson Institute (CMI) and the Department of International Health Care Research (IHCAR) at the Karolinska Institute in Sweden (IAS Annual report 1990).

The agreement signed between IAS and CMI involve the exchange of library and research materials as well as visiting scholarships between the two institutions. The IAS/ IHCAR agreement involve collaborative research in the field of health promotion.

3.4 **THE INFORMATION AND DOCUMENTATION UNIT (IDU)**

The Information and Documentation Unit of the Institute for African Studies was established in 1980. Establishment of this unit was sponsored by the Swedish Agency for Research

Cooperation (SAREC) for a period of one year. During its initial stages the unit was committed to the documentation of information on human settlements in Zambia. At the end of the SAREC sponsorship in 1981 the service was formally incorporated into the establishment of the IAS and was named the Documentation and Reprographic Centre.

The Documentation and Reprographic Centre was renamed the Information and Documentation Unit to "provide the technical back-up services and facilitate the strengthening of the Institute's data control, information systems and publications" (IAS Annual Report 1990). The unit served the needs of two other research institutes, Institute of Human Relations and the Rural Development studies Bureau, which were located at the same campus and have since been dissolved.

The scope of the Institute covers the Southern African (SADC) region. Therefore, the scope of the IDU also covers the whole region. Exchange of materials is carried out among the cooperating institutions. However, there is no central database that would ensure knowledge of research projects undertaken in other institutions so as to avoid duplication.

3.4.1 **The Library**

The library incorporated the collection of materials from the former Rhodes-Livingstone Institute library. It now maintains a special collection of over 3000 documents, all acquired through exchange, donations and gifts. The collection covers a wide range of subject areas

extension services and innovation; agricultural mechanization and intermediate technology; land and water use; small scale enterprises; population and employment; manpower planning; finance and taxation; marketing and trade; prices and incomes; land settlement; planning rural community and organization; urban and housing studies; and community health studies. The library specialises in the collection of grey literature type of documentation in addition to its collection of research reports, books, government documents, World bank documents, and other literature.

The IDU operates on a limited budget, as a result documents are acquired through exchange of the Institute's own publications and through donations and gifts. Acquisition is done by sending requests and visiting some organizations on a regular basis within Zambia. Requests for documents are sent also to organizations and institutions outside Zambia.

According to the IDU staff, conventional library practices are largely ignored in the processing of documents. The system was designed specifically to perform the single function of information supply in line with documentation practices. Documents in the library are, therefore, processed using a simple in-house mechanism to ensure accuracy and speed in the handling of requests for information without recourse to catalogues (IDU pamphlet 1986). The OECD thesaurus is used for deriving subject descriptors for the databases.

The collection consists of three categories of documents. There are research reports from other research institutions as well as the Institute's own research reports and those of the Rural Development Research Bureau. Conference and workshop papers are arranged in file

boxes and labelled under the title of the conference/ workshop. The library stocks World Bank publications such as staff working papers, country reports, technical report, and reprints. There is a collection of general literature reflecting the research interests of the Institute for African Studies, Rural Development Studies Bureau, and Institute of Human

Resources. It also stocks journals, newsletters, and government documents in subject areas covering research interests of the Institute.

3.4.2 **Information Services**

The IDU's main function is to provide specialised collection of works dealing with aspects of current development issues of professional and academic interests to the researchers.

The unit provides user services such as loan of materials, current awareness, referral, and reference services. Loan of materials is provided to the academic members of staff of IAS, IHR and RDSB. They are allowed to borrow an unspecified number of materials for a period of three months. The loan period can be extended upon request from the user. A ledger book is used to record loan details. Each user is allocated a page in the book where borrowing details are recorded. Periodicals and reports are lent out for a period of one week. Manuscripts. field notes and questionnaires are not supposed to leave the library.

Under current awareness, selective dissemination of information (SDI) is provided to individual researchers. Accessions lists are prepared on a monthly basis. Reading lists and other similar information can usually be supplied on request. When new items are received,

they are circulated and/or displayed to allow researchers to browse through them. No current awareness service is provided online.

3.4.3. **Computer Facilities**

The IDU has been allocated a stand alone microcomputer from the Institute's computer resources. The computer was installed in 1994. The computer is located in another room (together with the other PCs) due to the small size of the library. It is an IBM 386 machine with printer and a modem. The system uses MS DOS. Micro CDS/ISIS software version 2.3 is used for database management. Word Perfect 5.0 is used for word processing. In general, the computer resources in the Institute are stand alones and are applied for word processing, statistical applications in the analysis of raw data, and publishing of the research reports. According to the director's statement (Annual report 1990) an IBM desk-top computer publishing package received under a grant from the Friedrich Ebert Foundation in 1989, promises to significantly improve the Institute's publication function.

3.4.3.1 **Database(s)**

The input consist of mainly bibliographic data. Some local databases are created and these include Health Survey Research database and Library bibliographic database. The staff also produce computer printouts when users request for them. The data input sheet used for record entries is shown in Figure 2.

Users are allowed to search the bibliographic database. Brief guidelines for users have been prepared to assist them in the searching of the databases. In most cases the documentation staff carry out the searches on behalf of the users.

Figure 2: IDU Input Sheet for Bibliographic Records.

INSTITUTE FOR AFRICAN STUDIES
INFORMATION AND DOCUMENTATION UNIT
BIBLIOGRAPHIC INPUT SHEET

Fields

Author .....
Title .....
Place Publ.....
Publisher.....
Date Publ.....
No. of Pages.....
Illustrations.....
Series.....
Notes.....
Subject.....
Keywords.....
Abstract.....
Location.....
Price.....

The Institute is not yet connected to the e-mail at the University of Zambia although a modem is available. This is due to the technical problems related to telecommunication lines. The University has recently been connected to the Internet and is in a process of phasing out the Fidonet facility. Therefore, when the existing problems are sorted out, the Institute will be connected to the campus network and subsequently to the Internet.

Problems so far encountered in the use of computers include lack of software documentation, and lack of trained staff in hardware and software.

3.4.4 **Staff**

Currently the IDU is headed by a documentalist. He is assisted by one support staff. There are two programmers, however the head of IDU intimated that the provision of programmers under IDU establishment is only on paper, in practice they carry out duties in other areas which are not necessarily of the IDU. The IDU is authorised to employ two professionals holding M.Sc Information Science degree and one support staff.

3.4.5 **Users**

The primary users of the IDU are the members of the academic staff of the three institutions, viz: the Institute for African Studies, Institute for Human Relations and the Rural Development Studies Bureau. Members of the academic staff of all Schools of the University of Zambia are allowed to use the collection with permission of the head of the documentation centre. Registered postgraduate students of the University of Zambia may use the collection with permission from the head of IDU. Also the registered Research Affiliates of the University of Zambia from other institutions, local and abroad, may use the collection with permission from the head of the IDU.

Other users, outside the above mentioned categories may be allowed to use the collection upon submission of a written application to any one of the directors of the three institutions, explaining their needs and including a letter of recommendation from a sponsor or head of department.

3.5 **PUBLICATIONS**

The IAS produces its own publications which include a journal 'African Social Research', research reports, workshop papers and other occasional papers. Production of the IAS publications is the responsibility of the IDU.

CHAPTER 4

FINDINGS OF THE USER STUDY

4.1 INTRODUCTION

A user survey was carried out to solicit information on the information needs and information seeking pattern of the research workers at the Institute for African Studies (IAS). Data was collected through a structured questionnaire distributed to the research workers; additional information was obtained from the informal discussions held with the researchers. Sampling was not needed since the population is very small.

The questionnaire was targeted at the twelve research workers of (IAS) and other users of the IDU library. The IDU has no records to show the external users who frequently use the library. Therefore, the questionnaire was distributed at random to those users found using the library during the time of the survey. Sixteen questionnaires were distributed and twelve completed questionnaires were returned. Out of the twelve, eight were filled by research workers of the IAS and the rest by external users.

The questionnaire sought to gather information about activities the researchers were involved in, their research interests, the use of the IDU and other libraries. The questionnaire also solicited the views of the respondents on the information services offered by the IDU, information dissemination methods used, information sources used by the respondents, their information seeking patterns, and the format or information package preferred by the respondents.

asked whether respondents visit the IDU to consult journals for the purpose of keeping abreast with new developments in their field of interest, 50% answered positively and further expressed their disappointment at the lack of current literature or information.

Table 1: Purpose or reasons for using the IDU.

Purpose/Reason	Percentage
Look for specific material	100
Borrow books and Journals	66.7
Make literature search	25
Consult journals to keep up-to-date	50
Make reference inquiry	41.7
Browse through publications	50
Write a paper	50
Read newspapers, magazines etc.	41.7

Respondents were also requested to indicate whether they approached the IDU in order to make reference inquiries, and 41.7% said that they do so. On the question of whether the respondents go to the IDU to browse through publications, 50% replied affirmatively. Fifty percent of the respondents indicated they use the IDU for writing research papers when asked whether that was one of the reasons for visiting the system. This group noted that they often use the IDU to write papers specially when they need to consult some documents. Respondents were asked to indicate also whether they go to the IDU to read newspapers and magazines, and 41.7% responded positively. It is quite obvious that many research workers visit the Documentation centre for quite a number of reasons.

4.2.2 **Frequency of Use**

Respondents were asked to indicate whether they use the IDU very often to which 8.3% of the respondents said yes, while the same percentage (8.3) of users indicated that they rarely use it. Twenty five percent of the respondents pointed out that they use the IDU frequently, 58.3% of the respondents indicated they use the centre occasionally.

4.2.3 **Other Libraries/ Sources Used**

Use patterns related to the service of other libraries and information sources are presented in Table 2. Apart from the IDU at the Institute, research workers indicated that they use other sources like libraries within the city. Fifty percent of the respondents indicated that they use the University of Zambia (UNZA) library and the Medical branch library located at the University Teaching Hospital.

Table 2: Other libraries/ sources used.

Library	Percentage
UNZA Library system	50
Personal collections	25
Invisible college network	41.7
British Council Library	16.7
U.S Inform. Service Library	16.7
Government Institutions	58.7
No answer	33.3

Respondents were also requested to indicate whether they made use of personal (own) collections of literature, whereby 25% responded positively. In connection with personal collections, one researcher expressed the need to know some simple techniques that could be used in the organization of personal collections. When the respondents were asked whether they obtain some of the needed information from colleagues, 47.7% indicated that they do maintain human networks popularly known as "invisible college".

Respondents were asked whether they visit the British Council library, and 16.7% indicated that they do so and further explained that they obtain photocopied journal articles from there. When it was asked whether respondents make use of the US Information Services (USIS), 16.7% responded positively. This group indicated that they also get photocopying services from USIS.

Respondents were requested to indicate whether they visit government institutions in their quest for information, and 58.3% indicated that they do so specially for the purpose of looking for information on policy and government position on certain issues.

4.2.4 **INFORMATION SERVICES**

4.2.4.1 *Current Awareness Services*

Table 3 shows the current awareness services and the percentages corresponding to each service. Respondents indicated that they make use of more than one current awareness service, as indicated in Table 3 and that's why the percentages in the Table do not add up

to 100%. Respondents (58.3%) indicated that they browse through the new titles circulated to them or displayed in the library.

Respondents were also asked to indicate whether they get information from the displayed lists of new titles, and 25% responded positively. Twenty five percent indicated that selective dissemination of information service is provided by the IDU. Sixteen percent of the respondents did not respond to this set of questions

Table 3: Current Awareness Services.

Action	Percentage
Display/circulate new titles	58.3
Display lists of new titles added to the collection.	25
Selective Dissemination of Information (SDI)	25
No answer	16.7

4.2.4.2 ***Computer-Based Searches***

Respondents were requested to indicate whether they carry out computer searches personally or they consulted the IDU staff. Respondents (33.3%) indicated that they conduct searches personally and 41.7% approach the staff in the IDU to assist them. Probably this group consists of the respondents who indicated that they were aware of the databases but did not search as yet. Twenty five percent expressed their ignorance of the existence of computer databases in IDU. This could be due to the fact that computers are not located within the IDU and there is no guide to indicate where computers are located.

Access Points

Table 4 shows percentages of research workers against access points that they use in searching for information. The percentages in the Table do not add up to 100% for the reason that some respondents indicated that they use more than one access points. Table 4 shows that subject descriptors are the most useful access points, for 75% of the respondents indicated to make use of them. Other access points, namely author and title are relatively less used, 25% and 17% respectively. Twenty five percent of the respondents did not fill in this section.

Table 4: Access Points Used in Searching for Information.

Access Points	Percentage
Author	25
Title	16.7
Subject Descriptor	75
No answer	25

Respondents were requested to briefly explain their experiences when searching using the access points indicated in Table 4. When asked to indicate their experience by selecting one of the options, 50% of the respondents did not give any response. While 8.3% indicated that they find it very easy, 16.7% find it easy, and 25% indicated that due to the inappropriate subject descriptors used they find the searches unsatisfactory.

CD-ROM search service is not available at the IDU. Those (8.3%) who indicated having

used this service get it from the University of Zambia main and medical libraries. The online search service (of international databases) is not yet provided at the Institute.

Reference service is provided by the IDU and about 33.3% indicated that they have used this service although they did not state how satisfactory the service is.

4.2.4.3 *Reprographic and Micrographic Services*

Table 5 shows reprographic and micrographic services provided by the IDU and the percentages of the users who make use of each service. The figures do not add up to 100% as some respondents indicated having made use of more than one option. Asked whether the respondents use the photocopying or xeroxing service, and 50% responded positively. Respondents were also asked to indicate whether they make use of maps reproduction and/or reduction services, 8.3% indicated to have used this service. Respondents were asked whether they were provided with tabulation service, whereby 66.7% answered positively. Fifty per cent did not respond.

Table 5: Use of Reprographic and Micrographic services.

Service	Percentage
Photocopying/ Xeroxing	50
Microfilm/fiche	-
Maps reproduction/reduction	8.3
Photography	-
No answer	50

Some respondents indicated that they are provided with lending services and also that when extra copies of documents are available they are distributed to the researchers. Lending services are offered only to the research workers of the institute.

Respondents were requested to indicate the level of adequacy of the services they get from the documentation centre. The following categories were used: below average, average, and above average. 8.3% of the respondents indicated that the services were below average, while 8.3% said that the services were above average. And 66.7% of the respondents indicated that the services offered by IDU were average.

Respondents were requested to explain briefly how the problem of inadequate information affected their research work. Some respondents explained that inadequate information services affect research to such an extent that some studies could not be undertaken for lack of information. They complained that in the absence of current information, they are unable to keep abreast with the new developments in their subjects of interest, and also that it is quite difficult for them to prepare comprehensive framework for analysis. Others expressed dissatisfaction with the documentation unit which remain closed during the times when the information personnel are not available.

Respondents were requested to give suggestions, if any, that could be adopted to alleviate some of the problems they face in relation to information. Suggestions for improvements that are relevant to the field of specialization were forwarded. They include the need to order or borrow specific texts, need to acquire current books, journals and reports. Others suggested that a measure should be taken to develop a collection of literature relevant to

each special project undertaken by the IAS. The need for the collection to be updated was expressed. Some respondents explained that government documents are available free of charge from government ministries and departments. It was also suggested that indexing and abstracting services be provided on a regular basis. The concern for security were voiced by some research workers who suggested that there is need to safeguard present holdings to avoid disappearance of materials due to lack of supervision.

4.2.5 DISSEMINATION OF RESEARCH FINDINGS

Table 6 shows ways through which research workers disseminate findings of their works. Again figures do not add up to 100% due to the same reason that respondents had chosen more than one option. When they were asked whether they deposit their reports in the IDU, 75% answered positively. This is a requirement of the University of Zambia even for visiting research affiliates in the Institute to deposit their findings with the IDU or UNZA library.

Respondents were asked to indicate whether they also present their findings at seminars, conferences, etc., and 58.3% responded positively. Asked whether they distribute any of their works to fellow researchers and colleagues, and the answer was positive for 41.7% of the respondents. Others (58.3%) indicated that they publish their findings in local and international journals. Respondents were asked to indicate other uses of the findings, 8.3% indicated that they use their research findings in teaching. Twenty five per cent did not respond to this set of questions.

Table 6: Dissemination of Research Findings.

Action	Percentage
Deposit reports in the IDU	75
Present at conferences, seminars, etc	58.3
Distribute to fellow researchers and colleagues	41.7
Publish in local and international journals	58.3
Other uses, e.g teaching	8.3
No answer	25

4.2.6 **INFORMATION SOURCES**

A list of documentary and non documentary sources were identified and are listed in Table 7. The table shows the percentages of the research workers who use each type of source. Non-documentary sources listed are librarians/ documentalists and experts and colleagues. Librarians/ documentalists happen to be among the lowest (33.3%) indicated sources consulted by research workers. The reason is loss of confidence in librarians who in most cases are said to have failed to provide needed information.

Experts and fellow research workers are among the highest indicated preferred sources. About 83.3% respondents consult experts for information. They indicated that information obtained from this source is authoritative.

Majority of the respondents (83.3%) indicated that they use books and monographs in libraries. Usually books and monographs are read for a deeper understanding of a subject area and it was noted that they are more easily accessible. Other sources such as journals,

technical reports and conference proceedings are consulted by 66.7%, 50% and 66.7% respectively. It was noted that they are consulted for the currency and preciseness of information, and for information on latest developments in the fields of interest of the respondents.

Majority (91.7%) of the respondents indicated that they also read magazines and newspapers for information. Government documents are used by 66.7% of the respondents who indicated that the information contained in these documents is authoritative in nature. Research workers look for policy information and government views on certain matters, e.g. land issues.

Own collection of literature is preferred by 75% of the respondents. Personal collections may include sources such as books, magazines, newspapers and some photocopied articles. Respondents pointed out that personal collections are available any time one wanted to use them, and that they could be exchanged for other materials from colleagues.

Sources such as databases including CD-ROM databases, bibliographies (58.3%), indexing and abstracting journals (41.7%), and library catalogues (41.7%) are consulted by researchers to identify publications produced in the field of interest. Researchers explained that they use databases to retrieve precise required information within a short time, while abstracts give brief information on the contents of a source.

Table 7: Major Information sources Used by the Researchers.

Code	Sources	Percentage
1	Databases (including CD-ROM)	58.3
2	Books, monographs in libraries	83.3
3	Own collection of literature	75
4	Journals	66.7
5	References and footnotes	41.7
6	Library catalogues	41.7
7	Bibliographies	58.3
8	Abstracts and indexes	41.7
9	Magazines and newspapers	91.7
10	Technical reports	50
11	Conference proceedings	66.7
12	Current awareness bulletins	50
13	Acquisitions/ accessions lists	33.3
14	Librarians/ Documentalists	33.3
15	Experts	83.3
16	Government documents	66.7

References and footnotes, obtained from sources of information on the same subject area, are used by 41.7% of the researchers in order to locate further sources of information on her/his subject of interest.

Fifty percent of the respondents make use of current awareness bulletins to be aware of current publications. About 33.3% consult acquisitions lists for the purpose of getting information concerning the newly acquired materials added to a collection of a library or documentation centre.

4.2.7 INFORMATION SEEKING PATTERNS

Table 8 shows the different ways through which users seek information for their research works. The figures in this case also do not add up to 100% because respondents opted for more ways indicated in the table. Respondents were requested to indicate whether the use of magazines and newspapers was one of the ways they adopted, and 91.7% responded positively. 83.3% of the respondents indicated that they visit libraries and documentation centres to look for the required information. While another 83.3% indicated that they prefer to communicate and discuss with experts and colleagues.

Seventy five per cent of the respondents indicated that they use their personal collections of literature, while 66.7% indicated that they collect their required information through the following means: (a) by attending conferences, (b) by using conference proceedings, (c) by using journals, and (d) by browsing through publications in libraries and documentation centres.

Some of the respondents (41.7%) approach government institutions for information. About 33.3% approach librarians for information, and 50% collect information from technical reports, bibliographies, indexes and abstracts and also from the follow ups on the references and footnotes.

Conducting searches in databases has been identified as a means of gathering information by 58.3% of the respondents, and the same percentage of respondents have reported to depend on accidental discovery of information.

Table 8: Information seeking pattern.

Code	Information Seeking Ways	Percentage
1	Accidental discovery of information	58.3
2	Attendance at conferences	66.7
3	Conduct computer-based searches	58.3
4	Use libraries, documentation centre	83.3
5	Use own collection	75
6	Use journals	66.7
7	Follow up references and footnotes	50
8	Browsing through publications	66.7
9	Search library catalogues	41.7
10	Approach government institutions	41.7
11	Communication with fellow researchers	83.3
12	Use magazines and newspapers	91.7
13	Use conference proceedings	66.7
14	Use current awareness newsletters	50
15	Approach librarians/ documentalists	33.3
16	Use bibliographies, indexes & abstracts	50
17	Use technical reports	50

Table 9 shows the ranks from the first to the fifth and corresponding letters (A to L) representing most preferred information seeking patterns used by the research workers at the Institute for African Studies. Alphabetical letters represent the respondents (columns A to L). Under each column representing the respondents, preferred means of collecting information denoted by a code (see table 8) are entered against the choices in descending order.

Table 9: Five Preferred Information Seeking Ways in Descending Order.

Respondents

choice	A	B	C	D	E	F	G	H	I	J	K	L
1st	11	5	4	3	8	15	3	-	-	-	-	3
2nd	2	4	10	7	11	11	7	-	-	-	-	15
3rd	5	6	15	6	2	4	8	-	-	-	-	10
4th	8	9	17	16	5	13	6	-	-	-	-	7
5th	14	16	5	10	13	6	13	-	-	-	-	11

The table shows that contact with fellow researchers, using personal collection, and journals rank high (33.3% each) among the preferred means of collecting information. While Browsing through publications, using books in libraries and documentation centres, approaching government institutions, approaching librarians and documentalists, computer searches, follow up on footnotes and references and using conference proceedings are cited as favourites by 25% of the respondents each. Other favoured means of collecting information include attendance at conferences (16.7%), using bibliographies, indexes and abstracts (16.7%). Some respondents (8.3%) indicated that they prefer using library catalogues and technical reports.

Table 10 shows the frequency of the occurrence of the information seeking way ranked first. Conducting computer-based searches as a means of accessing required information is shown as the most preferred among the listed ways. The rest occur each only once in the table.

Table 10: Frequency of the information seeking way ranked first.

First choices	Frequency
Conduct computer-based searches	3
Use own collection	1
Browsing through publications	1
Use libraries, documentation centre	1
Communication with fellow researchers	1
Approach librarians/ documentalists	1

Respondents were requested to give reasons for using the information seeking way ranked first, and some of the reasons given are as follows:

> The respondents (25%) who ranked first 'conducting computer-based searches' argue that it makes it possible to make very extensive searches of large quantities of material in a shorter time. They further argue that it is easy to get specific information relevant to a particular subject and that related items are retrieved at once.

Respondents were requested to indicate what problems they face when searching for information. They explain that there are problems of poor definition of subject descriptors. Some researchers indicated that it is difficult to obtain up-to-date literature. Others observed that reading materials cited in some of the sources are not physically available in any of the libraries visited.

Table 11 shows the format preferred by research workers regardless of the type of information contents. Table 11 shows that 50% of the respondents prefer full-length original

document, while 8.3% prefer descriptive review of original document, and 41.7% prefer to use an abstract or a summary of the original document.

Table 11: Format or Package Preferred Regardless of Type of Information.

Format	Percentage
Full-length, original document	50
Descriptive review of original document	8.3
Abstract (summary of original document)	41.7
Graphic	-
No answer	33.3

4.2.8 **DISCUSSION**

Like most documentation centres in Africa the Information and Documentation Unit of the Institute for African Studies lack resources. The IDU operates on a limited budget, as a result computers and reading materials are obtained through exchange, donations and gifts. In most cases planning for computerisation of documentation centres in Africa is inadequately done. This happens in situations where computer resources are left behind after some donor sponsored projects have been completed.

Lack of and inadequate information professionals is another problem area at the Institute for African Studies. There is a need for qualified professionals to manage the automated information system and to provide information services to meet the needs of the researchers.

Lack of relevant and current information hamper research work at the Institute as indicated by the researchers. The IDU specializes in collecting grey literature type of documents. Collection of grey literature poses some difficulties in that the literature is rarely listed in bibliographical sources such as national bibliographies, indexing and abstracting journals etc. Most of the institutions, especially in Africa, who produce grey literature do not make it known in one way or the other to the people who may need to use the literature.

The IDU uses the OECD Macrothesaurus for deriving subject descriptors. The OECD Macrothesaurus was produced only as a layout for further development and is therefore inadequate for indexing purposes. There is need to develop it further for the purpose of making the macrothesaurus specific to local needs. In connection with subject descriptors used, respondents complained of poor subject definition. Ther is need to work closely with subject specialist who know what concepts are applicable in different sistuations.

The respondents also indicated that the organization of documents in the collection is not very clear as it is neither reflected by some tool such as card catalogue nor book catalogue to guide them on shelf arrangement of documents. This is a common problem encountered with grey literature type of documentation.

The computer facilities are located somewhere else due to the size of the IDU building. Therefore, users observed that they were not aware of the computer facilities. At the time of the survey only a few records had been created. This could be the reason why some users were not aware of the databases. User sensitization had not been done since database creation was still in its infancy.

The database created contain bibliographic records. However, researchers indicated that they also need information in other forms and formats, not only bibliographic data. There is need to create as many factual databases as possible to make information readily available to the researchers. Lack of mechanism for making optimum use of the available computers. Available computers and peripherals should be utilised to the benefit of the users.

CHAPTER 5

INFORMATION RETRIEVAL (IR) SOFTWARE

5.1 GENERAL OVERVIEW

The purpose of an information system in the Institute for African Studies is to provide access to data and information relevant to the activities of the research workers. The information has to be collected from various sources, processed, organised, stored and retrieved at a later stage when need arises. Information retrieval systems are concerned with the process of recovering from recorded knowledge particular pieces of information which may be required at particular times for specific purposes.

A number of programs have been developed for storage and retrieval functions and some of them are evaluated in a directory by Kimberley (1990). Of importance here is microcomputer-based retrieval software. Information retrieval software is distinguished from database management software by its characteristics which are listed as :

- variable-length fields;
- access to records through an inverted file index keys or text terms which are drawn from the records on the database;
- a range of retrieval facilities which support retrieval based on words in records, where there is limited control over the form of the search key in the record;
- emphasis on the management of one or more distinct databases, where the ability to draw data from a number of related databases is not critical;

- fixed applications which require relatively limited programming or systems development facilities.

Major features of information retrieval software are described in the following subsections.

5.1.1 **Market Features**

These include the cost factor which embraces the price of purchasing the software, price of maintenance and contracts. Some organisations opt to develop their own packages instead of purchasing off-the-shelf software. Another feature taken into consideration is the number of years the software has been on the market.

5.1.2 **Programming Languages**

The software vendors, usually, do not distribute the source code to the users. This is done so that the users may not make modifications to the software package.

5.1.3 **System Features**

The user may select a single user system which is only accessible to one person at a time. Depending on the user requirements, multi-user systems are also available; these can be accessed by a number of users simultaneously. Multi-user systems will be effective if they are run on a multi-user operating system. Of course, a number of work stations will also be required for many users to access the software at the same time.

5.1.3.1 *Indexing*

An index is a list of terms and phrases that have been specified for search purposes. Some software provide facilities that allow users to specify key elements from the inverted file meant to facilitate effective searching. Searching through the inverted file is faster than the sequential index searching.

Some packages offer a wide range of indexing techniques which may include: not indexed, only marked words, or all words indexed (Kimberley 1990). Indexing of full text, tags, fields, keywords, and relational indexing is possible in some packages.

Some packages provide for the creation of stop word lists where words such as 'a' 'an' and 'the' and other insignificant words are defined to be left out of the index. Stop word files are essential for efficient use of storage space in an inverted file.

Creation of vocabulary control devices such as thesaurus have been provided for in some packages. Thesaurus help in identifying the type of data and the descriptors needed for searching from the master file of records or the index. The user can browse through the thesaurus and/or terms dictionary before starting the search to help him/her input the terms the way they have been used in that particular database.

5.1.3.2 *Information Retrieval Facilities*

Information retrieval software packages provide for various search techniques. Some use Boolean search language, while others use commands such as FIND command.

5.1.3.2.1 **Search Logic**

The Boolean search language is provided in almost all the software packages. The Boolean operators include AND, OR, and NOT. In other packages the logic symbol equivalent of the operators may be used, these are: plus sign (+) for operator OR, the asterisk (*) represents operator AND; and the circumflex (^) sign represents the NOT operator. The Boolean search operators can be used individually or in combination depending on the user requirements.

5.1.3.2.2 **Adjacency/proximity Searching**

Adjacency or proximity searching helps in refining search statements by allowing the user to specify the context in which a term must occur. This type of search is more restrictive compared to the boolean logic but suitable for natural language searching. Short forms of Adjacency/proximity search that are used in some software packages include: ADJ for Adjacent, SEN for Sentence, WITHIN +/- N Words and DOC for Document (Kimberly 1990). Kimberley states that some systems permit proximity searching to be conducted on the full database, whilst others offer this facility within a search subset.

5.1.3.2.3 **Search Refinement**

Most text retrieval software packages have capabilities to refine a search by either broadening it or narrowing the search.

5.1.3.2.4 **Truncation and searching on word stems**

Truncation, and the ability to search on word stems is provided in most of the text retrieval software. Truncation and word stem searching is particularly valuable in natural language searching.

Truncation of terms can either be done on the left or right hand side. Some software provide for only right truncation, while others provide for right- and left- truncation and masking of letters in the middle of the word.

5.1.3.2.5 **Range Searching**

Some retrieval packages have range searching capability. Options in range searching include: GT for Greater Than, LT for Less Than, EQ for Equals, NE for Not Equals, GE for Greater than or Equal to, LE for Less than or Equal to and CONTAINING and NOT CONTAINING (Kimberley 1990).

5.1.3.2.6 **Browse on Index**

Browsing the index prior to the formulation of a search expression helps the user to identify searchable terms listed in the index. The index is usually arranged in alphabetical order. So the user can specify an alphabetical letter from which s/he wants to start browsing. An index will show the terms and corresponding number of postings for each indexed term. Terms can be selected directly from the index and entered as search statements.

5.1.3.2.7 **Text String Searching**

Text string or free text searching allows the user to specify search requirements on fields which have not been indexed. This search technique is valuable in searching abstracts and factual data.

5.1.3.3 ***Outputs***

The results of the searches may be displayed for viewing on the screen, saved for future reference or be produced as printed hard copy. Search results can be automatically saved for manipulation at a later stage before the next search could be carried out. Some software packages provide for creation of formats for displaying and printing records. Other software packages do not permit the user to define the printed record content at all (Kimberley 1990).

Facilities that support generation of current awareness services in form of Selective Dissemination of Information (SDI), printed indexes,and/or catalogues are provided in some

packages. Kimberley (1990) states that the most basic facility for the provision for SDI is that the package be able to store a permanent search profile(s).

5.1.3.4 *User Interface*

Another important feature in IR software is the user interface. User interface is also known as search interface or man-machine interface (Perera 1992). The user-interface has been defined as the surface on which the user interacts with the system (Geethananda 1991). Perera (1992) gives an illustration of a search interface as consisting of search language, screen layouts, onscreen instructions and printed manuals of the particular software package with which the user has to interact in order to retrieve information. Printed manuals constitute the system documentation that should help the user in design and implementation of the database. They also act as reference tools when the user is faced with difficulties in his/her work.

The search process involves a number of steps or activities. Vickery and Vickery (1993) outline some of the activities that take place when the user accesses the database(s), viz:

- user logs in (LAN system);
- appropriate database(s) is selected;
- query is clarified, its scope adjusted;
- query is formulated in the vocabulary suitable for the selected databases;
- query is expressed as search statement in the format required by the IR software, either by using Boolean and/or other operators;
- search output is presented to user in selected format;

- if search output is not acceptable to the user, search expression is amended;
- search output is presented and/or delivered to the user either on screen, or the user can decide to print the output in a required format; and
- the user can make modifications to the print format if so desires.

In carrying out the activities listed above, the interface may offer assistance at a number of points or stages. Vickery and Vickery (1993) state that aid from a computer interface may be offered aiming to:

- establish the context of the query, e.g. general subject area, search purpose;
- help in choosing appropriate database(s);
- offer user friendly facilities to express an information requirement;
- permit the enquirer to state an information in his/her own words;
- assist in clarifying the expression of the query;
- adjust the scope of the query so that the volume of retrievable information may be acceptable;
- formulate the query in the vocabulary used in the chosen database;
- express the query as a search statement in the required format;
- in search amendment, change the Boolean or other search operators, and/or change search terms by various means;
- present the search output in a helpful form, e.g. by ranking in order of probable relevance; and
- provide multilingual facilities.

5.1.3.5 *Security*

Security of data, in both single-user and multi-user system is important. There should be access control to certain parts of the database for different groups of users in order to shield facilities and data that are irrelevant to a specific user. Most of the security measures taken involve allocation of passwords, user IDs and data encryption or a combination of ID and password.

5.1.4 **Vendor Stability and Support**

The stability of the vendor or distributor of the IR software is important. Vendor support is the demonstration, training, help desk or assistance by telephone, and onsite and offsite training provided by the vendor (Geethananda 1991).

5.1.5 **System Development**

Because of the dynamism of information technology, it is essential for an IR software to be constantly developed to avoid obsolescence. Most IR software are continuously being revised to provide for improved functions that enhance user friendliness, fast access and retrieval of information.

5.2 MICRO CDS/ISIS SOFTWARE

Micro CDS/ISIS is an information storage and retrieval software for IBM micro computers and compatibles produced by Unesco in 1985. Other versions of the software are available for different hardware. MINISIS developed by IDRC runs on Minicomputers, while the program for IBM mainframes bear the same name, CDS/ISIS, as the microcomputer version. There is also a special version that runs on WANG-PCs (ISIS Manual 1989). The package is a combination of Unesco's 'Computerised Documentation System' (CDS) and ILO's 'Integrated Set of Information System' (ISIS).

Unesco distributes the software freely to non-profit making organisations. Micro CDS/ISIS can be obtained directly from Unesco or from national or regional agencies designated for the distribution of the software. Apart from being distributed free of cost, a growing number of users in developing and developed countries are attracted by its admirable features (Hopkinson 1989; Nieuwenhuysen 1991, Perera 1992). In Africa, 70% of the institutions surveyed by PADIS in 1994 make use of CDS/ISIS (PADIS 1990; 1994). The paper reports that most of these institutions are small centres, with small document collections and smaller resources for the acquisition of costly books and periodicals.

Micro CDS/ISIS was developed primarily for the information storage, processing and retrieval. The software is a generalised system which is designed for the computerised management of structured non-numerical databases (Perera 1992). Therefore, databases containing bibliographic data, profiles of institutions, experts or projects and factual

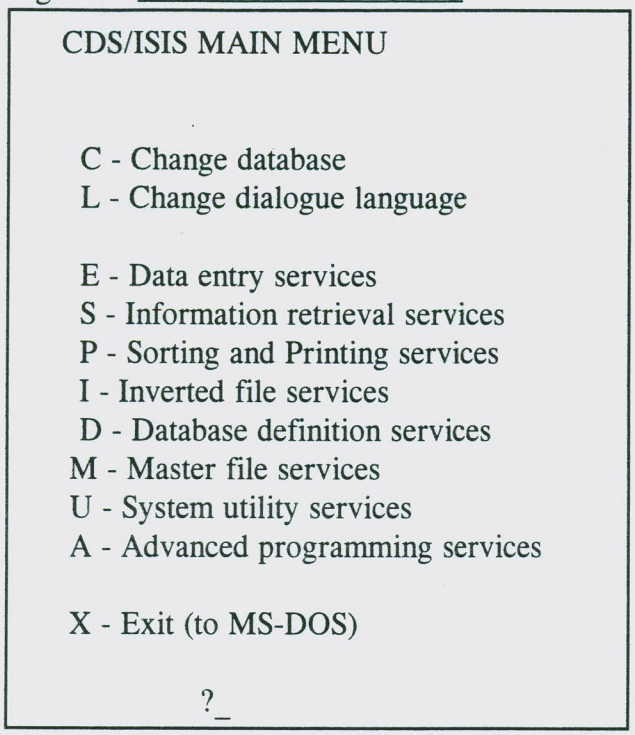
information can be created with this software. It is a menu driven software and provides for creation of integrated as well as separate databases.

5.2.1 **Functions of the Software**

Micro CDS/ISIS provides eight functions which appear in the main menu. The functions shown in figure 3 allow the user to:

- Define a database containing the data requirements;
- Enter new records into a given database;
- Modify, correct or delete existing records;
- Automatically build and maintain fast access files such as inverted/index files for each database in order to maximise retrieval speed;
- Retrieve records by their contents, through a sophisticated search language;
- Display the records or portions thereof according to user requirements;
- Sort the retrieved records in any sequence desired;
- Print partial or whole database and/or indexes, and retrieved records;
- Display the number of hits (postings and records) for each search expression;
- Save search results;
- Retrieve and re-execute previous search expressions;
- Display and browse the data dictionary;
- Develop specialised applications using the CDS/ISIS integrated programming facility; and
- Free text searching by specifying search requirements on fields which have not been indexed.

Figure 3: CDS/ISIS MAIN MENU



5.2.2 **Database**

Micro CDS/ISIS does not use relational model to structure databases. The data is defined in a single file, the master file. Relationships can be established using the REF function and L formatting function. Developing a database in CDS/ISIS begins with the definition of the fields and subfields if any, field tags, the field length, and repeatable fields where they occur. Micro CDS/ISIS provides for variable length fields. Bibliographic and factual information for research are of different lengths, hence require fields as those provided by CDS/ISIS with varying lengths. Repeatable fields provided by the software are an advantage for the IDU in that data such as representing research projects, experts can be entered in one field where they occur more than once. Fields in CDS/ISIS are identified by field tags. Subfields are identified by the circumflex (^) sign followed by a subfield identifier represented by an alphabetic character (a...z or A...Z).

5.2.3 **System Restrictions**

Micro CDS/ISIS imposes some system restrictions shown in Figure 4.

Figure 4: System Restrictions

Data Items	Limitations
Maximum no. of databases	unlimited
Max. no. of records in a database...	16 millions within the limit of 500mb)
Max. record size.....	8000 characters
Max. no. of fields (in FDT).....	200 (excluding repeatable fields)
Max. no. of FST lines.....	200
Max. field size.....	8000 characters
Max. no. of fields in a worksheet.....	19
Max. no. of pages in a worksheet.....	20
Max. size of display format.....	8000 characters
Max. No. of stopwords in a stop word file.....	799
Max. Hit record size	4000
Max. no. of characters in a field.....	8000 characters
Max. no. of indexes.....	1

5.2.4 **Input**

CDS/ISIS allows the creation of worksheets used to create, and/or update the contents of the records of the database. In an integrated database, each entity will require a separate worksheet with appropriate fields. When creating worksheets help messages can be specified on how to enter data in each named field. For people entering data, need only press function key F1 to call the help text on how to input data. The software provides an internal editor that assists in editing records during data entry.

Micro CDS/ISIS provides a full screen editor. Records can be modified and/or deleted. Geethananda (1991) states that the excellent internal editing facilities offered by CDS/ISIS, combined with the ease of input and editing on the online worksheet obviates the need for a word processor.

CDS/ISIS provides a mechanism that checks the validity of data during data entry. The software validates each field the user enters according to the field type defined in the FDT of that particular database. For instance, if non-numeric data is entered in a numeric type field, the system issues an error message and repositions the cursor at the beginning of the field to offer the user chance to make corrections.

5.2.5 **Indexing**

Inverted file, as defined above is a list of indexable terms selected for searching purposes. The inverted file in CDS/ISIS is created through the Field Select Table (FST). The FST defines field identifier, indexing technique, and the data extraction format by which data is extracted from the field(s) where it occurs. There are nine indexing techniques in CDS/ISIS (CDS/ISIS version 3.07 Read.Me file). The inverted file offers fast access in retrieval of information from CDS/ISIS databases.

5.2.6 **Information Retrieval Facilities**

Micro CDS/ISIS's information retrieval services allow the user to browse the master file, formulate a search expression, display search results, save search results, recall query

formulations, display terms dictionary, change display format, change dialogue language and to execute previous search.

5.2.6.1 *CDS/ISIS Search Language*

CDS/ISIS provides a search language for searching the databases. The search language of CDS/ISIS is based on Boolean logic. CDS/ISIS search language has the capability to refine a search by broadening it to retrieve more items or narrowing the search to retrieve only specific items.

For efficient and effective searching, the knowledge of search terms and search operators used in CDS/ISIS is important. To have an idea of the search terms used, it is advisable to browse the data dictionary of the database being searched. Terms intended for search can be selected right from the list of dictionary terms. In this case the user does not need to go back and key in the terms.

CDS/ISIS uses search operators with search terms in the formulation of search expressions. The types of search terms include: precise terms, right-truncated terms, and ANY terms. Precise terms refer to elements defined for a database such as subject descriptors, key words, key phrases, words in titles, institutional names and so forth. The search terms should be entered exactly the way they appear in the database. For instance, if the term 'Programme' is entered according to the British spelling, and instead the user enters Program, CDS/ISIS will not recognise the term.

The search operators consist of OR, AND, and NOT. These operators can also be represented by logical symbols: plus sign (+) for operator OR; the asterisk (*) represents the operator AND; and the circumflex (^) sign represents the NOT operator. The search operators may be used in combination or individually. For example, the search expression '(Social + Social Science) * Research', will retrieve records containing Social Research or Social Science Research.

5.2.6.2 ***Right-truncated search***

The truncation symbol used in CDS/ISIS is the dollar sign ($). Truncation in CDS/ISIS only applies to the right-hand truncation. In this case a root is entered instead of specifying a precise search term, for instance the root Social$ will produce the following: social anthropology, socialisation, social organisation, social stratification, social structure, social work, etc. These terms are retrieved because Micro CDS/ISIS automatically performs a logical OR operation between search terms having the specified root.

5.2.6.3 ***Range Searching***

CDS/ISIS has range searching ability. Range searching can be carried by selecting a sequential list of index entries, for instance, range searching of experts names of specified alphabetical letters (e.g M to S), a range of publication years (e.g 1990-1994) and/or range of research project by commencing or completion dates (e.g projects started in June 1993 or projects completed in October 1994).

5.2.6.4 *Field and proximity Search operators*

The operators used here are more restrictive of the AND operator. The field level and proximity operators include (G), (F), (.), and ($). Operator G will retrieve, for instance with the search expression 'Structural adjustment G Africa', all the records with both structural adjustment and Africa if they occur in the same field. Operator F will function like operator G when applied to non repeatable fields. In cases where operator is applied to a repeatable field then all records with specified terms (manpower F labour market) occurring individually in that repeatable field will be retrieved. The full stop operator (.) will work as F with a restriction that the terms are exactly n words apart. For example, the expression 'Child.Mortality' shows that there should be no word in between the terms (adjacent), Urban..Development implies that at most there could be one word in between the two terms.

5.2.6.5 *Relational Search*

Cross-referencing is another search technique available in CDS/ISIS. A record can contain relations to other records, even of a different type, through direct links. The links are established by means of specifying MFN of the record to be linked. Micro CDS/ISIS's REF function allows the user to gather together data which is stored in different records of the database, and make it appear like it is stored in the same record. However, CDS/ISIS only provides a mechanism for linking records and does not make any assumption as to the nature of a relationship existing between two records.

5.2.6.6 *ANY Term Search*

CDS/ISIS can search for groups of related terms through ANY term search from an ANY file. ANY file contains groups of, say, synonyms and other terms. An ANY term is a collective term standing for a pre-defined set of search terms. For instance searching for ANY African country will retrieve all records with the individual name of any country in Africa.

5.2.6.7 *Free Text Search*

A free text searching is a technique that allows users to search terms not indexed. This is also possible in Micro CDS/ISIS. Searching of abstracts or factual data is made easier by this technique. Upon selecting S (ISISRET) from the main menu, CDS/ISIS requires that a question '?' mark precede the search expression to differentiate free text searching from the normal search.

5.2.7 **Outputs**

Search results can either be displayed on the screen or be produced as printed hard copy. CDS/ISIS can store search results for subsequent printing. The user can make modifications to the search results displayed on the screen in any way s/he wants.

Micro CDS/ISIS has a powerful formatting language that can be used in creating display and print formats. By using the formatting language, the user can define formats according to his/her requirements.

Micro CDS/ISIS provides for import and export of data through the ISO 2709 format.

5.2.8 **User Interface**

The identified users of the IDU, some of which are actual users and others potential users of the databases, include: the research workers of the IAS, the IDU staff, academic staff of the University of Zambia, registered postgraduate students of the University of Zambia, registered Research affiliates of the University of Zambia, and other users from some government departments. Not all the users can be said to be familiar with computer based searches. All the categories of users (novices, intermediates, and experienced users) identified by Perera (1992) can be found among the above mentioned groups.

Therefore, the user interface should provide for, all categories of users, ease of interaction with the machine. Perera (1992) gives a detailed evaluation of the CDS/ISIS version 2.3 user interface. He concludes that Micro CDS/ISIS is more suitable for intermediate and experienced users than for novices.

The user interface of CDS/ISIS encompasses the search language, screen layouts, onscreen instructions and the printed manuals (Perera 1992). When accessing CDS/ISIS, first the main menu will be displayed from which the user can pick an option from among the

functions provided according to his/her requirements. He explains that a system can be called user-friendly if it satisfies all the categories of users named above, and CDS/ISIS is proved not to be satisfactory to especially novice users.

CDS/ISIS provides system prompts for the user. The prompts make the user aware of when s/he is supposed to interact with the machine. For instance, when accessing Micro CDS/ISIS, the user is asked to key in the name of the database before any operation could begin. The user is constantly kept informed of the number of hits and postings where the search expression occurs. Limited termination keys are provided by CDS/ISIS, although not very adequately.

The software provides a few error messages and these are quite hostile to all categories of users (Perera 1992). Error messages are neither extensive nor context sensitive. Help messages available to help users are inadequate. Control of output is not an easy task for the novice. The expert user finds it easy to control output in the way s/he wants. The ISIS manual and other available documentation are more helpful to the expert user.

Several attempts have been made to overcome these problems, and to come up with friendly search interfaces. Two such user interfaces are Heurisko and SISA (Molla 1993).

Micro CDS/ISIS version 3.07 incorporates a user interface, called Heurisko. The Heurisko search interface was developed by Elvio Pozzano of Unesco. The interface has three menus that allow users to select an appropriate databases s/he wants to perform some functions on.

The search and display menu enable the user to recall previous/last search; saved search results and a range of records.

The Pascal interface facilitates development of search interfaces by the users. Another search interface has been developed by a student of School of Information Studies for Africa (SISA), Molla Hunegnaw (Molla 1993). The main menu consists of three options: advanced search facility, online catalogue search facilities and service utilities.

5.2.9 **Network Support**

Micro CDS/ISIS's latest version 3.07 is suitable for supporting provision of information services in such research environments as the Institute for African Studies. Network support was first introduced in version 3.0. The Local Area Network (LAN) support provided by CDS/ISIS makes it easier and faster to provide services such as interactive information retrieval, retrospective searching, current awareness, selective dissemination of information to the researchers, etc. The IDU staff would be able to send notices for overdue items to faulting borrowers through the network.

The network facility would enable sharing of the resources, a number of users (research workers and IDU staff) can access and search and/or input data to the database simultaneously. Search requests can be sent to the IDU staff to carry out a search(es) on behalf of the user and send back the search results to the user.

5.2.10 **Security**

Security in any system be it stand alone or network, is very important to safeguard stored information. Security can be achieved by the use of IDs and passwords so that only users with acceptable IDs and/or passwords are allowed access to the system.

5.2.11 **System Development**

Unesco is committed to the development of the software. The package comes with a Pascal interface that allows users to design specific applications tailored to their requirements. A number of programs have been developed by individual users located in different parts of the world. Unfortunately, there is no established mechanism to collect these programs from the users so that they could be incorporated into the software package and distributed for the benefit of other users.

The development of the software has been quite rapid. A number of versions have been released within a short time: version 1 was released in 1985, version 2.3 in March 1989, version 2.32 september 1989, version 3.0 late 1992, version 3.03 and the latest version 3.07 were released in 1993. The package from Version 3.0 onwards incorporates features for networking.

5.2.12 **Vendor Stability and Support**

Micro CDS/ISIS is supported by Unesco, an international intergovernmental organisation. Unesco sponsors training programs in the use of the software. Unesco consultants assist users in system installation.

An added advantage in relation to system support is that the user group is enthusiastic to assist fellow users when they face problems in operating the software. This assistance is obtained free of charge. One can send a message through e-mail explaining the problems encountered in running CDS/ISIS. Other users who are on e-mail will then respond giving solutions to the problem.

CHAPTER 6

PROPOSED INFORMATION SUPPORT SYSTEM FOR THE INSTITUTE FOR AFRICAN STUDIES (ISSIAS).

6.1 GENERAL OVERVIEW

It has already been mentioned how important information as a resource is, in the research process. The productivity of any research institute depends on information. From the discussions in chapters three and four it is evident that the existing information system fall far short of meeting the information needs of the research workers. Hence, there is an urgent need to redesign the system to improve the information processing procedures, and to strengthen the provision of information for research activity. The information system should be able to provide accurate information at every stage of the research process.

6.1.1 RESEARCH PROCESS

Knowledge of the research process is pertinent to the provision of relevant information at every stage. The types of research carried out by the Institute for African Studies include its own initiated projects, individual researchers' projects and commissioned projects, and these projects should correspond to the policy of the Institute. The Institute, in accordance with the University of Zambia Senate, reviews its research programmes in relation to the changing social, economic and political circumstances at least every five years. Access to, and availability of, information is important in the process of reviewing and setting priority areas for the Institute. Figure 3 shows the research process and information systems.

6.1.1.1 *Programmes and Formulation of Research Problem*

Before formulating a research problem it is advisable to search the existing literature to ascertain that the intended project does not duplicate earlier work(s). It is also important for research workers to have access to information about research priorities set by the Institute. This type of information will enable them formulate research projects that fall within the Institute's identified priority areas.

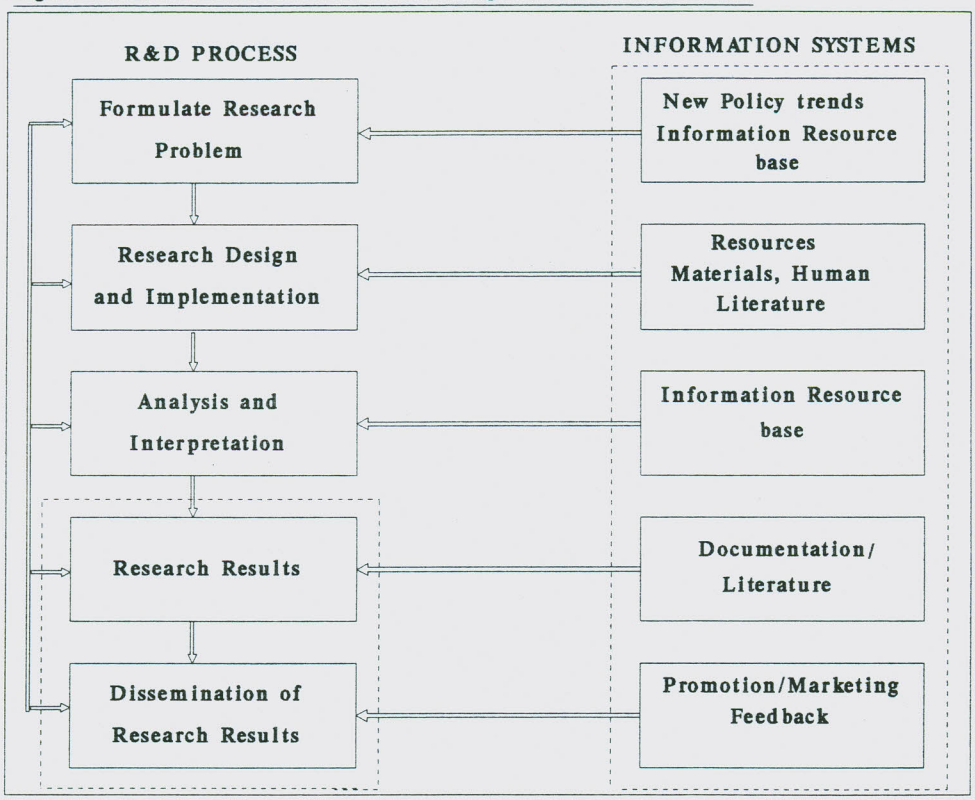
6.1.1.2 *Research Design*

The task of designing the research or the study require an input of information, too. When a research proposal has been approved, the research design is prepared. This is a plan of work defining every step and resources allocated to each stage of the research.

6.1.1.3 *Research Implementation*

In implementing the study, the research worker will have to decide on the methodologies to adopt to enable him/her to accomplish the objectives of the study. Information about research methodologies can be obtained from the literature, fellow research workers, and from experts and professional organisations such as the Organisation of Social Science Research for Eastern and Southern Africa (OSSREA).

Figure 5: Information needs at various stages in the R&D Process



Adapted from FAMESA (1992).

6.1.1.4 *Analysis and Interpretation*

After data has been collected, it is analyzed and inferences and conclusions are made. The analysis and interpretation of collected data take place in light of the existing knowledge. Katoboro (1985) states that "... facts do not speak for themselves, they have to be related to other facts to enable interpretation of their meanings".

6.1.1.5 *Report Writing*

Report writing refers to the task of making the findings of the study known either to the sponsoring institution and/or other users such as fellow researchers. The research worker can decide to publish his/her work in professional journals. Therefore information on the journals, editorial practices, and other regulations that go with a particular journal should be made available to the researcher.

6.1.1.6 *Dissemination of the Results*

Most of the research carried out at the Institute for African Studies has to be relevant to the needs of the country. Therefore, depending on the nature of the research topic, information about the research results has to be made available to the target user group. User groups or clients of research results may range from researchers, policy makers (sponsoring institution, government etc), the public to training institutions. There is a need to repackage and present the information in formats convenient for each user group.

6.1.2 **Types of Information for Research Activity**

ISSIAS will be expected to provide a variety of information relevant to the Institute's research work. The system should ascertain that information is provided in appropriate packages and formats as preferred by the research worker.

Types of information required for research work in the Institute may range from elements of the national development plan, national scientific and technological policies, socio-economic and demographic information to information on activities of other institutions in similar areas of study and research. Different types of information will be required depending on the stage or activity the researcher is engaged in. In most cases, more than one type of information may be required at any given stage or activity in the research and development processes.

6.1.2.1 ***Policy Information***

This type of information includes government policy and research institution's policy. Government policy information embrace national development plans, gazettes among other things that research workers may need at a given stage of their research. This information will ensure that the proposed activities are in line with the development aspirations of the nation. The Institute's policy enables researchers propose projects according to the stipulated regulations and priority areas.

6.1.2.2 *Programmes and Projects Information*

In formulating programmes and projects, the researchers at IAS must have access to information about past and on-going projects that duplication of efforts is avoided. For this, information sources such as profile databases and relevant directories of projects will be required. Conference proceedings, seminars and symposia reports will usually have recommendations for action on problem areas. Reports from socio-economic research projects and surveys, and consultancy mission reports and annual reports of other organisations will indicate problem areas which may need attention.

6.1.2.3 *Trend reports*

Information about new trends will help researchers know what developments are taking place in their field, new technologies used, and new developed methodologies for research. Thus trend reports on different areas of African studies will greatly facilitate the work of the researchers.

6.1.2.4 *Primary literature*

This type of information consists of original publications as found in journals, books and grey literature. Thus primary literature on areas of study of the Institute will enable the researcher to know what has already been done and helps him/her keep up-to-date with developments in his/her field of interest.

6.1.2.5 *Bibliographic Information*

Bibliographic information consists of titles with summaries of original publications produced over a period of time and in a given subject. Usually author and subject indexes and a classified contents page are provided to facilitate locating bibliographies of abstracts of interest.

6.1.2.6 *Directories of Experts and Institutions*

This type of information will provide information on researchers and experts in the field of interest and institutions engaged in the same type of activities. This type of information is important in enhancing team research, collaboration and sharing of resources and facilities. Relevant information centres can be identified and cooperation agreements for resource sharing can be forged.

6.1.2.7 *Statistical and Socio-economic Information*

This type of information can be used by research workers as direct input into their work. It is also valuable when researchers need to know about the developments taking place in the country.

6.1.2.8 ***Patents and Legal Information***

Patents contain information on technology which is ready for exploitation. Legal information will be required for purposes of negotiating contracts in cases of commissioned research.

6.2 OBJECTIVES OF THE PROPOSED ISSIAS

The objective of any information system is to help the parent organization realise its goals. Therefore, the primary objective of the ISSIAS is to contribute to the research productivity of the Institute for African Studies. The system will accomplish this by:

1. Providing accurate, reliable and timely information to the research workers from its own resources and/or by using those of other information centres within the country or from regional and international sources; and

2. Strengthening the information resource base upon which the research activity is dependent.

In order for the ISSIAS to realise its objectives the following specific objectives will have to be accomplished:

- to selectively collect, evaluate and make available information from a number of sources, both published and unpublished materials, related to the research activities of the Institute;

- to locate and make available information and results of research programmes and projects from other research institutions;
- to produce and distribute relevant information in appropriate packages and formats to the research workers according to their needs;
- to process and store the information in retrievable form;
- to keep in touch with subject experts who should directly participate in the selection and processing of information; and
- to carry out user studies from time to time and to evaluate information services being offered by the system to ascertain that researchers' information needs are met.

6.3 **FUNCTIONS**

Functions of the proposed system include acquisition of various forms of published information, process and store the information in conveniently retrievable forms, and to make the information available to the researchers in formats that they prefer.

6.3.1 **Input**

The input of the system can be considered from two angles: input for data storage and input for search expressions. Input for data storage are material resources collected for the purpose of processing, storage and retrieval for utilisation by users. The input to the system comprise of:

- Bibliographic information and abstracts of documents in the collection of the information system as well as from other systems;

- Requests for literature and/or information;
- The factual information and products of IA+C;
- Acquired literature;
- User inquiries;

Files

Files to be kept and maintained by the system include:

- acquisition records: exchange, donation, gifts and purchased materials;
- Files of records on institutional profiles, information systems, experts within and outside the Institute and research projects;
- Interest profiles which will be used for the SDI services; and
- Vendor files.

6.3.2 **Processing**

- Evaluation of requests;
- Analysis and evaluation of documents or information (IA+C);
- Searching for information in the collection or database(s); and
- Preparation of information products (packaging, repackaging etc).

6.3.3 **Output**

- Messages in form of processed data;
- Printed or online catalogue records;

- State of the art reviews, critical reviews, trend/analysis; and
- Profiles of expert, institutions, projects and information systems.

6.4 STRUCTURE OF THE SYSTEM

In most cases information systems are structured in ways that correspond to the organisation of their clientele or parent institutions they are designed to serve. Allen and Sutton (1993) discuss five possible structures based on the organisational structures of the user community in an interdisciplinary research institute.

From among the five possible structures discussed (Allen and Sutton 1993), a centralised and integrated system has been selected for the structure of the proposed information system. This type of structure serves research institutes whose user community is organised in a more dynamic intellectual organisation. The users in such a community cross disciplinary boundaries in their research activities. Users may not necessarily restrict themselves to materials from their own discipline and their information needs may vary from time to time. Therefore, Allen and Sutton (1993) suggest that a centralised and integrated information service offering a variety of reference sources, information retrieval, and SDI would be appropriate. Guinchart and Menou (1983) state that centralised, integrated information services are simpler and cheaper to run.

6.4.1 **Structure and Activities of ISSIAS**

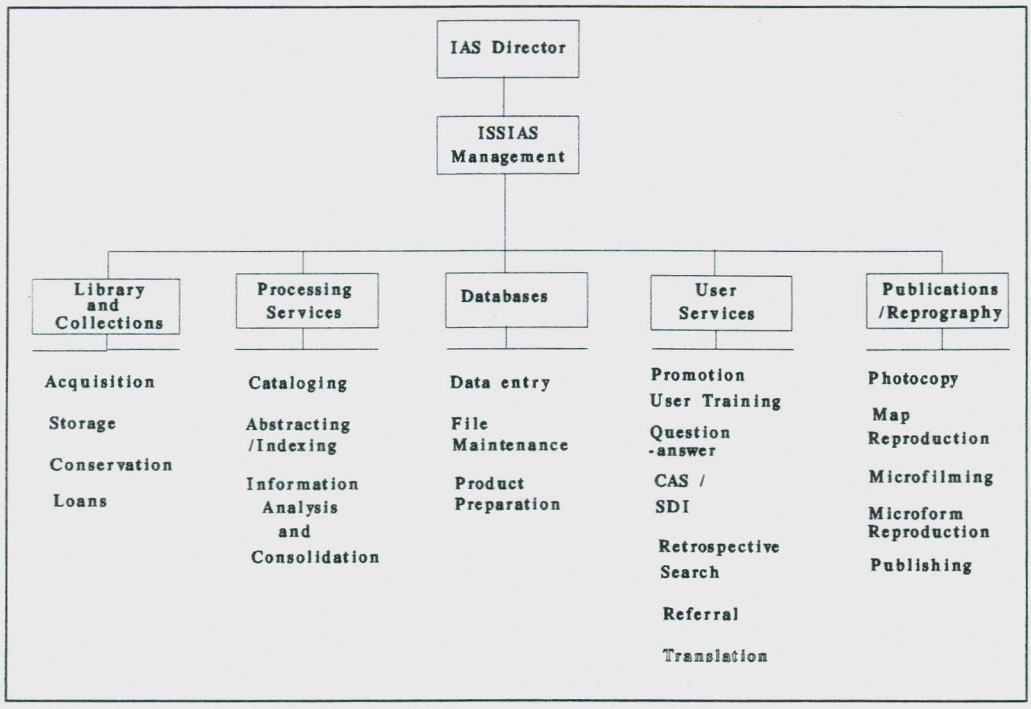
Looking at the research reports and the activities they engage in, research workers at the Institute cross boundaries in their research activities. Therefore, the proposed information system will adopt a centralised, integrated approach to information handling and provision to support research at the Institute. The system will make use of external services where necessary to cater for the needs of the research workers. The activities of the proposed system will include library house-keeping operations, processing services, databases, user services and publications service as shown in Figure 4.

The functional units shown in Figure 4 can be grouped in two major categories: (a) Library house-keeping activities, and (b) Information services. In order for the system to operate at optimum both categories should be automated. Due to time constraints the library house-keeping functions could not be worked on. Hence, the study concentrates on the information retrieval aspect.

6.4.1.1 ***Management***

Management of ISSIAS will be responsible for managerial functions of the information system. Some of the functions include planning and control of the activities of the information system. Systems development involves a life cycle of a system, therefore management will also ensure the development of the system whenever need arises. The head of the information system will report directly to the Director of the Institute.

Figure 6: Structure of ISSIAS



Adapted from Guinchart and Menou (1983).

6.4.1.2 ***Library Services***

The library will be responsible for physical storage of the collection of literature. Selection and acquisition of relevant materials to the Institute's work will be carried out in consultation with the research workers who are experts in their fields of specialisation and know precisely what type of information they require for their work. However, the information workers will also select materials on the basis of their knowledge of research programmes and priority areas set by the Institute.

Materials will continue to be acquired through donations/ gifts, and exchange. It is recommended also that valuable materials that cannot be obtained through the above mentioned acquisition modes may be purchased. Inter-library loan is another method through which materials can be acquired. Materials from the UN agencies will continue to be acquired through depository arrangements.

The collection of the literature should be arranged in an accessible way to allow for easier retrieval. Research workers who want to search for literature themselves should be able to locate materials they are looking for. The library will also continue to lend materials to the researchers to facilitate their work. There should also be provision for a reading room where researchers may consult materials. Infrequently used materials that are still valuable to scholarly work may be preserved on microfilms. Microfilming services can be obtained from external services or libraries and documentation centres which provide such services.

6.4.1.3 *Processing Activities*

a. **Cataloguing and Classification**

Cataloguing is the process of preparing bibliographic descriptions of a document for unique identification of that particular document from the rest. Classification of materials is necessary to provide for a systematic arrangement of materials on the shelves. The classification should be clear to the users to enable them locate a particular item among other documents in the collection.

b. **Indexing and Abstracting**

Indexing involves the definition of a subject for information retrieval purposes. The purpose of indexing is to make information content of a document known to the users through use of concepts that represent the content. Abstracting is the process of brief description of the contents of a document. These processes are means of improving access to information which has not previously been processed.

c. **Information Analysis and Consolidation (IAC)**

Information analysis should be a major activity especially in the Institute for African Studies where emphasis is placed on information provision or supply. Information analysis and consolidation process consists of the selection, analysis, evaluation and compression of information and data obtained from one or more sources and presenting the result in a language, style and format appropriate to the specific target users (Neelameghan 1992).

6.4.1.4 ***Database Services***

Database services will be responsible for the centralised management and control of the IDU's data. The centralised control will help reduce problems such as redundancy, which is the duplication of fields and files. This duplication can occur in cases of creation of, say, document database and databases of profiles such as experts, institutions, projects and information systems. Centralised control ensures that duplication of common attributes or fields like name of person, dates, title, objectives and many others which occur in all the entities is minimised.

Central control of database services enables users to have access to and share a variety of data and information resources of the Institute. It also enhances the integrity of data through improved consistency, accuracy and reliability of data.

Centralised control of databases ensure data independence, since the database definition is done externally, outside the application program. In a centralised database system access is controlled to ensure the security of the data. Control measures such as issuing of IDs and passwords ascertain that only authorised persons have access to the database(s) and /or to parts of the database(s).

Some of the functions of the database services include data entry, file maintenance, and preparation of information products from the database(s). Depending on the user requirements new databases will have to be created to carter for those needs. New

information or documents will have to be entered and where necessary new databases created.

6.4.1.5 *User Services*

a. **Current Awareness and SDI Services (CAS/SDI)**

Current awareness services provide researchers with information that helps them keep abreast of advances in their fields of specialization. Selective dissemination of information is a current awareness service whose emphasis is on personalised information service. Current information can be provided from the information system's collection (databases), and from local, regional and international information systems. Selective dissemination of information service facilitates researchers' search for relevant information in their fields. Research workers are relieved of going through the bulk of information to sift that which is relevant to their work.

b. **Retrospective Search Service**

This service entails searching primary literature, bibliographic databases, bibliographies, indexes, directories and other secondary sources or information. The proposed information system will provide retrospective searches from the existing collection of materials and bibliographic as well as factual databases of the system. Established and new contacts with other national, regional and international information systems will be maintained for access to their information resources. This service is essential for the preparation of state of the art reports, and for the continuous transfer of information to the researchers (Samarasinghe and Wing 1984).

c. **Question-Answer Service**

The question-answer service implies a situation where a user approaches the information system with a question or set of questions. The system should be able to give the answers or refer the user to some source(s) where s/he can obtain answers(s) to his/her question(s).

d. **Referral Services**

Referral service involves directing the user to an appropriate source for the information s/he requires. The information workers by implication should have a good knowledge of information sources to be able to refer users to the right source(s).

e. **Translation Services**

The functions proposed for the ISSIAS will include a responsibility for preparation of translations of articles from local languages into english especially for the researchers in social and cultural research programme. Also research affiliates who come from abroad may need translation services. It is advisable that the system should be able to refer the user to people who can assist in translation services. It also involves translation of information supposed to be disseminated to end-users. Thus it is essential to translate information into vernacular of the research findings targeted especially to people who do not understand english, e.g. the rural population.

f. **Dissemination/promotion Services**

Research programmes and projects designed at the Institute for African Studies have some relevance to, if not completely tailored to, finding solutions to the country's problems. Therefore, research findings from the investigations should be disseminated to the users for

utilisation in development work. Dissemination is a process of distributing information to the users through newspapers, magazines, pamphlets, radio, and television and many other communication channels depending on the target user group.

The services of information analysis and consolidation will be required in the preparation of information products. The information to be disseminated will require rearranging and packaging into formats appropriate for each user group.

Promotion of information services and products to researchers within the Institute is important to ascertain that the services are exploited to the benefit of research work. There is a need to train users in the use of information services being provided by the information system. Promotion of the Institute's research results to the end-users is essential to enable them apply the results in development endeavors.

6.4.1.6 **Publication Services**

The system will continue the function of publishing research reports of the Institute and other publications. Production of research reports does not necessarily have to be in hard copy, it can be done electronically. Services such as photocopying, map reproduction, microfilming, microform reproduction and binding should be provided. The system should be able to make use of external resources which are not available at the Institute.

6.5 COMPUTER APPLICATION

Research work at the Institute can benefit from proper application of appropriate computer technology. Computer technology increases productivity and efficiency of an information system. The main applications of computers in information systems are concerned with acquisitions, processing, storage, retrieval and communication of data and information. The emphasis of the proposed system is to provide specialised information services. Nevertheless, it is important to automate library house keeping operations such as acquisitions, cataloguing and circulation carried out to a lesser extent in documentation centres. Automating these activities does not only ascertain proper record keeping but also relieve the information professionals from the tedious routine work in order to enable them concentrate on preparing value-added information products.

Other areas where computer technology is used in information systems include computer-mediated communications, networking, optical storage technology, desktop publishing and so forth.

Computer-mediated communications enables communication of documents and messages among others. Communication with vendors and other information systems is enhanced through this facility.

Optical storage technology such as CD-ROM, WORM etc., are used in some African academic institutions. CD-ROM databases contain large amounts of bibliographic information which is helpful in research. Researchers can make use of CD-ROM databases

to search for information produced in a particular field of study. The databases can be used also by the information system in the acquisition process, for identification of relevant materials and bibliographic verification purposes.

Desktop publishing can enhance publication activities of the Institute for African Studies. It can be used to prepare the research reports and such documents as newsletters, magazines, books, journals, brochures, pamphlets, calendars, forms and other publications.

6.5.1 **Hardware**

The hardware recommended for the proposed system are IBM microcomputers and compatible. The microcomputers will be connected to other computers in the Institute in a Local Area Network (LAN). Bridges (1986) defines a LAN as "a system of interconnected computers and associated devices which allows interchange of information within a limited geographical area".

6.5.1.1 ***LAN System: Objectives and Functions***

The LAN systems are designed to facilitate communication in an organization. This implies that every associated entity of the organization should be connected and should be having compatible devices that enables exchange of information through the network.

The network system facilitates interchange of messages among the researchers and between the researchers and the information system. It is possible for researchers to route their

queries through the network to the information system for searches. Or they could actually interact with the databases of the information system searching for information from their personal computers.

In the Institute for African Studies, with limited resources, the LAN plays an important role. It enables sharing of resources such as printers, discs (file servers) and databases. In a LAN system users are able to simultaneously access the databases and carry out their various activities, say searching or data entry services.

Another significant purpose of a LAN system in the Institute is to enable linkage to external networks and information services. In a research environment the availability of network system is of paramount importance. This will enable the information professionals access remote databases, search the databases, and download the required data or information on to a diskette or disc. The downloaded information will then be disseminated to the researchers who requested for it. Research workers can also access the databases in other institutions and search for needed information.

6.5.2 **Software**

As mentioned in chapter three the types of software used at the Institute include word processing software and statistical packages. For database management, the software used at the moment is Micro CDS/ISIS version 2.3. The Micro CDS/ISIS software version 3.07 with network support facilities is recommended for the proposed information support system for the Institute for African Studies. The software is not recommended only for its being

distributed free of charge but because of its attractive features. There is no limit to the number of databases that can be created in CDS/ISIS. Therefore, as many databases as possible can be created for research information for the Institute. A single database can handle up to 16 million records. It also operates on IBM microcomputers and IBM compatibles which are commonly found in small documentation centres in Africa (PADIS 1992). A single record can handle 200 fields. The formatting language allows the user to create output formats, screen or print formats, in the way the user wants the records to be displayed or printed. The software allows the user to specify search terms through the creation of the Field Select Table (FST). The retrieval capabilities of CDS/ISIS are suitable for search functions for research information. The search language of CDS/ISIS is based on the Boolean logic. The network support provided by the software enables data entry at different points and searching the database(s) at the same time. The details of the features of CDS/ISIS are presented in the previous chapter.

6.5.3 **Databases**

Databases of relevant documents, institutions, projects, experts and factual information are essential in the provision of information for research activities. CDS/ISIS software and the ABNCD+ (Abebe et al 1992) structure based on the MIBIS format (Di Lauro 1990) have been used in creation of databases. The ABNCD+ system allows the creation of an integrated structure consisting of bibliographical records, and profiles of projects, institutions, information systems and experts, see appendix 2. The bibliographic records include documents like monographs, part of monograph (analytic/ monograph), serial

(whole), part of serial (analytic/serial) and non-book materials such as audio and video cassettes, micro-forms, etc.

6.5.3.1 ***Prototype Databases***

Two prototype databases have been created for the proposed information system. The structure of the integrated database follows the ABNCD structure; however, while choosing fields for indexing and for designing the display format users' requirements were given due priority. The integrated database is the first segment of an information system on whose basis value-added information can be produced. The specialised database (FIAS) consist of records of factual information collected from various sources.

The Integrated Database (BIAS)

BIAS database is an integration of bibliographic records, profiles of projects, information systems, institutions and experts. This database contains records of monographs, analytical parts from monographs or collections, serials (periodicals), and articles from periodical publications. The fields of the worksheets of bibliographic records have been combined in appendix 4. The Field Select Table (FST) for BIAS database and display format (BIABI.PFT) for bibliographic records appear in appendices 3 and 5, respectively. It may be noted that users have multiple access points viz. author, title, keywords, etc., through which they approach information sources. For example, they can search this database by selecting fields listed above and record display will appear as shown in the sample records in Figures 7-9.

Figure 7: Sample record of an analytic part from a monograph.

BIBLIOGRAPHIC RECORDS

Angi, C. and Coombe, Trevor
The primary school leaver crisis and youth programmes in Zambia. In: Education Policies and the changing economic and environment in Zambia, Kelly, M.editor. Lusaka: University of Zambia, 1986: 56-68.

DESCRIPTORS: PRIMARY SCHOOLS; SCHOOL LEAVERS; YOUTH CENTRES; YOUTH ORGANIZATIONS; YOUTH UNEMPLOYMENT; YOUTH UNREST; PRIMARY EDUCATION; RURAL DEVELOPMENT; YOUTH

ABSTRACT : Examines some aspects of the school leaver problem in Zambia with particular reference to training and employment opportunities, problems of youth in urban areas, and the development of a youth programme in Zambia. Based on a survey of literature and a series of interviews with Zambian government officials in social service organizations, educational institutions, and business and industry.

Figure 8: Sample record of a Monograph

*** BIBLIOGRAPHIC RECORDS ***

Lungwangwa, G.
The impact of structural adjustment on the quality of basic education in Zambia Lusaka: University of Zambia, 1990.

DESCRIPTORS: STRUCTURAL ADJUSTMENT; BASIC EDUCATION

ABSTRACT : Discusses Zambia's structural adjustment programme which was aimed at liberalizing the economy and allowing market forces to play a greater role in the allocation of resources. Defines basic education as primary education and non-formal education activities for out-of-school youth and adults. Concludes that the implementation of structural adjustment measures need not necessarily lead to a decline in the quality of social services and the state of basic education in particular.

Figure 9: Sample record of an analytic party from a serial

BIBLIOGRAPHIC RECORDS

Serpell, Robert
Setting Research Priorities for a Social Research Institute in an African University. In: African Social Research Journal, 24, 1985: 15-20.

DESCRIPTORS: SOCIAL RESEARCH; RESEARCH; RESEARCH INSTITUTIONS; AFRICAN UNIVERSITY

ABSTRACT : The paper gives a brief historical background of the Institute for African Studies. It also discusses research in developing countries and research programmes of the Institute.

Experts profile

Records of profiles of experts contain information about persons involved in research, and experts in disciplines of the social sciences. This information is valuable in establishing invisible colleges for the research workers. In research activities that require the contribution of a group of people (experts), this type of information helps in identifying persons with the necessary qualifications and experience to be included in team research. A sample record of profile of experts is shown in Figure 10. The worksheet and display format for experts profile appear in appendices 6 and 7, respectively.

Figure 10: Sample record of Experts Profile

PROFILE OF EXPERTS

NAME	: Dr.Lumbwe, C.
SEX	: M
NATIONALITY	: ZM
AFFILIATION	: Institute for African Studies, Economic and Labour Research Programme
ADDRESS	: P.O.Box 30900, Lusaka, Zambia, Phone 292463, Telex ZA 44370, Fax 260-292462
PROJECT TITLE	: The Copperbelt and Lusaka will take the most: demography and regional allocation of personnel in the Zambian public health system in the 1990s'.
QUALIFICATIONS	: Ph.D, Educational Administration, University of Toronto.
PECIALIZATION	: Social and Economic Policy
WORKING LANG.	: English
CURRENT EMPL.	: R&D
PREVIOUS WORK	: Lecturer

Institutional Profile

Institutional profiles furnish information about institutions that are involved in similar activities as those of the Institute for African Studies. Such information may include type(s) of research, research programmes and activities as well as information pertaining to resources like equipments that other institutions have. This information enhances cooperative ventures and collaboration in research work. A sample record showing an institutional profile appear in Figure 11. The worksheet and display format appear in appendix 8 and 9, respectively.

Figure 11: Sample record of Institutional Profile.

PROFILE OF INSTITUTIONS

NAME OF INSTITUTION	: Institute for African Studies
ADDRESS	: P.O.Box 30900, Lusaka, Zambia, Phone 292463, Telex ZA 44370, Fax 260-292462
DIRECTOR	: Saasa, Oliver S.
DISCIPLINE	: Social Science
YEAR ESTABLISHED	: 1938
NUMBER OF STAFF	: Research Professionals, 12; Supporting Professionals, 9; Technicians, 5; Others, 7
ASSOCIATED ENTITIES	: Economic and Labour Research Programme, Urban Development Research Programme, Health Promotion Research Programme, and Social and Cultural Research Programme
TYPE OF INSTITUTION	: Parastatal, Research centre
TYPE OF RESEARCH	: Applied. Commissioned.
OBJECTIVES	: To undertake research, both self- initiated as well as commissioned studies; research parameters include theoretical or concepts building and problem solving or consultancy, current emphasis is on socio-economic issues pertaining to national development.
WORKING LANGUAGE(S):	En
PARENT ORGANIZATION:	University of Zambia
PUBLICATIONS	:African Social Research, Zambian Papers, Research Notes and Comments, Monographs.
GEOGRAPHIC COVERAGE:	Zambia, Southern Africa
DESCRIPTORS	: RESEARCH; DEVELOPMENT RESEARCH; RESEARCH CENTRES; RESEARCH METHODS
ABSTRACT	: IAS carries out its own initiated projects, commissioned research, consultancy, community services, and organise conferences and workshops. IAS has a library collection of 3000 documents.

Projects profile

Information and knowledge of on-going, completed and proposed projects in other institutions is essential. Awareness of research projects being undertaken in other institutions does not only reduce duplication but also gives an idea of methodologies used. A sample record of project profile appear in Figure 12. The worksheet and display format are shown in appendix 10 and 11, respectively.

Figure 12: Sample record of Projects Profile

*** PROFILE OF PROJECTS ***

TITLE	: Evaluation of improved charcoal stove dissemination in the urban areas of Zambia.
PERFORMING INSTITUTION	: Ministry of Power, Transport and Communications; Institute for African Studies
RESEARCHERS	: Maembe, Edward; Nawakwi, Edith
SPONSOR	: Ministry of Power, Transport and Communications; 36,000, Zambian Kwacha
PROJECT STATUS	: Completed
DURATION	: 2 Months
TYPE OF RESEARCH	: Survey
DESCRIPTORS	: ENERGY, CHARCOAL, FUELWOOD

DESCRIPTION : The report analyzed the major factors which have affected the promotion production and selling of the improved stove by tinsmiths and assessed why people have either shunned or adopted the new stove.

Information Systems

No single information system is self-sufficient. Therefore, knowledge and information about libraries, documentation centres and information systems is important in identifying activities and information resources found and being offered by those systems. This type of information will assist forging cooperation links and resource sharing activities. Figure 13 shows a sample record of an information system. The worksheet for information systems is the same as for profile of institutions (appendix 9). The display format appear in appendix 12.

Figure 13: Sample record of an Information System

*** INFORMATION SYSTEMS ***	
NAME OF SYSTEM	: Copperbelt University Library
DATE OF ESTABLISHED	: 1989
HEAD OF INSTITUTION	: Lundu, Maurice, Prof.
PARENT ORGANIZATION	: Copperbelt University
ADDRESS	: P.O. Box 21692, Kitwe
DISCIPLINE	: Business Studies, Environmental Studies, Industrial Studies
PERSONNEL	: Professionals 8, Support staff 32
SERVICES OFFERED	: Reference Service, Special Loan Services, Book binding, Printing
CLASSIFICATION SYSTEM	: Library of Congress
SUBJECT HEADING LIST	: Library of Congress Subject Headings
WORKING LANGUAGE	: En
GEOG. COVERAGE	: Zambia

Specialised Database

This database contains records of information collected from various sources. Information analysis and consolidation is the basis for providing such type of information. It is an integrated database containing records on exchange rates and records of information in the informal sector. A single FDT containing fields for all the records, and FST appear in appendices 13 and 14, respectively. Whereas the worksheets and display formats have been prepared separately for each type of information, see appendices 15 and 16 for the worksheet and display format, respectively, of the records of exchange rate of the Zambian Kwacha to the US dollar. The worksheet and display format for records of the Informal sector are shown in appendices 17 and 18, respectively.

The results of the survey show that researchers do not only need bibliographic data but also information in the form of reviews, full original documents, abstracts, information presented in tabular form and many other formats. Therefore, the specialised database contain records

of information not in bibliographic format but as abstracts and tables. The output of sample records appear in tabular form as shown in figures 14 and 15.

Figure 14: Sample record showing the sexes and some activities carried out in the Informal Sector.

*** INFORMAL SECTOR ***

Title : Sexes in the Informal Sector

Activity	Male		Female	
	No.	%	No.	%
Tailoring	114	(80)	29	(20)
Basket Making	66	(96)	3	(4)
Pottery	2	(29)	5	(71)
Sweet Manufacturing	3	(50)	5	(50)
Charcoal Burning	17	(85)	3	(15)

Source of information: Fourth National Development Plan, 1989; World Bank Memoranda, 1993

Figure 15: Sample record of Exchange rate of the Zambian Kwacha to the US dollar.

Annual Average exchange rate of the Zambian Kwacha to the United States Dollar for the last ten years.

YEAR	EXCHANGE RATE
1985	3.14
1986	7.79
1987	9.52
1988	8.27
1989	13.84
1990	32.85
1991	64.64
1992	167.63
1993	435.00
1994	670.00

Source of information: Economist Intelligence Unit, Zambia Country Profile, 1993/94;World Bank Memoranda 1993

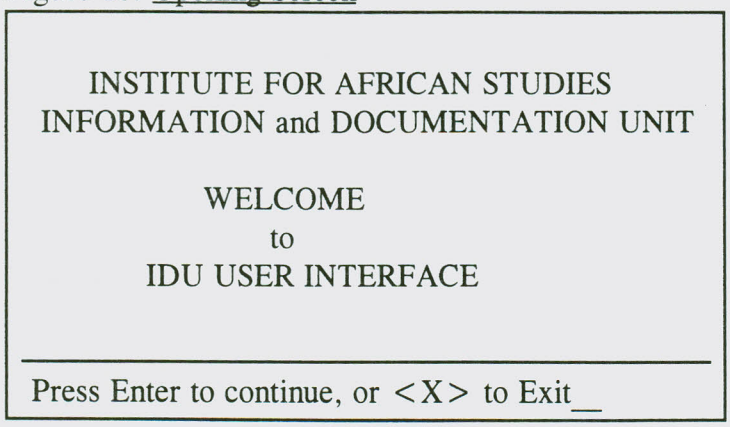
6.6 **USER INTERFACE**

A user interface has been developed using the advanced programming facility of Micro CDS/ISIS software. It has been designed to assist end-users interact easily with the databases when searching and retrieving records from one or more databases. The interface allows users to:

- select database on which s/he wants to perform a search;
- change from current database to another database;
- gives information on the contents of the database(s);
- lists access points commonly used for searching by users;
- help message on how to enter search expression; and
- allows the user to display search results.

The interface is based on simple menus as shown in the figures below. The application program for the interface, Simui, can be run by choosing option 'A' from the main menu of Micro CDS/ISIS. Figure 16 shows the opening screen of the interface program.

Figure 16: Opening Screen



On pressing <CR>, at the first screen the Database Search Service screen is displayed (see Figure 17). The screen is displayed showing options as indicated in Figure 17. Selection of either option 1 or 2 will lead to a small window displaying the available databases on the right side of the Database Search Service Menu box.

Figure 17: Database Search Services

```
DATABASE SEARCH SERVICES

1. Select Database
2. Change database
3. Information on databases

Enter choice by pressing any number/letter__
_____________________________________________
X  to Exit
```

If option 3 is selected, the screen containing information on databases is displayed. Brief information on the contents of each database is given, as shown in Figure 18.

Figure 18: Information on databases

```
INFORMATION ON DATABASES

BIAS database contains records of bibliographic
    information about books/collections, analytic parts
    from a book/collection, and articles from serials; and
    profiles of experts, projects, institutions and
    information systems.

FIAS database contains records of factual information on
    the monthly and annual average exchange rates of the
    Zambian Kwacha to the US dollar and information
    about the informal Sector.
_____________________________________________
Press <CR> to continue or <X> to Database Services
```

Upon selecting a database, the Search Menu is displayed listing options of access points from which the user can select his/her choice for search purposes. Figure 19 shows the menu that gives search options to the user to search by title, subject, topic, and name of author or expert.

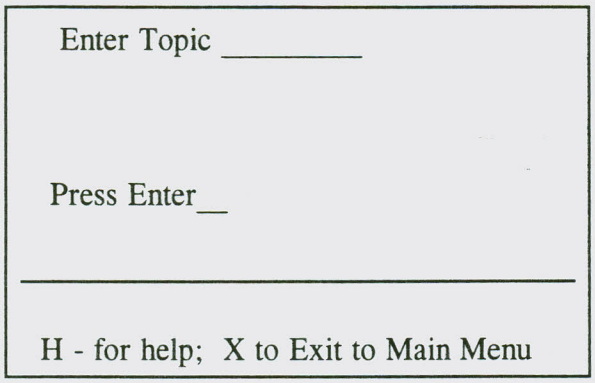
Figure 19: Search Options Menu

```
        SEARCH MENU
         Search Options:

          T - Title
          S - Subject
          P - Topic
          N - Name
          Q - Quit Searching

 Enter letter of your choice__
F1- Help                    X- Exit
```

Option T for title enables the user to search for a known title. Subject search will match the search expression given to the subject descriptors used in the database(s). Topic is a broad search which searches for terms in the title and the subject descriptors. Selecting option N for name allows the user to search for name of author, name of expert, and name of head of institution.

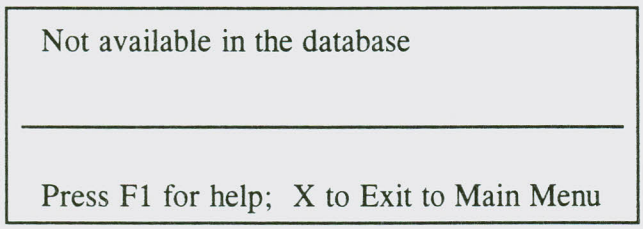
If the user opts for searching by topic, then s/he is prompted to type or enter the topic as a search expression (Figure 20).

Figure 20: Enter Search Expression Menu



If the search expression entered is not available in the database a message is displayed as in Figure 21.

Figure 21: Invalid Search Expression Message



Help messages are provided to guide the user in the formulation of search expression. Pressing X at any point will take the user to the Search Menu.

6.7 **SYSTEM DEMONSTRATION**

The user will approach the system with a query or set of queries. S/he will log in using the ID or password recognised by the system. Then the screens as discussed above will be displayed subsequently one after the other.

Search expressions can be formulated to search the BIAS or FIAS databases. For instance, the user would want to find out:

a. the number of men and women in the informal sector involved in charcoal burning activity in 1989. The user may enter Keyword(s) in either upper or lower case as:

Examples

CHARCOAL BURNING and 1989

MEN and CHARCOAL$

WOMEN and CHARCOAL$

The system will search for the search expression(s), if it does not find the terms then an invalid message is displayed as in Figure 21. If present, the system will ask the user whether to display the record(s) or not. The record containing the terms will be displayed as in Figure 14.

6.8 **IMPLEMENTATION**

The decision to implement the proposed information system will have to be made by management of the Institute. Nevertheless, a number of considerations are involved in the process of implementation. There are several ways the implementation might take place, depending on the circumstances. The phased or partial implementation approach is recommended. This implies that the implementation will be carried out in phases over a period of time.

There is a need to provide enough room, bigger than the present one to accommodate the collection, equipment such as computers, offices and working area for the members of staff. The computers should be located in the same building where operations are performed. A reading room where researchers can consult materials should be provided within the building.

Computers and other related equipment should be acquired. The types of software required for the operations of the Institute will also have to be acquired. A feasibility study for the purpose of establishing the LAN and the associated peripherals should be undertaken.

Staffing should be improved. Available professionals should be trained in the management of the computer-based information system. To ascertain maximum utilisation of the information system, there is need to train users in the use of the system.

There is a need for periodic evaluation and adjustment or modification of the system. Systems have life cycles as such they require periodic evaluations and readjusting to move with the changing times and carter for users' needs at different points in time.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

The Information and Documentation Unit of the Institute for African studies is a relatively small centre with limited resources. Nevertheless, it is faced with a challenge to providing information services to support the Institute's interdisciplinary research activities. The Unit operates on a limited budget that restricts the acquisition of costly books and periodicals. As a result, most of the reading materials are acquired through exchange, donations and gifts.

The processing mechanism used by the Information and Documentation Unit is not clear to the users. It is difficult for the users to retrieve documents on their own. There is need for a clear mechanism and tools for locating documents.

The results of the survey have shown that subject descriptors are the commonly used access points when searching for information by users. However, some of them expressed dissatisfaction with the descriptors used, citing poor subject definition as one of the major problems.

The results of the survey show that, most users are not satisfied with the services offered by the system. The collection is inadequate and materials are outdated. The researchers suggest that indexes and abstracts should be provided on a regular basis.

Inadequate information services seriously affect research activity at IAS in many ways. Some studies cannot be undertaken due to lack of information. In the absence of current information, researchers are unable to keep abreast of the advances made in their areas of interest. Inadequate information also affect their preparation of frameworks for analysis.

There is no mechanism for sensitization of the users. Many users have expressed their ignorance of the existence of computer services at the Institute. Some users who are aware of the service had searched once at the time of the survey. Others, although aware of the databases, had not yet made any searches at the time of the survey. Lack of sensitization, training and the unfriendly nature of the system have contributed to underutilisation of the facilities.

The results of the study indicates that the information handling activities in the Institute are inadequate to support research. Therefore, there is a need to redesign the information system to provide for better methods for acquisition, processing, organization, retrieval and dissemination of the information.

In order to provide adequate support to the research activities of the IAS, a computer-based information system has been proposed. The system will be able to provide information at every stage of the research process. The information will be processed, packaged and repackaged in formats that the researchers would prefer.

Two prototype databases have been created, BIAS and FIAS. BIAS database contains bibliographic records of monographs, analytic part from monographs/collections, and

analytic part from serial; and profiles of projects, institutions, experts, and information systems. FIAS is a specialised database containing records on factual information about the exchange rate of the Zambian Kwacha to the US dollar, and about the informal sector. A simple user interface based on menus is developed to assist users in searching the databases.

The system is to operate in a Local Area Network which in the long run will be connected globally via appropriate Wide Area Network. This will enable the system to provide efficient services to support research.

7.2 **RECOMMENDATIONS**

The present research has provided much insight to the researcher about the existing problems related to information facilities available at IAS, and has thus enabled her to come up with a prototype system. However, the following measures need to be taken to gain the optimum benefit from the information support system of the Institute.

1. There is a need to form a committee which will be responsible for the computerisation process of the information services of the IDU. The committee should ensure participation of the users in the development of the system. A feasibility study should be carried out for the purpose of introducing the LAN system in the Institute.

2. Processing of materials should be done in consultation with subject specialists. Processing should include indexing, abstracting, analysis and packaging and

repackaging of information to meet the user requirements. The creation of database records should follow standards. This is helpful in the exchange of information with other systems.

3. For communication purposes the Institute should connect to the electronic mail facility available at the main campus of the University of Zambia. Eventually the connections should be made to external networks which will provide the information system and researchers access to remote databases on one hand and on the other hand enable other systems access the Institute's databases.

4. Any developments to the system should be made known to the users. The researchers should be trained in the use of the system's services when it is operational. Interaction of the research workers with the system should be made easier to ascertain full utilisation of the services offered.

5. There is an urgent need to improve the staffing situation of the IDU. Train the existing information professionals to enable them better manage the computer-based system. The challenge of providing information products in formats required by the researchers demand the services of qualified information professionals and subject experts in the fields covered by the Institute.

6. Information systems have a life cycle, therefore there should be continuous evaluation, feedback and improvements in the system. User studies should be part of the strategy of the information system in obtaining feedback from the researchers.

7. More databases of factual information should be created to provide a wide variety of information for research activity. CD-ROM databases should be acquired to provide a wide range of bibliographic information in the fields of research of the Institute.

8. There is a need to improve and develop the interface further to simplify the retrieval of information for the researchers.

9. Information technology infrastructure needs to be improved. Government should ensure a better information infrastructure in all the major sectors in the country. Formulation of an information policy should be considered a crucial issue. The policy should be framed such that one should be complementary to the other.

10. Collaboration with other information centres attached with research institutes in the same area, anywhere in the world, needs to be established. The existing cooperation agreements need to be strengthened. Such agreements would enable exchange of information in hard copies as well as in machine-readable form. There should be close cooperation with the PADDEV database for both the input of research data as well as for retrieval of information.

11. International agencies may be approached for funds for acquisition of current technologies for the information system.

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APPENDICES

Appendix 1: Sample Questionnaire

SURVEY OF THE INFORMATION NEEDS AND FLOW PATTERN AMONG THE RESEARCHERS AT THE INSTITUTE FOR AFRICAN STUDIES (IAS).

PLEASE ANSWER BY TYPING OR PRINTING AND TICKING IN THE BOX [ ] WHERE NECESSARY. IF SOME QUESTIONS DO NOT APPLY, INDICATE N/A FOR "NOT APPLICABLE".

PART 1
IDENTIFICATION DATA

1. Surname (optional) ---------- Other Name(s) (optional)----------
   Nationality ---------- Sex: [ ] Male [ ] Female

2. Mailing Address Telephone: Home (optional)----------
   _____ Office _____
   _____ Telex: _____
   Fax : _____

3. Affiliation_____
   _____

4. **ACADEMIC QUALIFICATIONS:**
   Highest Degree/Diploma_____
   Subject (Major)_____
   Awarding Institution_____

5. Main fields of Specialization at work (Please indicate your subject area(s) of specialization)
   _____
   _____

6. Services offered (the category of work you are involved in. (Tick where appropriate)
   [ ] Research [ ] Teaching [ ] Consultancy [ ] Others (Please specify)_____

PART II
USE OF DOCUMENTATION AND INFORMATION UNIT

7. Do you use the Documentation and Information unit?
   [ ] Yes [ ] No If No, skip questions 9, 10, and 11.

8. If your answer to the above question is NO, please briefly explain why.

_____

_____

9. For what purpose do you use the facilities of the Documentation and Information unit? (Tick the applicable options below)
   [ ] To look for specific materials
   [ ] Borrow books and journals for preparation of research
   [ ] Make literature searches using abstracting and indexing journals
   [ ] Consult journals in order to keep abreast with developments in your field
   [ ] Make reference inquiry
   [ ] Browse through journals and monographs
   [ ] Write a paper
   [ ] Read newspapers, magazines, etc.
   [ ] Other (Please, specify)_____

10. How often do you use the Documentation and information unit?
    [ ] Very often [ ] Frequently [ ] Occasionally
    [ ] Rarely [ ] Never

11. When looking for information in your documentation and information unit who does the computer searches?
    [ ] yourself [ ] the documentalist on your behalf

12. If you do the searching, what access points do you usually look for? Tick the one you prefer.
    [ ] Author [ ] Title [ ] Subject/Descriptors [ ] Other (Specify)----------

13. Using the access point ticked above would say that you find it easy to get the required information from the database?
    [ ] Very easy [ ] Easy [ ] Fair [ ] Difficulty [ ] Very difficulty

14. Please briefly explain what difficulties you encounter when searching for the desired information. _____

_____

PART III
INFORMATION SERVICES

15. Does your Documentation Centre provide you with any of the following services? (Tick where appropriate)
    15.1 Current Awareness Services (Informing users in general of new publications received)
       [ ] display or circulation of new items received
       [ ] display of lists showing new items added to the collection
       [ ] Selective Dissemination of Information (Giving specific information to specific individuals about new items relevant to their field of specialization)

15.2 [ ] CD-ROM searches of databases on CD-ROM discs.
15.3 [ ] Online searches of databases (interactive interrogation of databases containing bibliographic information or source data, held on host computer)
15.4 [ ] Question and answer services (where one asks questions for specific required information)
15.5 Reprographic services
[ ] Photocopying/Xeroxing of documents
[ ] Microfilm/fiche reproduction
[ ] Maps reproduction/reduction
[ ] Photography
[ ] Other (please, specify)_____

16. Would you say that your Documentation and information unit provides adequate services to meet your information needs? (Tick according to your perceived level of adequacy)
[ ] Average [ ] Below average [ ] Above average

17. If the answer to QUESTION 16 above is in your view not adequate what other sources of information do you use to meet your information requirements?

_____
_____

18. Please, indicate if possible, the extent to which inadequate information facilities hamper your work as a researcher?
[ ] No limitation [ ] some limitation but not serious [ ] Serious limitation

_____
_____

19. What improvements relevant to your field of specialization would you like your institution to make to its collection?

_____
_____

PART IV
DISSEMINATION OF RESEARCH FINDINGS

20. What do you do with your research findings and reports?
Tick all the applicable answers
[ ] deposit in the Documentation and Information unit
[ ] present at a seminar or conference
[ ] distribute to fellow researchers and colleagues
[ ] publish
[ ] Other (specify)----------

PART IV
INFORMATION SOURCES

21. There are many sources from which needed information could be obtained. Which information sources do you obtain information from? please tick.

[ ] Conduct computer-based information searches
[ ] Monographs, Books in Libraries
[ ] Own collection of literature
[ ] Journals
[ ] References and footnotes
[ ] Library catalogues
[ ] Bibliographies
[ ] Abstracts and indexes
[ ] Magazines and newspapers
[ ] Technical reports
[ ] Conference proceedings, workshop and seminar papers
[ ] Current awareness bulletins
[ ] CD-ROM search
[ ] Reference Librarian
[ ] Fellow researchers and colleagues
[ ] Government documents
Other sources (specify)----------

22. There are many ways of looking for information. From the list please tick the ways you use.

[ ] Accidental discovery of information
[ ] Attendance at conferences, seminars, etc
[ ] Conduct computer-based information searches
[ ] Use Books in Libraries
[ ] Use own collection of literature
[ ] Use Journals
[ ] Follow up references and footnotes
[ ] Browsing through publications
[ ] Search library catalogues
[ ] Approach government institutions
[ ] Communication with experts/fellow researchers
[ ] Use magazines and newspapers
[ ] Use conference proceedings/workshop/seminar papers
[ ] Use bibliographies, indexes and abstracts
[ ]Use current awareness bulletins
[ ] Approach librarians/documentalists
[ ] Use technical reports
Other sources (specify)_____

23. List in descending order five (5) of your preferred ways ticked above.

_____
_____
_____

_____

_____

24. Briefly explain why you use the one you have ranked first.

_____

_____

25. Do you encounter any problems with the ways you have indicated above. State the problems.

_____

_____

26. In what format or package would you prefer regardless of the type of information you need?

[ ] full-length, original document
[ ] descriptive review of original document
[ ] abstract (summary of original document)
[ ] graphic
[ ] Critical review of original document
[ ] Other (Please, specify)_____

Thank you for your cooperation.

Appendix 2: ABNCD Field Definition Table

?3	Tag3	Name	3Len	3Type	3Rep3	Delimiters/Pattern3
_	1	Participating centre code	100	X		
_	2	Participating centre record no	6	N		
_	3	Record status	1	P		A
_	5	Date record entered	10	P		9999-99-99
_	6	Date record changed	10	P		9999-99-99
_	7	Bibliographical level	5	A		
_	8	Bibliographical level - parent	1	A		
_	9	Country of origin of record	2	P		AA
_	10	Record number of parent	6	N		
_	11	Record number(s) of part(s)	6	N	R	
_	12	Record no of other lang version(s)	6	N	R	
_	20	Language of analysis	18	A		
_	21	Language of text(s)	2	A	R	
_	22	Language(s) of summaries	2	A	R	
_	25	Record heading	50	X		
_	100	Title	500	X		
_	101	Parallel title(s)	500	X	R	
_	102	Translated title - English	500	X		
_	105	Translated title - other	500	X		
_	110	Personal author(s)	80	X	R	ab
_	111	Corporate author(s)	500	X	R	abcdz
_	112	Affiliation	500	X		abcdz
_	113	Other associated inst(s)	500	X	R	abcdez
_	114	Meeting	500	X		abcde
_	115	Trans. name of instn.	200	X		
_	116	Address	300	X	R	abcdefghi
_	120	Edition	25	X		
_	121	Publisher	250	X		abc
_	122	Date of publ/issue - free form	30	X		
_	123	Date of publ/issue - ISO form	10	P		9999-99-99
_	130	Collation (M/C)	200	X		abc
_	131	Part statement	150	X		ab
_	140	Monographic series	200	X	R	abz
_	141	Thesis	200	X		abcd
_	142	Related project(s)	200	X	R	ab
_	150	Notes	700	X		
_	160	ISBN	13	X	R	
_	161	Document number	50	X	R	
_	162	Availability	100	X		

_	200	Title of serial	400	X		z
_	201	ISSN	9	P		9999-99-99X
_	202	Title of parent (M/C)	500	X		
_	210	Personal author(s) - parent	80	X	R	ab
_	211	Corporate author(s) - parent	500	X	R	abcdz
_	300	Primary descriptors	200	X		
_	301	Secondary descriptors	400	X		
_	302	Geographic descriptors	200	X		
_	303	Local descriptors	200	X		
_	303	Proposed descriptors	100	X		
_	310	Abstract/Description	1000	X	R	
_	320	Broad subject heading	100	X		
_	400	Processing status	4	X		
_	410	Location	10	X	R	
_	411	Call number	40	X		
_	412	Number of copies	2	N		
_	415	Accession numb.	10	X		
_	420	Type of material	50	X		
_	430	Documentalist (initials)	10	X	R	
_	500	Acquisition type	4	X		
_	509	Order number	25	X		
_	510	Date ordered	10	P		9999-99-99
_	511	Date claimed	10	P		9999-99-99
_	512	Date received	10	P		9999-99-99
_	513	Number of copies ordered	2	N		
_	514	Requester	25	X	R	
_	515	Supplier	200	X		abcdez
_	516	Price	20	X		ab
_	517	Acquisition notes	200	X	R	
_	901	Corporate body	500	X		abcd
_	902	See reference(s)	500	X	R	
_	903	Other language version(s)	500	X	R	
_	904	Former name(s)	500	X	R	
_	905	Later name(s)	500	X	R	
_	908	Reference code	20	X		
_	911	Serial title	400	X		
_	912	ISSN	9	P		9999-999X
_	913	See reference(s)	400	X	R	Z
_	914	See also other lang edition(s)	400	X	R	
_	915	Former name(s)	400	X	R	
_	916	Later name(s)	400	X	R	
_	921	Supplier authority code	4	X		
_	922	Supplier name and address	200	X		abcde
_	997	Authority record notes	200	X		
_	998	Authority record date	10	P		9999-99-99
_	441	Duration	50	X		
_	442	Date:proposal/approval	25	X		ab
_	443	Date:starting	10	X		

_ 444	Date:expect. compl.	10	X	R	
_ 445	Date:actual compl.	10	X		
_ 446	Date:terminated	10	X		
_ 447	Date of birth	100	X		
_ 830	Nationality	100	X	R	
_ 831	Qualifications	100	X	R	abcd
_ 832	Specialization	100	X	R	
_ 833	Work experience (last)	200	X		abcde
_ 834	Current work	200	X		abcde
_ 835	Marital status	10	X	R	
_ 836	Sex	6	X		
_ 850	Recommended by	100	X	R	abcd
_ 855	Honours and awards	200	X	R	abc
_ 856	Membership in societies	200	X	R	abcd
_ 525	Language competence	100	X	R	abc
_ 556	Assignments	200	X	R	abcd
_ 895	Databases	300	X	R	ndrfa
_ 896	Classification system used	100	X	R	
_ 897	Subject headings list	100	X	R	
_ 898	Thesaurus	100	X	R	
_ 899	Periodical publicat.	300	X	R	ij
_ 890	Patents taken	200	X	R	abcdefgh
_ 900	Services offered	200	X	R	
_ 570	Personnel	100	X	R	ab
_ 625	Objectives	500	X	R	
_ 700	Financial aspects	200	X	R	sacp
_ 950	Project status	50	X		
_ 952	Training courses	200	X	R	
_ 954	Project number	50	X	R	a
_ 955	Contract number	50	X	R	
_ 957	Resources(equipment...)	200	X	R	
_ 960	Type of institution	100	X	R	
_ 961	Type of research	100	X	R	
_ 965	Research priority	100	X		
_ 966	Committee's decision	100	X		
_ 999	Record type	1	P		A
_ 1000	Name of object	100	X		
_ 1001	Local name (Eng.)	100	X	R	
_ 1010	Function	300	X	R	
_ 1015	Source/Donor (Person)	100	X	R	sfh
_ 1016	Source/Donor (Organization)	300	X	R	
_ 1017	Vendor	300	X		
_ 1018	Price	100	X		cp
_ 1020	Provenance	100	X		
_ 1021	Archaeological site	500	X		
_ 1025	Ethnic group	100	X	R	
_ 1028	Date	100	X		
_ 1030	Material	300	X	R	

_ 1035 Condition	1000	X	R	
_ 1040 Dimension (Front)	100	X		hwld
_ 1041 Dimension (Back)	100	X		hwld
_ 1042 Weight	100	X		
_ 1050 Description	1000	X		
_ 1055 Fine number	100	X		
_ 1056 Photo number	100	X	R	
_ 1060 Negative number	100	X	R	
_ 1065 Accession number	100	X		
_ 1070 Other numbers	100	X	R	
_ 1075 Location/storage	100	X		rs
_ 1080 Location/exhibit	100	X		rs
_ 1085 Classification/Keywords	100	X	R	
_ 1090 Treatment	500	X	R	
_ 1091 Lab. treatment dates	25	X	R	
_ 1100 Exhibitions	300	X	R	
_ 1105 References	300	X	R	
_ 1110 Remarks	300			
_ 1115 Date of entry	20	X		
_ 1120 Date(s) of update	20	X	R	

Appendix 3: Integrated database (BIAS) Field Select Table

ID	IT	Data extraction format
-	100	4 v100
-	110	0 (v110/)
-	111	0 mhl,v111^a|%|
-	111	0 mhl,v111^b|%|
-	111	4 (v111^b| |,v111^a|%|),v112^||,v112^a|%|, (v113^b| |, v113^a+|%|)
-	111	0 (v111^c/,v111^d/,v111^z/)
-	111	0 v112^c/, v112^d/, v112^z
-	111	0 (v113^c/, v113^d/, v113^z/)
-	112	0 (v112^a/, v112^b/, v112^c/)
-	113	0 v113
-	114	4 v114^a+|%|
-	114	0 (v114^b/, v114^c/, v112^e/)
-	116	0 (v116/)
-	121	0 v121
-	122	0 v122
-	150	0 v150
-	160	0 v160
-	200	0 v200
-	201	0 v201
-	300	2 v300
-	300	3 v300
-	301	2 v300, v301, v302, v303, v304
-	302	0 v302
-	303	0 v303
-	310	4 v310
-	320	0 v320
-	410	0 (v410/)
-	411	0 v411
-	412	0 v412
-	441	0 v441
-	443	0 v443
-	445	0 v445
-	447	0 v447
-	525	0 (v525/)
-	570	0 (v570/)
-	625	0 (v625/)
-	700	0 (v700/)
-	830	0 (v830/)
-	831	0 (v831/)
-	832	0 (v832/)
-	834	0 v834
-	836	0 v836

- 895 0 (v895/)
- 896 0 (v896/)
- 897 0 (v897/)
- 898 0 (v898/)
- 899 0 (v899/)
- 900 0 (v900/)
- 950 0 (v950/)
- 960 0 (v960/)
- 961 0 (v961/)

Appendix 4: Worksheet for Bibliographic Records

Record status: .....
Date record entered.....
Date record changed.....
Bibliographic level.....
Bibliographic level of parent.....
Country of origin.....
Record number of parent.....
Record number(s) of other language version(s).....
Language of analysis.....
Language of text.....
Language(s) of summaries.....
Title.....
Parallel title(s).....
Translated title- English.....
Translated title- French.....
Translated title- Spanish.....
Translated title- Other.....
Personal author(s).....
Corporate author(s).....
Affiliation.....
Other associated institution(s).....
Meeting.....
Edition.....
Publisher.....
Date of publication/issue- free form.....
- ISO form.....
Part Statement.....
Project.....
Note(s).....
ISBN..... Document number.....
Title of Serial.....
Title of parent (M/C).....
Personal author(s) - parent.....

Personal author(s) - parent.....
Primary descriptors.....
Secondary descriptors.....
Geographic descriptors.....
Local descriptors.....
Proposed descriptors.....
Abstract.....
Broad subject heading.....
Processing status.....
Location.....
Number of copies.....
Documentalist.....

Appendix 5: Display Format of Bibliographic Records

```
If v999:'B' then mhl,c16,'*** BIBLIOGRAPHIC RECORDS***'##
/c8,v110#/ v12,V100(12,7),|. | if (v700:'A' and v800:'M') then
|.In:|v202(7,7) |, |,v210^a|, |v210^b|. |fi v121^a(7,7), |:
|,v121^b(7,7),|, |,if (v007:'A' and v008:'S') then |. | v200,|,
|,v131^a    |,    |v122(7,7),|:    |,v131^b|.|,v122(7,7)|.|fi
##/c8,'DESCRIPTORS: 'v300(21,20)##/c8, 'ABSTRACT    : 'V310
(21,20)/fi
```

Appendix 6: Worksheet for Profile of Experts

```
Type of record(999)E        Date record entered.....
Record heading PROFILE OF EXPERT.....
Name of person.....
Sex.....
Affiliation.....
Address.....
Date of birth.....
Assignments.....
Nationality.....
Formal educational qualifications.....
Language competence.....
Discipline.....
Work experience.....
Current work.....
Project title.....
Recommended by.....
Honours and awards.....
Membership in associations.....
Marital status.....
Remarks/Notes.....
Person entering data.....
```

Appendix 7: Display Format of Profile of Experts

```
If v999:'E' then mhl,c10,'*** PROFILE OF EXPERTS ***'##
/c2,'NAME                  : 'v110/c2,'DATE OF BIRTH       :
'v447/c2,'SEX                : 'v836/c2,'NATIONALITY        :
'v830/c2,'AFFILIATION         : 'V112(23,22))/c2,'ADDRESS
     : '(v116^b,|, |v116^c,|, | v116^e,", ", "Phone "v116^f
(23,22),",  ",  "Telex  "v116^h(23,22),",  ",  "Fax  "v116^i
(23,22))/c2,'PROJECT  TITLE              :  'v200(23,22)/c2,
'QUALIFICATIONS      : 'v831/c2,'SPECIALIZATION      : 'v832
(23,22)/c2,'WORKING LANGUAGE   : 'v525/c2,'CURRENT EMPLOYMENT
: 'v834/c2,'PREVIOUS WORK      : 'v833/fi
```

Appendix 8: Worksheet for Records of Profile of Institutions and Information Systems

Record type(999)i Record heading PROFILE OF INSTITUTIONS....
Date record entered .....
Principal officers .....
Name of Institution .....
Trans. name of instn.....
Parent organization .....
Address .....
Location .....
Working language .....
Associated entities.....
Services offered.....
Descriptor.....
Geographical area.....
Discipline .....
Financial aspects.....
Resources (equipment).....
Membership in societies.....
Honours and awards.....
Date of establishment.....
Type of research.....
Objectives .....
Personnel.....
MFNs of publications.....
Note.....
Activities.....
Periodical publicat.....
Person entering data.....

Appendix 9: Display Format of Profile of Institutions

```
If v999:'I' then mhl,c10,'*** PROFILE OF INSTITUTIONS ***'##
/c2,'NAME OF INSTITUTION    : 'V111(26,25)/c2,'TRANS. NAME
      : 'v115/c2,'ADDRESS                : 'V116^b,|, |V116^c,
|,  |v116^e,",  ","Phone  "v116^f(26,24),",  ","Telex  "v116^h
(26,25),",  ","Fax  " v116^i(26,25)#/c2,'DIRECTOR
:  'V110/c2,'DISCIPLINE                    : 'V320/c2,'YEAR OF
ESTABLISHMENT : 'v443/c2,'NUMBER OF STAFF       : 'v570(26,25)
/c2,'ASSOCIATED  ENTITIES       :  'v113(26,25)/c2,'TYPE  OF
INSTITUTION    : 'v960/c2,'TYPE OF RESEARCH       : 'v961/c2,
'OBJECTIVES            : 'v625(26,25)/c2,'WORKING LANGUAGE(S)
 : 'v525/c2,'PARENT ORGANIZATION    : 'v112/c2,'PUBLICATIONS
        : 'v899(26,25)/c2,'GEOGRAPHIC COVERAGE    : 'v302+|,
|##/c2,'DESCRIPTORS             : 'v899(26,25)##c2,'ABSTRACT
          : 'v310(26,25)/fi
```

Appendix 10: Worksheet for Records of Projects

```
Record type(999)P    Record heading RESEARCH PROJECTS.....
Date record entered.....
Project title.....
Principal officers.....
Performing institutions.....
Type of institution.....
Other associated institutions.....
Address (Phone, etc).....
Project number(s).....
Contract number(s).....
Language of project.....
Location.....
Duration.....
Current status of project.....
MFNs of Related Projects.....
Descriptor.....
Geographical area.....
Discipline.....
Financial aspects.....
Resources (equipment).....
Research priority.....
Committe's Decision.....
Date:Proposal/Approval.....
Date:Starting..... Expected completion.....
Date:Actual completion..... Date terminated.....
Type of research.....
Recommended by.....
Objectives.....
Resource Persons.....
Resource Persons type.....
Personnel.....
MFNs of publications.....
Note.....
Abstract/Description.....
Person entering data.....
```

Appendix 11. Display Format of Profile of Projects

```
If v999:'P' then mhl,c10,'*** PROFILE OF PROJECTS ***'##/
c2,'TITLE                    : 'v100(25,25)/c2,'PERFORMING
INSTITUTION: 'v111(25,25)/c2,'RESEARCHERS          : 'v110
/c2,'SPONSOR              : 'v700(25,25)/c2,'PROJECTS STATUS
     : 'v950/c2,'DURATION              : 'v441/c2,'TYPE OF
RESEARCH     : 'v961/c2,'OBJECTIVES          : 'v625(25,25)
/c2,'DESCRIPTORS          : 'v300(25,25)/c2,'DESCRIPTION
 : 'V310(25,25)/fi
```

Appendix 12: Display Format of Information Systems

```
If    v999:'S'    then    mhl,c4,'***    INFORMATION    SYSTEMS
***'##/c2,'NAME  OF  SYSTEM              :  'v111/c2,'DATE  OF
ESTABLISHMENT:    'v443/c2,'HEAD    OF    INSTITUTION        :
'v110/c2,'PARENT ORGANIZATION   : 'v112/c2,'ADDRESS
    :   'v116^b,|,   |,v116^c,|,   |,"Phone   "v116^f,",","Telex
"v116^h(24,23),", ","Fax "v116^i(26,25)c2,'DISCIPLINE
  : 'v320/c2,'PERSONNEL            : 'v570/c2,'SERVICES OFFERED
      :   'v900(24,24)/c2,'DATABASES                          :
'v894/c2,'CLASSIFICATION SYSTEM: 'v896/c2,'SUBJECT HEADING LIST
: 'v897/c2,'THESAURUS             : 'v898/c2,'WORKING LANGUAGE
   : 'v525/c2,'GEOG. COVERAGE        : 'v302,", "/fi
```

Appendix 13: FDT for the Specialised database (FIAS)

?	Tag	Name	Len	Typ	Rep	Delimiters/ Pattern
-	5	Date record entered	10	X	P	9999-99-99
-	6	Date record changed	10	X	P	9999-99-99
-	10	Topic	200	X	R	
-	11	Title	500	X		
-	12	Year	100	X	R	
-	13	Exchange Rate	100	X	R	
-	15	Coverage	200	X	R	
-	18	Environmental Effect	500	X	R	
-	19	Social Effect	500	X	R	
-	20	Subject Descriptors	100	X	R	
-	21	Source	300	X	R	
-	22	Objectives	1000	X	R	
-	23	Activity Name	100	X		
-	24	Population	25	X		
-	25	Employment Percentage	25	X		
-	26	Ownership	25	X		
-	27	Documentalist	30	X		
-	29	Male	100	X	R	ab
-	30	Female	100	X	R	ab
-	32	Month	100	X	R	
-	33	Annual Average	80	X		
-	35	Pollutant	100	X		
-	37	Source of Information	100	X	R	

Appendix 14: FIAS Field Select Table

	ID	IT	Data extraction format
-	10	0	(v10/)
-	11	0	v11
-	12	0	(v12/)
-	13	0	(v13/)
-	15	0	(v15/)
-	18	0	(v18/)
-	19	0	(v19/)
-	20	2	(v20/)
-	21	0	(v21/)
-	22	0	(v22/)
-	23	0	(v23/)
-	24	0	v24
-	25	0	v25
-	26	0	v26
-	29	0	(v29/)
-	30	0	(v30/)
-	31	0	(v31/)
-	32	0	(v32/)
-	33	0	v33
-	35	0	v35
-	37	0	(v37/)

Appendix 15: Worksheet for Records on Exchange Rate

```
Title.....
Year.....
Month.....
Exchange Rate.....
Annual Average.....
Subject Descriptors.....
Source of Information.....
Date record entered..... Date record changed.....
Documentalist.....
```

Appendix 16: Display Format of Records of Exchange Rate

```
mhl,c4,v11(4,6)##/c8,'|','-----------------------------
','|',c10,if p(v12) then 'YEAR',c25,'EXCHANGE RATE', '|'/
,c8,'|','---------------------------- ','|'/, (c8,'|', c10,
v12,c28,v13(28,28),c38,'|'/)c8'----------------------------
'/c2,"Source of Information: "v37(25,24) #/else if p(v32) then
'MONTH',c25,'EXCHANGE RATE','|'/ ,c8, '|','--------------------
---------','|'/,(c8,'|', c10,v32, c28,v13 (28,28),c38 ,'|'/)
/c8,'----------------------------'/c2,"Source of information
: "v37(25,24)#/fi fi
```

Appendix 17: Worksheet for Records of Informal Sector

```
Title.....
Topic.....
Activity Name.....
Employment percentage.....
Year.....
Objectives.....
Ownership.....
Subject descriptors.....
Male.....
Female.....
Source of Information.....
Date record entered..... Date record changed....
Documentalist.....
```

Appendix 18: Display Format of Records of Informal Sector

```
mhl,c14,'*** INFORMAL SECTOR ***'##/C2,'Title          :
'v11(14,13)#/c2, if p(v10) then 'Topic          : 'v10/
c2,'Ownership  : 'v26/c2,'Descriptors: 'v20/c2,'Objectives:
'v22(14,13)##/c2,'Source of information: 'v37(25,24))#/ else
if p(v12) then c2,'|','--------------------','|',c2,'|' ,c4,
'YEAR',c14,'Population','|'/c2,'|''--------------------','|'
/(c2,'|',c4,v12,c15,v25,c24,'|'/)c2,'--------------------'/fi
fi#/c2, if p(v23) then c2,'|','--------------------','|'/c2,
'|',c4,'Activity',27,'Male',c38,'Female',c46,'|'/c2,'|',c25,
'No.',c31,'%',c38,'No.',c44,'%',c46,'|'/c2,'|','----------
------',c46,'|',/ (c2,'|',c4,v23(4,4), c25,v29^a,c30, v29^b,
c38,v30^a,c42,v30^b,c46,'|'/)/c2,'|''--------------------',
c46,'|'##/c2,'Descriptors:    'v20(15,14)##/c2,'Source    of
information: 'v37(24,24)/fi
```

DECLARATION

The thesis is my original work and has not been presented for a degree in any University.

Muyoyeta Simui

May 24, 1995

The thesis has been submitted for examination with our approval as university advisors.

Dr. G.G. Chowdhury

May 24, 1995

Dr. Taye Tadesse

May 24, 1995