ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
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ETHIOPIAN FORESTRY INFORMATION SYSTEM: A USER STUDY

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DEDICATION

To my family, my childhood friends, especially to my mother Abaynesh Gorfu my brothers Gedlu Belachew And Sentayehu Bekele.

ABSTRACT

The Ethiopian forestry information system can not help the forestry problem of the country, and develop the economy unless users and needs are identified. The user must be the focal point of the forestry information system..

The Ethiopian forestry information need originates out of permanent engagement in forestry research and development activities aimed at solving the existing forestry problems. The majority of forestry organisations and scientists that generate forestry information have lack of self-contentment. There is a demand for forestry information. The needs disclose the knowledge gaps.

Since a single method brings a problem triangulation technique is used to enrich measurement. Questionnaire, interview, document analysis and observations were used to collect data. Purposive sample is used due to difficulties to treat the whole group.

The survey has examined users as input output processors, the current forestry information status, the generators, users needs, information resource, source, services, facilities and finaly practical solutions are recommended

ACRONYMS AND ABBREVIATIONS

AAU	-	Addis Ababa University.
ACA	-	Awasa College of Agriculture.
AGRIS	-	FAO/International Information System for the Agricultural Sciences and Technology.
AUA	-	Alemaya University of Agriculture.
CADU	-	Chilalo Agricultural Development Unit.
CARIS	-	FAO/ current Agricultural Research Information system.
CIDA	-	Canadian International Development Authority.
CFDD	-	Community Forestry Development Department.
DANIDA	-	Danish International Development Agency.
DEPSA	-	Development Projects Studies Authority.
DLARC	-	Debre Zeit Agricultural Research Centre.
EESP	-	Environmental Education support publication.
EFAP	-	Ethiopian Forestry Action Programme.
EHT	-	Ethiopian Heritage Trust.
EVOS	-	Ethiopia valley development studies Authority.
EWNHS	-	Ethiopian Wildlife Natural History Society.
FAO	-	Food and Agricultural Organisation of the United Nations.
FAWCDA	-	Forest and Wild life Development Authority.
FGRCP	-	Forest Genetic Resources conservation project.
FINNIDA	-	Finn International Development Authority.
FRI	-	Forestry Resource Institute.
FRC	-	Forestry Research Centre.

FRU	-	Forest Research Unit.
FIAG	-	Forest Industries Advisory Group for Africa.
GDP	-	Growth Domestic product.
GTZ	-	Gessellschaft fur Technische Zusammenarbeit (Agency for Technical Co-operation of the Federal Republic of Germany)
GOE	-	Government of Ethiopia.
IAR	-	Institute of Agricultural Research.
IBAs	-	Important Bird Areas.
IBCR	-	Institute of Biodiversity Conservation and Research.
IDRC	-	International Development Research Centre (Canada).
ILCA	-	International Livestock Centre for Africa.
IRI L	-	International Livestock Research Institute.
MME	-	Ministry of Mines and Energy.
MOA	-	Ministry of Agriculture.
MOWR	-	Ministry of Water Resources.
NGO	-	Non-Governmental Organisation.
NRMRD	-	Natural Resources Management and Regulatory Department.
ODA	-	Overseas Development Administration (UK).
PGRC	-	Plant Genetic Resources Centre.
PLANT	-	Plant Locally and Nurture Trees.
RRC	-	Relief and Rehabilitation Commission (RRC).
SAREF	-	Swedish Agency for Research Co-operation with Developing Countries.
SDI	-	Selective Dissemination of Information.
SEEP	-	Schools Environmental Education Project.
SFODA	-	State Forestry Development Agency.

SIDA	-	Swedish International Development Authority.
SLU	-	Swedish University of Agricultural Science.
SRC	-	Silviculture Research Centre.
UNDP	-	United Nations Development Programme.
UNSO	-	United Nations Sudano-Sahelian Office.
WBISPP	-	Woody Biomass Inventory Strategic Planning Project.
WGCP	-	Wondo Genet College of Forestry.
WUARC	-	Wood Utilisation and Research Centre.

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CHAPTER ONE

1. INTRODUCTION

1.1.BACK GROUND

Ethiopia known to be one of the ancient countries, with an ideal type beauty of thirteen months of sunshine, wildlife, unpenetratable jungle, rivers, cataracts, lakes, mountains, ethnic, linguistic and cultural combination.

The economy is predominantly agricultural. For decades the economic performance had shown a negative growth. The problem to effect fast recovery is reasoned by the gradual and slow loss of its natural assets, particularly its forests.

It is claimed that at the turn of the century, 40% of the country was covered with natural forest and, 20% in early 60s. In the first half of the eighties, the figure declined to less than four percent. The five million hectares of the Savannah woodland increases the figure to 7% (EFAP, 1994). Others estimate that of the total land mass, 7.6% is Wood Land, 6.9% productive land, 49.8% natural pasture, and 26.2% waste Land (Daniel, 1966).

Deforestation has become a major source of economic and environmental problem (Simon, 1992). According to Ohlsson (1978) the major problem of the Ethiopian forestry is related to the economic life of the rural poor, deforestation caused untold sufferings in the country. Drought and starvation were the out comes of such predicament. It is a well known truth that Ethiopia remained subject to series of devastating famines for the last two and half decades.

Thus, to overcome the existing predicament forestry research and development efforts were carried out, almost for a century since the reign of Emperor Menelik II.

The Ethiopian forestry research and development efforts took an institutionalized pattern after the end of the first half of the century. However the institutionalized, but isolated attempts of research and development proved weak infront of the rampant and persistent challenges of forestry.

As in other developing countries there is inadequate, human, physical, and financial resource in the Ethiopian forestry research and development sector (FAO, 1992).

Forestry research organization and management were important problems for years. One of the fundamental problems is the generation, handling, and dissemination of forestry research and development information. The need for current, adequate, credible and valuable forestry information had constrained the development in the sector. Since awareness is very low, today there is no clear, defined, and formulated forestry national policy, that helps to enhance development, conservation and sustainable utilization guidelines (Tilahun, 1998).

Thus, the Ethiopian forestry research and development undertaking remained fragmented, there is a wide forestry information gap that can not be bridged with out identification of stakeholders and their needs that facilitate to define priority areas, inorder to overcome the problems of forestry research and development.

1.2. STATEMENT OF THE PROBLEM AND JUSTIFICATION FOR THE STUDY.

The forestry research and development in Ethiopia has met popular expectations. The forest and Woody vegetation resources of the country are disappearing with a rapid rate. If the trend of decline continues, the country will be without any forest cover in the coming few decades.

Scientific research is unsuccessful since it was not able to communicate forestry data and facts to users to solve the forestry problems of the country. Scientific publications are very much limited. Lack of access to disseminate forest research findings had persisted for decades.

Forestry information is basic and fundamental to the economic development, sustainable utilization, and conservation of forests. It is impossible to practice an economic development and establish a strong, wealthy and civilized nation without adequate, and usable information (Rajagopelan, 1980).

The absence of reliable forestry information system and the knowledge gap that exists in the different forestry research institutions, development organizations, higher learning institutions, industries, factories, the urban and rural communities, extension-agents, governmental and non governmental organizations, adds to the predicament.

Since there was no defined priority researchers in the past were working on their own, that they felt of urgent nature. Thus, it is difficult to say that all research activities undertaken addressed national problems. Although commendable efforts and achievements were made over the years, the major problems still remain unsolved.

The lack of information or knowledge in the various components of forestry research have been described in detail in the strategy document for forestry research (EARO, 1998). Although forestry information is important it is one among other factors such as human resource, financial and physical investment constraints in the sector. However the focus of this survey is information.

The information need in the sector is evident from the narrow scope of research problems, the lack of forestry research result publications, and the fragmented standalone pattern of research between agencies due to the absence of all encompassing National Forestry Information System. Except the vague awareness of the needs from the scenario, proper forestry need identification research was not known in the past. There were no research priorities (Aklog, 1993).

The expressed, unexpressed and dormant forestry information user needs were not priorities of the overall forestry activities of the country. The user is not precisely and purposely identified. Identification of user is identification of needs. Factors that influence the forestry information user need have to be examined without which the realization of an effective and efficient forestry information service is unthinkable (Devadson and Lingum, 1990).

Although the forestry information requirement is said to be critical especially to the forestry scientists both in forestry research and management, the poor and weak information system has never identified user groups and needs to provide a valuable information. Information is important and valuable only when it is usable to the users (Atherton, 1977).

In general, there is no formal link between user groups. The data that were results of past, and ongoing activities are vast, enormous, fragmented, and were not properly coded, and stored, their flow is not safe and permanent, updated and smooth. The absence of user link had limited the movement of documents to few areas and a particular data is restricted to a particular circle. Thus replications and duplications were not unusual for forestry researchers during the recent two decades (Desta Hamito and Feysa Abte, 1994). Since lack of access is evident the importance that emanates from purpose, timelessness, and absence of information management, generation, acquisition, processing, storage and dissemination is unimaginable (Gashaw, 1992). Thus a user and user need study is the essential matrix to a scientific forestry information input, process and out put system.

There is no debate among forestry research regarding the necessity of adequate, valuable and timely forestry information flow to develop and rehabilitate the old growth, to enhance reforestation, regeneration of nation wide programs, forestry management and research of the country. This information needs is dependent on the nature of users. Users react, search and retrieve only if the information is based on proper user identification.

Forestry research activities of Ethiopia appeared in its organized manner roughly since the last three decades (EFAP, 1994), however due to absence of credible data and access it proved impossible to carry out research of urgent nature to researchers.

Discussions and arguments were carried out among researchers in respect to lack of data collection, compilation, utilization and access. Importance of information for trouble-shooting constraints in forestry research such as silviculture was ascribed to lack of research information in governmental and non-governmental organizations. The wide knowledge gap

between researchers and other users were hot issues of the recent past. Researchers had emphasized the absence of data on indigenous forestry knowledge in agro-forestry and related areas. Similarly lack of data for growth estimates and the lack of sufficient information to guide decisions of management options together with the necessity of data as fundamental concern of forestry researchers were often indicated. The requirement of advanced models and statistical information that furnish an optimum choice of scientific analysis was a problem faced by many researchers in forestry. The probability of replication and duplication yields of research, the absence of documentation, and publication of forest related research such as wildlife (Constantine,1993; Mebrate,1993; Russel,1993; Zewdu,1993; Berhane,1993; Yosef,1993; Leykin,1993)were problems, which researchers faced in the past and the present.

Thus this project is very important with respect to a well-established forestry information system:

- that forecast and cares about probable hazard and growing economic demands.
- that assesses and evaluates existing situation.
- that understands to take necessary actions in demanding areas.
- that enhances and develops forestry and related researchers.

In view of the above explanations the study has addressed the following questions:

1) Who are the Ethiopian forestry information users?

2) What are the information needs of various groups of users and to what extent is the capacity of the existing forestry information system to accommodate these needs?

3) What are the major problems faced in the current information service?

4) What must be done to satisfy forestry information needs?

1.3. OBJECTIVES OF THE STUDY

The general objective of this project is to conduct an Ethiopian forestry information user study and to identify the various forestry information user groups, organizations to which they belong, their requirements and access problems, in order to recommend proper solutions.

In order to achieve the general objective the following Specific objectives have been considered.

I. to identify users of the existing forestry information system of Ethiopia, which helps to assess how much the existing information service accommodates users needs.

II. to identify organizations and institutions that are engaged in forestry research and development or any other related area in order to determine their information requirements and to know what type of information they generate.

III. to identify if the required forestry information sources are whether documentary, institutional, or research and development.

IV. to identify if the various user groups link that helps to explain the pattern of information flow in formal and informal channels.

V . to determine whether the information is adequate, timely, reliable and accessible.

VI. to identify the extent of use of information technology and the skill used in the existing forestry information services.

VII . to expose the overt and covert user problems, and challenges in light of need to set priorities a change in user composition if any, impacts of location, facility, education, training, experience and nature of job, together with how the impediment in the activity of one user group affects the other.

VIII.to recommend proper information dissemination, handling, and importance of researcher user linkage.

1.4. SCOPE AND LIMITATIONS

The survey covers the forestry and forestry related user groups, and their organizations or institutions in relation to the existing forestry information services of the country.

Since time and finance are obvious constraints the study does not deal with a detailed design and prototype development or implementation process.

1.5.SIGNIFICANCE OF THE STUDY

The study would benefit all forestry information users and their organizations through creating awareness of their existing status in terms of information in their field. It also helps them to work towards a systematic and harmonious nation wide forestry information that would enhance their efforts in research and development.

Furthermore, it serves as requirement study to establish an all rounded forestry information system design, policy and information technology strategy plan.

1.6. METHODOLOGY

1.6.1 Triangulation

In a user study difficulties are often met due to an adherence to a single approach. One of the best and reliable methodologies used by most of researchers is triangulation. Triangulation is a multiple technique that represents data, theories and methods. Triangulation is an appropriate technique that helps to examine different angles. Method triangulation is useful

to compare variables and avoids bias. Thus, this study applies methodological triangulation in examining the components of the overall system.

1.6.1.1.Traditional and Alternative Paradigms Triangulation.

Traditional and Alternative paradigms Triangulation, as compatible methods, are used to examine the forestry information user in relation to information service, and sources. The main purpose of using this method is to improve measurement by using diverse indicators (Neuman, 1994).

By using the traditional paradigm the Ethiopian forestry information is examined as a real world problem and users as input-output processors.

In contrast it uncovers the freedom of users to squeeze their need out of the existing forestry information system. The alternative paradigm provides need definition, nature of information value and the results of information since there is no any other way that explains needs in changing environment of the same information system (Dervin and Nilan, 1980). As outlined by Dervin and Nilan this approach is helpful to:

1.focus on forestry information needs and use studies with respect to objective/subjective information.
2.examine forestry information users as passive and active beings.
3.examine information needs and use studies as static, across time and space/dynamic (people who operate from different locations at different time).
4.examine forestry information needs and use assessment in particularity/aggregate.

5.examine forestry information need and use studies by applying quantitative and qualitative research techniques.

1.6.1.2. Information Need Assessment Approach:

16.1.2.1.Resource Approach - is used to evaluate or measure user consumption of sources, systems, materials and channels. The approach was useful to identify degree of information need.

1.6.1.2.2. Awareness Approach - is used to identify the user degree of awareness of the services at work. It practically indicates areas of lower forestry information user awareness.

1.6.1.2.3. The like-Dislike Approach - is used since the different forestry information services are investigated, users satisfaction and dissatisfaction of these services has been examined. Such approach indicates the demand for more services that satisfy the user.

1.6.1.2.4. Priority Approach - is used to identify the type of information that the user prefer and need for developing the forestry information services.

1.6.1.3. Composite Approach- is used to determine the forestry information user needs, through information needs analysis.

1.6.1.4. Mandate Approach - is used to identify the type of forestry information that forestry research and development institutions needed to fulfil their mandates on the basis of government laws, rules, and regulations.

1.6.1.5. User-Centered Approach - As Wilson (1994) indicated in his research a shift from system-centered to user-centered studies has been made after the 1980's while most of the methods used to collect and systematize facts were system based. As few studies in Agriculture and other development sectors indicate the system-centered approach is dominant. Often one can easily contact system Analysts, where as the role of an Information Need Identifier (INI) is not known at all. Thus the user - centered approach has been used to examine user attitude towards the forestry information environment.

In general to identify the Ethiopian forestry information users and their needs employing a single methodology or approach was not sufficient at all. Thus there was a need to apply various methods in this study since one method or tool was not able to serve the entire examination (Devadson and Lingam, 1996).

1.6.2. DATA COLLECTION

The user study demanded an extensive assessment of the current forestry information users of Ethiopia. Thus it has used different methods of data gathering, such as questionnaires, interview, and document analysis and observations.

The survey used different categories of questionnaires. Three types of questionnaires were designed and used. The questions were closed, and open ended, that are used to gather data from forestry research managers, under graduate and postgraduate students, forestry researchers, who are members of international, national, governmental and non-governmental organizations affiliated to forestry, and staff members of academic institutions.

Interviews were conducted formally and informally with the Forestry Research Center, other forestry related research organizations information service heads, documentation experts and librarians. These interviews were essential to examine the situation.

Repeated visits were made to the Ethiopian Agricultural Research Organization (EARO) Addis Ababa University, National Herbarium, Woody Biomes Inventory and Strategic Planning Project, Ministry of Agriculture, Forestry Research Center, National Tree seed Project, Natural Resources and others Management and Regulatory Department, Institute of Development Research to examine forestry information services, users, and facilities inorder to strengthen the data that is gathered through questionnaire. Secondary data on forestry information users, needs, systems, researchers, information specialists organizations and institutions were collected from documents and other records. In addition a literature review has been made on user studies and other related areas.

1.6.3. POPULATION:

The target population includes those who generate and use forestry information of the country.

The survey has considered samples within the target population forestry information user groups individuals and the organizations they belong.

FORESTRY USER POPULATION: In surveying the Ethiopian forestry information system user population it was essential to identify the categories of users in respect to the current information facility (Kuntz, et al., 1977).

In general all user groups, such as academic institutions, international agencies and organizations directly or indirectly engaged in forestry and related activities, researchers, students, policy makers, planners and managers, who are the nucleus to the forestry information users of Ethiopia were studied (Michael 1984).

The survey has considered the following users and their organization in relation to the existing forestry information services of the country.

GOVERNMENT ORGANIZATIONS:

1. Adet Agricultural Research Center.
2. Areka Agricultural Research Center.
3. Bako Agricultural Research Center.
4. Debre Zeit Agricultural Research Center.
5. Ethiopian Agricultural Research Organization.
6. Jimma (Melko) Agricultural Research Center.
7. Forestry Research Center (FRC).
8. Mekele Research Center.
9. Ministry of Agriculture.
10. Ministry of Mines and Energy.
11. Nazret Agricultural Research Center.
12. National Tree Seed Project.
13. Natural Resources Management and Regulatory Department.
15. Sirink Agricultural Research Center.
16. Woody Biomass Inventory and strategic planning project.

17. Wood Utilization and Research Center.

18. Tiro Boter Bacho Integrated Forest Development and Utilization Project.

19. Forest Genetic Resource Conservation project.

20. The National herbarium and the Ethiopian Flora Project.

21. Institute of Development Research Documentation.

22. Institute of Biodiversity Conservation and Research.

23. The Ethiopian Science and Technology Commission.

UNIVERSITIES AND COLLEGES:

1. Addis Ababa University.

2. Alemaya University of Agriculture.

3. Awasa College of Agriculture.

4. Swedish University of Agricultural Sciences (SLU).

5. Wondo Genet College of Forestry.

INTERNATIONAL ORGANIZATIONS:

1. Agency for Technical Institute of the Federal Republic of Germany (GTZ).

2. International Livestock Research Institute (ILRI).

3. Swedish International Development Agency.

1. The Ethiopia Heritage Trust.

2. The Ethiopian Wildlife and Natural History Society.

3. Forest Genetic Resource Conservation projects (GTZ).

4.Advisory Assistance to the Forest Administration (GTZ).

1.6.4. SAMPLING:

A purposive sample technique is helpful to examine the behavior of the entire forestry information user population and institutions. Purposive sampling is the best technique to select cases with purpose (Neuman, 1994). Selecting subjects who represent the population by displaying certain common attributes is easier and meaningful than considering the traditional random technique that may mislead to include non-users and non active members (Glassier et al; 1983, Berg, 1995:179).

Thus 120 questionnaire were distributed on the basis of a criteria and with grouping range of 0-25, 5; 26-50, 16; 51-75, 15; 75-100, 20 101-126, 25 250 and above 30 questionnaires to include all sample members. All samples within the target population were reached.

1.6.5. DATA ANALYSIS:

Hundred questionnaires were received back out of 120 in the time specified. Classification schemes often known as coding frames were designed and representative responses were

examined and grouped. Since some questions were given more than one answer multiple mention codes were also been used.

Thus answers from structured question responses were computed for frequencies and answers from the open-ended questions were summarized. Additional rating and other responses were grouped, and tabulated in meaningful ways. There were questions that were left unanswered by some respondents.

1.7. ORGANIZATION OF THE PAPER

The second chapter deals with the Forestry Research and Development Information background of the country. It examines importance of forestry information, forestry research, and institutional development, higher learning institutions, organizations, and forestry education in Ethiopia.

The third chapter presents, findings, which are facts and figures of survey results that show current forestry information status of Ethiopia. It exhibits information generators who are forestry scientists, and users need, sources, services, facilities, and pattern assessment by respondents.

The fourth chapter is a discussion of the survey results. The fifth chapter presents the conclusion, and it recommends major solutions from different angles.

CHAPTER TWO

2. THE ETHIOPIAN FORESTRY RESEARCH, AND EVELOPMENTINFORMATION AND EDUCATION.

2.1.INFORMATION NEED FOR ETHIOPIAN FORESTRY

The existing forestry research, development and training problems are partly rooted in the under developed forestry information system of the country. The sector is constrained by inadequate, inaccessible, and untimely decision making information. In order to realize a reliable forestry research and, to enhance management decision, it is necessary to co-ordinate the scattered data and the various forestry information user need (Berhanu et al., 1988).

Information need originates out of permanent engagement that contributes to the solution of a given problem. It is lack of self-contentment that constitutes information needs. It is these needs that disclose knowledge gaps in the situation of users (Cronin, Blaise, 1981:40).

The conservative legal and economic policies of Ethiopia in late 60s and early 70s were not favorable to express the need in the sector. The dormant needs which the researcher himself was not aware of were obstacles to achievements. This was due to the absence of any other forestry research engagements, and the training bottlenecks in the area. Further, the overall activity of almost half a century (1895-1961) was concentrated on a species trial in a discontinuing pattern (Amare Getahun et al., 1990). Researchers were not interested to examine other dimensions, since there was no professional orientation and due to unfriendly economic and legal environment of the past (Devadason and Lingam, 1996).

The Ethiopian forestry information user need as any area depends on forestry research, development and training activities. The absence of essential information facilities, the status of forestry professionals, low motivation to bridge the knowledge gap, and seeking for new ideas, the low consideration given to forestry research and discoveries by the past management were significant impediments. (Craw ford, 1978:61-81).

The absence of information specialists and intermediaries that manage and provide the available information curtailed information, access of information to researchers, and consumed most of their time needed for research undertaking than routine research work. On the other hand, as in any developing country information services, the building of large collections in Ethiopia were not considered from the forestry research and development information user need of the country (Longwe, 1986). As Longwe expounds further, since information need is data, and fact that helps in solving real world problems, and necessary to the user to practice his undertaking the dissemination is unquestionable. But, the transfer of information has to be purpose oriented (1986:71).

In general most of the research data in the past were not reliable. There was lack of familiarization with research problems, absence of collecting scientific knowledge on the subject, weakness of interpreting data of other researchers defining and proving the working hypothesis. Hasty generalizations and myopic recommendations and predictions with a style that can not convey message, and the exposition that results due to lack of discourse flow by inexperienced and untrained young researchers were the major problems in the past. The limited number of forest professionals, unreliable documentation, measurement error, weak management and manual data handling had contributed to the problem (Bowen, 1985; Kaungamno, 1986).

Earlier, there were no institutions entrusted with generating information than species trials. The growing need that demanded quick and practical solutions at national level during the 70's was not systematized, diversified and integrated. At present, generation of forestry information has shown a remarkable progress. However, its strength in respect to the existing challenge is questionable. A need for a competent research system can not be practical with out proper accommodation of forestry information need.

It is believed that forestry research can help to generate and provide qualitative and quantitative forestry information to enhance forestry development, through workable rational decision-making (EARO, 1998).

The end of the first half of the 80's was an important landmark in the Ethiopian forestry information or data. It was during this time that the data on species selection was compiled and published with the support of SIDA (FRC, 1986).

Still the information of the past had suffered from two setbacks, namely research area, and coverage. The research area was based on only species selection and the data was of that type (Von Breitenbach, 1961; Bown, 1985; Huedberg , O., 1978; Mebrate et al; 1993). More over, during the same period (1975-1982), since forestry experiments were carried out, as UNDP/FAO projects were limited in the Tigry, Wollo, and Hararge regions. The data generated were limited to these few areas, and results of earlier experiments were not documented (Bown, 1985).

2.2.EARLIER FORESTRY INFORMATION OF ETHIOPIA

Published, recorded and compiled data, and/or information on the forestry resource of Ethiopia are very few, except those recordings compiled by Woldemichael Kelacha (Mesfin Tadesse, 1992: 265-291).

The absence of remote sensing information technology had disabled estimation to be taken as authentic reference (NRM & RD, 1998).

In the absence of actual and accurate forest cover data of Ethiopia, there were no comparable data available that covers the country as the whole (EFAP, 1994).

According to the computer based forest monitoring of Ethiopia, that assisted by Geographic Information System analysis based on FAO data (1973-1976) high forests based on WBISPP data (1986-1989) and high forests based on Abay data (1986-1900) shown a 4.75% forest cover for 1973-1976, and 3.93% for 1986-1996 respectively. Thus the current forest coverage data has used the land cover and land use, and land cover of Ethiopia, data (FAO/UNDP, 1978), the Abay River Basin Integrated Survey and Analysis (MoWR, 1997), the Digital land cover classification of South Western Ethiopia (WBISPP, 1997).

2.3.CURRENT FORESTRY INFORMATION IN ETHIOPIA

Currently, there is substantial information on research and development as the result of the ever-growing diversified activities of forestry. According to the report of the Agro-Forestry Research Consultant, there are no documents, other than FAO field results and the Forest

Research Center (FRC) notes (Amare et al., 1990). Similar reports were made in 1983/84 by the FRC regarding the limited data and wider variation that need repeated tests of seed and nursery research (Amare and Girma, 1995:2).

Lack of information specialists and under utilization of the data generated by forest researchers and other agents in the past are current problems. Some data were destroyed partly due to lack of appropriate handling. Even the available data can not be used for an immediate purpose since it is raw and unprocessed. In addition there is expansion of forestry research and activity. Newly generated data and information are building on the earlier unmanaged one. Absence of proper management in storage, access, and retrieval has exasperated the problem from time to time. Some researchers have suggested resource sharing need facility as a way-out. They pointed out that it can help to accommodate the forestry information user with credible data, a freedom of access and easy flow of information. (Berhanu et al., 1988: 14).

The national agencies that established in early 70's were engaged in similar and limited activities in the 80's. There were no proper information service facilities that provide data and information (Berhanu et al., 1988).

It is evident as forestry research and development information is highly disintegrated and badly decentralized. Such predicament had shown wastage of scarce resources in replication and negligence of the most important areas. Peer praise has an important power and influence. This major psychological reward can be effected only in a situation that facilitates user-link. The forestry information can not show development without shared information, facilities and equipment (FAO, 1992:9).

2.4.FORESTRY INFORMATION IN ECONOMIC DEVELOPMENT

Research conservation, development and proper exploitation of the natural resources in general and forestry in particular demands diversified assortment of needs and users. A country, which works towards an economic development, must effect a permanent and safe flow of information in each sector for planning and overall management of its resources. Thus data on resources and data on techniques to exploit these resources are essential (Atherton, 1977:7).

The forestry sector could benefit the country if it is facilitated with skilled manpower fund, proper technology and, information. The data and information produced by the forestry research and development is significant in developing the economy by facilitating policy, and decision making. To plan and produce programs and policies, that answer the economic need of the nation, it is essential to support decision making with forestry information (Berhanu et al., 1988:9).

2.5.ETHIOPIAN FORESTRY RESEARCH AND INSTITUTIONAL DEVELOPMENT

2.5.1.PATTERN AND DEVELOPMENT OF FORESTRY RESEARCH IN ETHIOPIA

A good account of the historical development of forestry research in Ethiopia can be found in the works of Amare and his co-authors (Amare et al; 1990). It provides a general agreement that the history of the Ethiopian forestry research dates back to the end of the last century. It was said to start in 1895 during the reign of Emperor Menelik II, (Amare et al., 1990:2; Berhanu et al., 1988; Mebrate et al; 1983; Von Breitenbach, F., 1961).

According to Mebratu Mihrate (1983) Swain had showed another effort, after 60 years (1954), and details were recorded in his own report.

The fifties had experienced more efforts specially in trials and experiments which established at Holetta Agricultural Research Station (1956) and proliferated to Shoa, Ambo and Guder (1958-1961), but without any recorded results (Von Breitenbach, 1961).

The Chilalo Agricultural Unit (1957) and the then Alemaya College of Agriculture (1959-1961) were runner-ups in the forestry research undertakings of the country (Mebratu et al., 1983). The earlier half a century although marked by Eucalyptus was a period of high deforestation in the country. As Berhanu Hika, Jan-Erik Nylund and Kari Mustan Oja reported (1988), the forestry research begun in institutionalized form after sixty-six years as the Forest Research Institute (FRI) in 1961. This Forestry Research Institute (FRI) that heralded a bright future in the forestry research development of the country survived only for two years. Since incorporated into the then Faculty of Science, and abandoned its activities due to lack of funds (Berhanu et al; 1988; Amare et al., 1990). The institution that died earlier than its recognition was a well-facilitated institution with equipment, and laboratories for wood testing, chemical soil, water analysis and a green house, but it had had few staffs.

The forestry program that started within the department of plant science under the then Alemaya College of Agriculture in 1959, attract the research and the consent of parties to transfer the facilities to Alemaya. Meanwhile, the Ethiopian Forestry Association was founded in 1960, and the Ambo School of Agriculture graduated the first ten foresters at diploma level after a year.

The other forestry research was a tree species trial plot established within Chilalo Agricultural Development Unit (CADU) by Swedish International Development Authority (SIDA) assisted fund in 1965 (Berhanu et al 1988). Three different reports dated this time as 1957 (Mebratu et al; 1983), as 1965 (Berhanu et al., 1988) and 1968 (Amare et al., 1990); but consistency agrees to the important events in forestry research record as it was 1968 (Amare et al., 1990:9).

In 1967 as the Forest Research Institute (FRI) was abandoned and two years after the support discontinued the staff transferred to Debre Zeit and other sites to work under the then new phytobiology program.

In early 70's a short term program without development plan, and strategy that originated the three years development project: National Forestry program was launched. Phase one of the program was carried out by the then state Forestry Development Agency (SFODA) and by the assistance of UNDP/FAO at the end of the second half of the decade (Birhanu et al; 1988; Amare et al 1990).

During this time trials similar to earlier efforts were made at Menagesha, Yerer, Shashmene, Bellate, Hamulo, Bedele and Dire Gerbicha. Data produced from these experiments were compiled and benefited analysis and assessment (Mebratu et al; 1983).

Priory in late 60's expatriate researchers after a land resource survey at Overseas Development Administration of UK (ODA) had warned the then Ethiopian Government about the probable hazard of deforestation and decline in soil productivity. It occurred after half a decade as severe drought and famine that attacked Wollo, Tigry and Hararge regions. The

Relief and Rehabilitation Commission (RRC) with NGOs started afforestation, water and soil conservation by the financial assistance of SIDA and UNDP/FAO (Berhanu et al., 1988; Mebratu, 1983; Amare, 1990). The serious problem exasperated despite the late attempt of the then government. The reforestation program was not a quick solution. However the successful research proliferation in the particular research area did not leaf a credible data (Mebratu et al; 1983).

To enhance the reforestation in the draught stricken north it was essential to establish a forestry research center. Thus the Forest Research Center (FRC) was established by UNDP/FAO assistance by upgrading earlier insignificant research program under state Forestry and Development Agency (SFODA). The Forest Research Center (FRC) consolidated itself through the ETH/78/012 project support of FAO to carry out research that helps in afforestation and conservation. When FAO discontinued its assistance the IDRC (Canada) took over the responsibility with the aim of supporting FRC in agroforestry research. Other forestry research efforts were shown in areas of wood properties utilization by the Addis Ababa University Building College in co-operation with SIDA, and by the Forest Industries Advisory Group for Africa (FIAG). This development had facilitated the opening of the Wood Utilization and Research Center (WUARC) in 1979 on the basis of the FAO/UNIDO/FIAG, and SIDA reports (Amare et al; 1990).

It was a year before WUARC that Wondo Genet Forestry Resources Institute was established. The subsequent developments in the history of forestry research of the country in early 80's brought a consideration in soil conservation research with the assistance of SIDA through Community Forestry and Soil Conservation Department in 1981. New agro forestry trials followed in 1985, together with the National Resources Conservation Development Main

Department under MOA. Similarly the establishment of the forestry department at Alemaya University of Agriculture and the Mertule-Mariam Training Center for Forest Technicians, the Development projects studies Authority (DEPSA) as a consultant in project fund preparation, were major achievements. Further, upgrading Wondo Genet Forestry Resources Institute at a College level in 1989 was one of the fundamental achievements. The expansion alongside the demand developed research activities in the 90's. The Ethiopian Forestry Action Program which gave importance to forestry research came into existence in the first half of the 90's (Amare et al; 1990:9-12).

The other major development of the decade was the reorganization of FRC and FPURC under the Ethiopian Agricultural Research Organization (EARO).

To day forestry research is not sole responsibility of the FRC, FPURC, and other research centers, all national, international, governmental and non governmental institutions, universities, Colleges and individual researchers are seen in sharing such demanding and important tasks (FAO, 1992).

2.5.2.FORESTRY RESEARCH INSTITUTIONS AND DEVELOPMENT ORGANIZATIONS

2.5.2.1. THE FORESTRY RESEARCH CENTER (FRC).

One of the two centers mandated to run forestry research in the country is the Forest Research Center that established by the assistance of UNDP/FAO mainly with reforestation activities of the northern part of the country in 1975.This responsibility changed, and the activity mainly focused on the seed Center and on multi-location species trials during the second phase of UNDP/FAO at the end of the 70's and the first half of the 80's (Amare et al., 1990: 6-7).

Before the establishment of FRC, forestry research had been carried out under the Ministry of Agriculture in 30 sites of species identification located in the south and western parts of the country, although efforts in the north were hindered due to war.

FRC as young research institution, suffered from three major resources, needed in forestry research, namely human (scientists, technicians) finance, and physical (infrastructure, equipment, and other facilities) resources (FAO, 1992).

The FRC was limited in its research activities. Some of its engagements were species and provenance trials, seed physiology, nursery techniques, tree spacing trials, plantation techniques, silvicultural systems (AFRENA, 1990; Amare et al., 1990).

Research activities in FRC were divided into Silviculture, Farm Forestry or Agroforestry, Forest Management Economics, National Tree Seed Project and Contract Research Scheme and each area had broad objectives of its own (EARO, 1998).

In1997 forestry research was transferred to the Ethiopian Agricultural Research Organization that evolved out of the Institute of Agricultural Research by proclamation No. 79/1997, article 17, sub article 2 (Federal Negarit, 1997).

The FRC currently operates under the umbrella of the Ethiopian Agricultural Research Organization (EARO) as one of the five sectors that are led by directors. The FRC has its own head that manages and administers the different components of the research Center.

It has Services, Forest vegetation Research, Forest Products Utilization and Research Co-ordination offices.

FRC has human resource problem. As in any developing country forestry research organizations, the number of scientists and technicians is very much limited since investment in forestry education and training of researchers is insignificant (FAO, 1990). FRC is running its nation wide and complex research activities with two PhDs, in Forest Ecology and Seed Physiology and Technology; 15 MSc's in Agricultural Science, Forestry, Forest Management, Forestry and Agricultural Research, Forest Engineering, Environment, Statistics, Wood Technology, Wood Chemistry and an MPhil in Forestry; 8 diplomas in Forestry science at College level; 11 Technical School diplomas in Forestry related areas; six certificates in Forestry; 4 in Wood and Electricity. The rest of the 84 employees are engaged as a support staff, in the administration and finance, procurement, library, carpentry, driving, in tending garden, operating telephone, Guarding, and as Cleaners, who range in their education from College diploma to the barely literate. The limited fund is one of the fundamental problems that hindered most of its success (Bengston and Gregersen, 1988). According to FAO survey the salaries of 75% researchers in developing countries forestry research organisations are 40% or more below comparable professionals of the same status in their countries (FAO, 1992:8). Similarly there is no any incentive that stimulate research productivity in the Ethiopian situation.In addition lack of sufficient library and information source and service, laboratory facilities, communication links, access and information sharing facilities are problems that curtailed the Forest Research Center from what is would have achieved as any developing country forestry research organization (FAO, 1992).

2.5.2.2.THE WOOD UTILIZ2ATION AND RESEARCH CENTER (WUARC).

The wood utilization and Research center was established in 1979 and has been engaged in Forest Products Utilization Research. WUARC was carrying out research, result dissemination, training, consultancy, advisory, saw doctoring, and other services related to wood properties, and proper exploitation of timber species of Ethiopia (WUARC, 1995).

WUARC is also understaffed center as FRC. It has 3 MSc's in Wood and Forestry Science, 3BSc's in Timber Technology, Forestry and Forestry Management, 18 diplomas in Forestry and Wildlife, Wood and Timber Technology and Electricity (WUARC, 1995).

2.5.2.3.OTHER RESEARCH CENTERS

Currently forestry research undertaking is the chief task but not the monopoly of the Forest Research Center. There are number of forestry research centers which at the present work in an integrated and co-ordinated pattern under the forestry directorate of EARO.

2.5.2.3.1.DEBRE ZEIT AGRICULTURAL RESEARCH CENTER (DZARC)

Although the DZARC Undertaking was mainly of agricultural research, it had launched the Forestry Research Program in 1979 at unit level.

The important research of the Forestry Research Unit (FRU) of DZARC are provenance trials of timber trees, multipurpose trees, Agrofrestry systems, propagation of indigenous tree

species by chemical biological treatments, and integrated watershed management. Currently, the FRU is running its research activities in adaptability trial of tree species for fuelwood and timber, evaluation of multipurpose tree species for fuelwood and feed, plantation date determination, indigenous species, and exotic adaptability trials. Since the forestry research program had been established under DZARC it exploits the available fund, staff and facility of the center (EARO, 1998).

2.5.2.3.2.BAKO AGRICULTURAL RESEARCH CENTER

The Bako Agricultural Research Center is a unique research center since it had launched its agroforestry research at the end of the 80's to challenge food, land degradation, fuelwood, construction, animal fodder, wood products and services as acute problems in the region. The Bako Agroforestry research which fully functions since 1992 is undertaking its Agroforestry as farming systems that combines production with conservation of natural resources as the foundation to agricultural sustainability. The Agroforestry research at Bako has completed one and running 7 and discontinued 3 trials since 1992. These experiments are mainly focus on Agroforestry Management, Multipurpose Trees and Shrubs (EARO, 1998).

2.5.2.3.3.SIRINKA AGRICULTURAL RESEARCH CENTER

Sirinka Agricultural Research Center has a significant practice in its farm forestry research, especially to tackle soil erosion, gully formation, deforestation, and wind and fuelwood problems(EARO, 1998).

2.5.2.3.4.NAZRET AGRICULTURAL RESEARCH CENTER (NARC)

The Nazret Agricultural Research Center (NARC) is one of the research centers that had forestry undertakings in alley cropping and production of tree fodder (EARO,1998).It is not active in forestry research at present.

2.5.2.3.5.JIMMA (MELKO) AGRICULTURAL RESEARCH CENTER (JARC)

The forestry research in the Jimma Agricultural Research center has focused on the growth of coffee under tree shade or natural forests. It has also running experiments in intercropping of coffee with fruit growing trees.

2.5.2.3.6.ADET AGRICULTURAL RESEARCH CENTER

This center as a number of other centers is carrying out research in agroforestry mainly in inter- cropping.

2.5.2.4.HIGHER LEARNING INSTITUTIONS

The higher educational institutions such as the Addis Abeba University (AAU) Alemaya University of Agriculture (AUA), Wondo Genet College of Forestry (WGCF), and Awasa College of Agriculture (ACA) had carried out a number of forestry research in different fields (EARO, 1998).

2.5.2.4.3.AWASSA COLLEGE OF AGRICULTURE (ACA)

Forestry research appeared within the research program of the College after a decade of its establishment (1985). The first phase of its forestry research was a species screening trial at five sites of differing ecological zones of the South.Gradually and slowly the forestry research considered various forestry areas (Hoekstra et al; 1990).

2.5.2.4.4.ADDIS ABABA UNIVERSITY (AAU)

The Addis Ababa University (AAU) has been engaged in various forestry research activities such as tree physiology, and propagation techniques; ecology of forest ecosystems, farm forestry, Sociology, wood chemistry, Flora of Ethiopia, wood properties, and medicine. It has achieved significant results that are beneficial to the forestry research and development (EARO, 1998). Other institutions such as the ex-Asmara University, Mekele University College, and Bern University contributed to the forestry research in the country.

2.5.2.5.INTERNATIONAL ORGANIZATIONS

2.5.2.5.1. INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE (ILRI)

ILRI the ex-International Livestock center for Africa (ILCA) has been engaged in farm forestry research in Debre Zeit, Soddo, Zwai, Addis Ababa, and Ginchi focusing on initial screening evaluation of different species for fodder (Hoekstra et al; 1990).

2.5.2.5.2.OTHERS

Other international organizations such as CIDA, DANIDA, FINNIDA, FAO, GTZ, IDRC, , ILRI, SIDA, UNDP, SDA, have been supporting research activities in one way or another.

2.5.2.6.NON GOVERNMENTAL ORGANIZATIONS (INTERNATIONAL)

Numbers of NGOs have been working on differing agroforestry activities in Ethiopia. Organizations, such as African Highland Initiative, CARE, Farm Africa, Food for the Hungry International, Munchen fur Munchen, Addis-Bah Development Project contributed significantly as one can learn from the published results of the organizations (EARO, 1998).

2.5.2.7. NON GOVERNMENTAL ORGANIZATIONS (DOMESTIC)

Organizations such as the Ethiopian Heritage Trust, the Ethiopian Wildlife and Natural History Society and the Biological Society of Ethiopia have a consider-able contribution in the Ethiopian forestry research, conservation and development activities. (EARO;1998).

Individuals who were interested in preservation, conservation and restoration of historic and natural sites had founded the Ethiopian Heritage Trust in 1992. This non-political, non religious and non profit organization has been engaged in activities that promote pleasant recreational sites, parks, native trees, shrubs, flowers, birds, and wildlife together with mass education in natural environment and ecosystem conservation. Further it had contributed in prevention of soil erosion, flooding and in promoting tourism (EHT, 1998).

Similarly the Ethiopian Wildlife and Natural History Society is also a non-profit, non-political, and non-governmental, indigenous organization which was established in 1966. The organization is mainly engaged in environmental awareness creation in the educational sector. Currently, the society is undertaking projects such as Environmental Education Support Publications (EESP); Schools' Environmental Education Project (SEEP); Plant locally and Nurture Trees (PLANT); Indoor/Outdoor Activities and Important Bird Areas (IBAs) program (EWNHS, 1998).

2.5.2.8.GOVERNMENTS ORGANIZATIONS /UNIVERSITIES (INTERNATIONAL

Countries such as Australia, Denmark, France, Germany, Great Britain, the Netherlands, Sweden, Switzerland, and the United States of American are operating in the different forestry research and development areas of Ethiopia since a considerable time (EARO, 1998).

2.5.2.9.GOVERNMENTAL ORGANISATIONS (DOMESTIC)

A Number of governmental organizations that are engaged in forestry research and development and related activities directly and indirectly are adding and expanding from time

to time. The contribution they are making can be evaluated and assessed from the results of their undertakings. The following are the few among these organizations.

2.5.2.9.1.THE NATURAL RESOURCES MANAGEMENT AND REGULATORY DEPARTMENT (NRM & RD).

The NRM & RD is one of the organs under the Ministry of Agriculture that is entrusted with:

- Development and utilization of the nation's forest and wild life resources, and the follow-up of its implementation.
- Demarcating state forests, national parks, conducting inventory, collecting data and preparing forest maps;
- Drawing short and long-range forest management plans (state/reserved forests and parks);
- Forest conservation development, utilization activity survey and package preparation from the out put for extension;
- Inventory and Registration of potential energy sources;
- Industrial and plantation forests action plan development;
- Facilitating conditions and, designing strategies for private forest and wild life investment;
- Designing a means to protect natural and plantation forests (from pest, disease and fire);
- Preparing regulations and guidelines on forest and wild life products, movement within and outside the nation, the training of forestry professionals to solve current human resource problem, and other important functions;

The department is further structured into the Land Use Planning and Regulatory Team, the Soil Conservation and Development Technology, and Regulatory Team, and Forest and Wildlife Development and Regulatory Team, that are entrusted with their own duties and responsibilities. It is answerable to the Head of the Natural Resources Management and Regulatory Department.

2.5.2.9.2.ADVISORY ASSISTANCE TO THE FOREST ADMINISTRATION

The Forest and Wildlife Management and Regulatory Department run different projects to facilitate its operation. One of the most important projects is the Advisory Assistance to the Forest Administration, which is operating under GTZ. The project is established in 1995 with the DM 1.7 million (Phase 1) and DM 3.0 million (phase 2). The main purpose of the project is capacity building in the forestry sector and the improvement of policies at national level. Its main focuses are formulation of the working on guiding principles and, forestry policy. It assists regional bureau to improve agricultural administration and forestry management training. Developing forest action plans and supporting the various forestry actors are its main activity areas (GTZ, 1995).

2.5.2.9.3.WOODY BIOMASS INVENTORY AND STRATEGIC PLANNING PROJECT (WBISPP).

The WBISPP is one of the well-known projects that recorded considerable achievements in inventory and strategic planning of biomass in the country.

The WBISPP is established under the program energy I of the Ethiopian Government (GOE) assisted by the World Bank (IDA loan) with the implementation responsibility of the Ministry of Mines and Energy (MME) which manage external funding and technical support of Ministry of Agriculture (MOA). Currently CIDA & DGIS finance it (since World Bank support had discontinued in 1995 march) with the objective of planning sustainable supply by integrating woody biomas with other agrarian activities. Its major focus areas are inventory, survey of consumption pattern, and problem identification to its development and consumption (WBISPP, 1993).

The project works towards developing methodologies, such as developing a system for priority area, studying management options and developing a monitoring skill.

WBISPP runs a number of activities that agree with its objective (WBISPP, 1993) namely:

- infrastructure and institutional building in respect to structure, equipment, procedures and trained personnel.
- installation of an Image Analysis System (IAS), that helps in analyzing past, present, and future satellite images and archives data since 1972. The system provides quality colored image maps, especially with information on land cover and its changes.
- installation of Geographic Information System (GIs)-computerized database management with spatial map data. Its input is current and existing data, which are used as geographical reference to provide an analysis that is linked to IAS. Thus data appears in images from GIs. The output may include slope, soil, topography, erosion hazard, which are very important information to Woody biomass management and any forestry research.
- developing Natural Resource Data - that encompasses collection of relevant, current information, inventory of 250,000 Sq.Km for woody biomas, distribution, extent and

environmental interaction, and collection of land-use, soils, terrain, grazing data and analysis are few among its responsibilities.

The WBISSP is a well established, well organized, equipped, funded, and staffed organization that meets the current national and international forestry and related information demands.

2.5.2.9.4. FOREST GENETIC RESOURCE CONSERVATION PROJECT (FGRCP).

The FGRCP is a project that carries out its activities as a support body to the Institute of Biodiversity Conservation and Research established under proclamation No. 120/1998 by the Federal Democratic Republic of Ethiopia (Federal Negarit, 1998: 17).

It has a partnership with FRC, the National Tree Seed project, the Federal and Regional bureau of agricultural development through its three teams, the Orthodox Church, NGOs and Projects working on conservation for project implementation (BDI-FGRCP, 1999).

2.5.2.9.5 THE NATIONAL HERBARIUM AND THE ETHIOPIAN FLORA PROJECT.

Botanical Research in Ethiopia dates back in the 50s as a department at the University College of Addis Ababa. The herbarium established at the end of the second half of the 50s, and latter emerged fully-fledged as the National Herbarium.

The achievements of the botanical research from the 80s onwards could be witnessed by its undertaking of the Ethiopian flora Project. The Flora Project is launched as the result of the collaboration between Addis Ababa University and the Ethiopian Science and Technology

Commission in close co-operation with the Department of Systematic Botany of Uppsala University in Sweden. The Swedish Agency for Research Co-operation with Developing Countries (SAREC) was the principal financial source, and currently SIDA.

The National Herbarium is adequately equipped, staffed, and financed. It produces a modern flora of Ethiopia with the aim of creating an awareness of conservation and plant Biodiversity utilization,and a library for pharmacognosists, agriculturalists, foresters and wild-life specialists. The project focuses on recording the whole flora, building a National Herbarium, and promoting scientific activities in taxonomic and economic botany, forestry, plant ecology and physiology (Anonymous, 1999).

2.5.2.9.6.FORMER GOVERNMENT ORGANIZATIONS AND INSTITUTIONS.

In addition to the organizations and institutions that are mentioned earlier, in the past the ex-State Forest Development Agency (SFODA) 1972-1977; the ex-Land use planning and Regulatory Department (LUPRD) 1977-1985; the ex-community Forestry Development Department (CFDD); the ex-Plant Genetic Resources Center (PGRC Ethiopia) now Institute of Biodiversity conservation and Research (IBCR), ex-Ethiopian valleys Development Studies Authority (EVDSA) are government organizations that were engaged in forestry research, development and related activities (EARO,1998).

2.5.3.FORESTRY EDUCATION IN ETHIOPIA.

The problems of forestry and related areas of research and development can not be tackled with- out adequate and trained human resource in the field. Shortage of professionals is the critical problem that the forestry sector of Ethiopia suffered for a considerable time as in other

developing nations. Human resource development or investment in capacity building and forestry education is a bottleneck to research, conservation and development (FAO, 1992).

The Imperial Government in the past had had considered the forestry to be significant for the over all development of the country in its revised constitution of 1955. It was as the result of such consideration that the Ambo School of Agriculture and Forestry has been established in 1957.The school graduated its first batch of trainees in 1961 (Amare et al; 1990). Since then different attempts were made to solve the situation, however the problem persisted.

The ex-Wondo Genet Forestry Institute had been established in 1978. It was running a program designed to train forest professionals, undertake forestry research, disseminate results and participating in natural resources conservation and development activities (Anonymous, 1997).

The effort that the Institute made in contributing to the human resource need of the country was significant. But, the contribution was not in comparative degree with the ever expanding and diversified demand of forestry research, conservation and development.

Gradually responsible parties began to be aware of the necessity of up grading the Institute at a college level. Hence forestry education started at a Bachelor of Science level in 1968 by the financial support of the Swedish International Development Agency (SIDA) and with the implementation responsibility of the Swedish University of Agricultural Sciences (SLU).

It graduated three batches of 15 students' four years time (1986-1990). In earlier days, except scholarship awards in forestry the country had had no any other option. Most of the professionals were non-returnees (Larson, 1998).

In the period between 1992-1994 a MSc program in forestry was agreed to be established as a department through the co-operation between AUA and SLU. Finally, in 1994, the first MSc program financed by SIDA started to operate (Anonymous, 1997).

As the reports on trained manpower needs assessment in forestry and related fields explains, the program was aimed at capacity building, in the natural resources development sector. Professionals with forestry and related areas back ground at B.Sc. level were selected for the training.

SLU provided its qualified staff to overcome the local human resource shortage. Three-quarter of the training was set at Wondo Genet, while the rest took over at SLU in Sweden (Anonymous, 1997: Annex III).

In the mean while, the AUA and SLU partnership in the program decided to transfer the faculty to Wondo Genet. The joint effort of WGCF and SLU would have an important influence in the forestry education, training, conservation and development of the country.

Table 1. Composition and number of respondents by discipline.

Discipline	Number of respondents (%)
Forest Management	20
Silviculture	19
Farm Forestry	13
Forest Soils	8
Forest Economics & Policy	4
Forest Protection &Ecology	3
Others	33

3.1.2. Issues Addressed by the Respondents

The respondents reported that they address various issues related to forestry and related fields (Table 2).

Table 2. Issues addressed by the respondents.

Issues	Number of respondents (%)
Conservation	14
Decline in Crop Yield	14
Soil Degradation	8
Agroforestry	7
Natural Resources Degradation	7
Feed & Wood Shortage	4
Soil Fertility	4
Establishing Techniques	4
Land Use Activities	4
Fodder	4
Rational Utilization of Forest	4
Timber Supply and Demand	4
Environment	4
Tree Seed Supply Research	4
Biological Knowledge	2
Indigenous Techniques	2
Demand for Forest Products	2
Crop Breeding	2
Knowledge on Indigenous	2
Rehabilitation of Degraded soil	2

3.1.3. Priority Areas in Forestry Research

Priority areas in forestry research have not been properly identified, and most of the research programs/activities have not been well planned and executed. Respondents differed in their opinion about the research areas that have been given (Table 3) and should be given priority in forestry (Table 4).

Table 3. Research areas that have been given priority in forestry.

Discipline	Number of respondents (%)
Silviculture	19
Farm Forestry	17
Seed Research	12
Forest Genetics	14
Forest Soils	11
Forest Products	10
Forest Economics	10
Forest Protection	9
Forest Ecology	5
Forest Management	4

Table 4. Research areas that should be given priority in forestry.

Discipline	Number of respondents (%)
Conservation	24
Rehabilitation	19
Forest Ecosystems	11
Plantation Forests	8
Others	38

3.1.4. Purposes of Generating Forestry Information

Based on their responses concerning the purposes of their efforts to generate forestry information, the respondents can be grouped into two – one group (the majority of respondents) that has clear opinion and another group without any clear opinion about the purposes of their efforts to generate forestry information. Respondents in the first group indicated that they generate forestry information to fill the information gaps that are prevalent in the sector. The information generated is targeted to serve rural and urban communities

(particularly the resource poor farmers), government and non-government organisations, research and higher learning institutions, policy makers, small and large scale industries, etc. It has been indicated by the group that the ultimate purpose is to enhance sustainable agricultural production and productivity through the development, sustainable utilisation and conservation of natural resources in particular and the environment in general. The few respondents in the second group indicated that their purposes are related to generating data to fulfil requirements for project progress reports.

3.1.5. Reasons for Gaps in Forestry Information

Respondents considered lack of efficient documentation, poor and limited communication facilities, lack of information exchange, lack of co-ordinated and adequate research, lack of data base management, lack of awareness, absence of networking and shortage of qualified personnel in the sector to be the reasons for gaps in forestry information.

3.1.6. Access to Forestry Information and Information Requirement of Researchers

It is an established procedure that a researcher should review the available literature to see if the topic that he/she has intended to research on has already been carried out. This will avoid duplication or replication of work as well as unnecessary wastage of resources (money, time, labour, facilities, etc.). In this regard, the majority of respondents (87 %) pointed out that they undertake literature review before embarking on any research activity. A few (7 %) indicated that they don't undertake literature review due to constraints related to lack of funding, lack of access to information sources and shortage of time. Others (6 %) failed to respond to the question.

Respondents also indicated the phases of their research activities in which they require information. For problem identification and hypothesis testing, the majority of respondents (75 %) stated that they depend on 80-100 % of the total information they require while the rest (25 %) depend on 60-80 % of the total information they need. Similarly, for problem identification, developing conclusions and recommendations, 50 % of the respondents depend on 80-100 %, 25 % of them on 60-80 % and the rest 25 % on 40-60 % of the total information they require. When it comes to reference/bibliographic needs, 50 % of the respondents depend on 60-80% and 25 % of them on 40-60 % of the total information they require.

3.1.7. Methods of Research Topic Identification

To achieve successful results, researchers have to use proper methods of identifying research topics. Various methods are employed by the respondents to identify topics for research. These include: making gap analysis based on review of existing knowledge, observation and/or field survey, literature review and workshops, using questionnaire and discussion with clients, feasibility studies, socio-economic surveys and problems raised by beneficiaries. A significant number of respondents noted that they use gaps identified in the *recently* developed strategy for forestry research to identify research topics.

3.1.8. Review of Potential Research Problems

Reviewing of newly proposed, on-going and completed research activities as well as monitoring and evaluation of the last two, have become common practices in research and development programmes in Ethiopia and elsewhere in the world. Half of the respondents confirmed that they get their research proposals/activities reviewed or discussed up on. Some

pointed out that the research topics are reviewed at department and national level, others indicated that they make discussions with farmers and a few of them use workshops, seminars and field tours to discuss their research activities.

3.1.9. Ways Used to Disseminate Research Outputs

The term dissemination is used here to denote extending outputs from forestry research to the end-users/beneficiaries. The respondents use various ways to disseminate outputs from their research activities (Table 5).

Table 5. Ways used to disseminate research outputs by the respondents.

Ways	Number of respondents (%)
Research Reports	28
Local Publications	25
Condensed Papers	13
International Journals	12
Seminars	12
Workshops	6
Others	4

3.1.10. Feedback from Forestry Information User

The majority of respondents believe that feedback from users of forestry information is important while a few of them have shown unawareness of its usefulness. Nevertheless, only 30 % responded that they receive user feedback while 54 % of the respondents indicated that they have never received user feedback and the rest (16 %) did not answered the question.

Those that receive feedback from users explained that their works (published or unpublished) are either requested directly or have been cited in other publications. Others attributed the lack

of feedback from users to the absence of established feedback systems, lack of forum to discuss with users, constraints related to communication with end-users and limited experience of the researcher.

3.1.11. Challenges to Addressing the Changing Need of the Forestry Sector

Forestry research has to be organised and geared in such a way that the scientists can detect and address problems related to the ever-changing needs of the forestry sector. When asked if their research outputs can help to address the changing needs of the forestry sector in the country, 49 % of the respondents reacted positively, 19 % negatively, 4 % answered "not yet" and 28 % declined to respond.

The respondents also suggested areas that they consider to be new challenges in the forestry sector. These include: conservation of forest genetic resources, rehabilitation of degraded areas, keeping the balance between exotic and indigenous trees/shrubs for farm forestry practices, conserving and developing natural forest ecosystems, reconciliation of production forestry and conservation forestry, production of alternative and potential raw materials for industries, energy and construction, shortage of land for forestry, crop cultivation and grazing, etc. On the other hand, a few respondents indicated that there are no new challenges in the forestry sector.

3.1.12. Constraints in Information Generation

The respondents raised quite a number of constraints that are believed to hinder the generation of forestry information in Ethiopia. These are enumerated below.

- Library service comprises documentation centre, which can not produce (process) data.
- Most institutions surveyed do not have publishing divisions that compile, edit, and reproduce by printing except WBISPP.
- No compilation service that facilitates researchers.
- No document procurement services that provide microfilm microfiche, photocopy or any other.
- Immediate research results are hampered by lack of materials to users.
- Immediate generation is hampered and constrained by lack of funds, computers, laboratories, facilities, equipment, and skilled professionals.
- Lack of incentives for researchers (Attractive salary, reward, etc.)
- The long time required for forestry research (e.g. 0-25 years)
- Over burden in responsibilities of researchers

3.1.13. REASONS FOR COLLECTING INSUFFICIENT DATA BY RESEARCHERS

The respondents had different opinions about the reasons for obtaining insufficient data. These are presented below.

- Shortage of technical support staff
- transport facility constraint
- lack of equipment
- damages done by natural factor, human attitude, and animals
- low level of research qualification
- inadequate fund allocation
- lack of motivation
- untimely budget release lack of appropriate information proper organisation of research problem of covering large area in limited time, lack of legislation
- complexity of trials in number and status
- unmanageable trials in number and status and
- redundancy in trials within subjects

3.1.14. Research Areas That Attract Donors

Researchers indicated that the following research areas attract funds from donors since there are gaps in information in the areas.

- Development oriented forestry project
- Natural resources and their rehabilitation
- Reforestation
- Deforestation
- Reserve forest survey

3.1.15.Information Need Users And Information.

Researchers have the conviction as they assess user and need behaviour when they generate data and these users groups are researchers, forestry students, managers, planners, organisations, and, higher learning institutions. Thus, more than half of the researchers assesses their behaviour, while 46% do not use this method . The needs are 20% Silviculture,3% Pollution vis-à-vis Farm production,25% Farm Forestry,15%Forest management,5% Forest economics,16 %Forest product Utilisation 6%Others such as, plant diversity of names, distribution and ecological requirement of species.

3.1.16.Research Initiation And More Fund Demanding Stages.

Scientists invest a considerable sum on data collection, due to lack of an organisation that provide base line data, and most of the information they generate do not answer user need due to self-interest research initiative and most researchers think that their data is available although not timely and adequate. Almost 40% of the research is based on self-interest, while 25% is initiated as demand driven, and 21% is done to fulfil research programmes, and 2% according to fund allocated to particular areas.

3.1.17.Researchers Opinion On Information Generation Cycle Priority And Publications

Different researchers give priorities to different forestry research information stages. In majority of cases 47% to data gathering, 22% to processing, 17% to analysis and 13% to dissemination. The reason for such problem is the absence of data in some areas and in certain cases due to the nature of the research .The majority of the scientists (75%) publish their out put, while some (25%) have not published up to now. However, it is limited in number and circulation. Most of the publications were in recent decade. The scientists think as there is enough information but with bottlenecks.

3.2. FORESTRY INFORMATION USERS

3.2.1.Information Channel, Usual Need Provision Pattern and Assessment: Service and Need Specification

Forestry researchers use different channels such as net work, superiors, their departments, and colleagues to obtain information for usual need. Those who get current information are limited. The user need is mainly based on work. These information provisions are inadequate, although services are related to user mission. Forty-five percent of these data are 5-10 years, while 23% is between 1-5 years and the other 23% is of within all ranges of time. In the majority of cases, the information is relevant but not adequate. (See Tables 6-9).

Table 6. User Usual Information Need

Information category	percent
Research Information	25
Planning Information	10
Activities	17
Educational Information	12
Information To Develop Knowledge	23

Table 7. User Available Information

Years	Percent
5-10 Years	45
1-5 Years	23
Less than a Year	0
Very recent	0
With All Ranges	23

Table 8. User Forestry Information Need PATTERN

PATTERN OF NEED	RESPONDENTS%
Is constant always	11
Is changing from time to time	15
Depends on user activity	19
Depends on work environment	29
Is based on reading interest	15
Depends on available Material	11

Table 9.User Organisation Information PROVISION

Importance	Percent
Is related to user mission	62
Is partially related to Mission	23
Is barely related to mission	0
Is indirectly related to user mission	5
No response.	10

3.2.2. User Knowledge Of Information Technology Access ConstraintAndEvaluation.

User computer knowledge is minimum. Usage is mainly for data storage and analysis. Only thirty-seven respondents have computer skills while sixty-three revealed as they have none. The most available facility is telephone. Most of information need is for planning and day today activities. Thirty-seven users have the opinion as privileged groups hinder them from information access. These groups constitute 27% Managers/planners, 5%Researchers, 11% Information specialists, 57% of the respondents do not know these gate keepers. Almost all users have no satisfaction with communication, and they believe, as forestry information system is not well established.

The User Information Need Specification Category Has the Following Pattern.

- For planning projects, forestry activities
- For setting up research priorities
- To draw specifications, design, and adjust
- To schedule, process, know material requirement(Production, plantation)
- To identify source of finance mobilise funds, budgeting To decide whether to continue or stop projects

3.2.3. User Response to Change, Judgment and, Language Preference

User believe as he/she can do more if the system improves and the majority have the opinion as the ongoing research is significant and satisfactory, and 66% of user prefer English, while34% Amhric as information language. It is the belief of all researchers that as reorganisation of the system can help them to perform more.

3.3. THE ETHIOPIAN FORESTRY INFORMATION SERVICE UNITS

The forestry information service units are all the information centres that are established under the forestry and related research development, and academic institutions. Most of these service units are libraries which encompass all other information services, while few acquire libraries, and computerised information search services (database), selective dissemination of information (SDI), document delivery, data and information analysis service, in addition to documentation and publication units.

3.3.1. The forestry research center library

Although it is difficult to establish the exact time, and condition regarding its establishment, it was intended for a reading room of magazines, newspapers, and some unrelated, insignificant publications in the early 70s, while the centre was running only one research programme. Currently the library is situated in the centre at shola. It is a moderate library with a collection of 3000 books, 72 abstracts, 50 diskettes, 100 microfilms, 70 journals, out of which 50% is of forestry and related areas. The 50% of the share in forestry consists of Silviculture, Agroforestry, and forest management, with greater share of 20% in Silviculture, and insignificant part which is 0.5% in social sciences.

The Forestry Research centre library has contacts with the umbrella organisation EARO, WBISPP, AAU, and WGCF, AUA, WUARC, AAU, ILRI, FAO and UNDP, and the British Council etc. The major sources of information are research, database, and documents from external source.

Its major Channel is publication. The current available, information is within a limit of a month. The library works for a solid day. It generates, data reports to users. Its users are internal, and external, mainly researchers from the centre that don't exceed in number from 70-80 and graduate, under graduate students from different institutions.

The library acquires materials through purchase, subscription, gift or donations, from different agencies. In the early 90's the library had a publication service, that publish FRC News letters, and forestry research bulletins. These activities were carried by the support from FAO/UNDP project ETH/88/010.

During the end of the 80s and the beginning of the 90s, the activities of the library were based on information capacity building, such as data management in general, and organising its own data with CDS/ISIS application adapting the international AGRIS standards, weeding activities, registration of periodicals with entries, classification of books, and distribution of News letters (Amare et al; 1990:20-24).

Currently the FRC library answers internal and external information user need in 75% of its time. It provides its FRC database, which consists over 1000 records and research data with nearly 100 records to users.

The library has a single 286 computer with EPSON LQ 2550 printer and some diskettes. It has also a microfilm service on AGRIS database.

The FRC library has a budget problem since 1992. Lack of money is a strong constraint to maintain the cracking building of the library, to purchase new books, and subscribe for scientific journals and above all the publish research out puts.

3.3.2. WOODY BIOMASS INVENTORY AND STRATEGIC PLANNING PROJECT

The WBISPP library is a moderate library with one room of reasonable size with adequate shelves, tables chairs, manuals, books, periodicals, directories, a bibliography a computer and a humble qualified librarian, with a special training in CDS/ISIS and computer skill. The WBISPP has 654 books, over 800 documents, number of magazine titles, few abstracts, plenty of diskettes, and few CD-ROM.

Most of its book collection is of woodlands, and the rest on forestry, soil, water, and related areas. It has 11 titles in Agroforestry and 2 in ecology. It obtains most of the materials through gift and donations, and the rest with purchase, and subscription. It produces nearly 1/3 of the information in reports, maps, and manuals. It has publications of its own, which are more than five occasional papers reports such as training manual, inception report, Preliminary Biophysical Assessment, and miscellaneous.

WBISPP library serves internal and external users. Its external users who are mainly from the Environmental Protection, AAU, SLU, WGCF, Regional Governments Bureaux, Slovakia

Faculty of Wood Technology Technical University in Zvolen, AAU, Commercial College of Addis Ababa, graduate and under graduate students from other universities, college and institutions, ILRI, and UNDP/FAO, Governmental and Non Governmental Organisations, which are national and/or foreign were recent beneficiaries.

The library provides its database, books, and publications, abstracts proceedings and reports to user with former requests.

The database is served through a Local Area Computer Network that connects 20 computers with the project. The library has one computer that is connected to the network and a data base servers.

3.3.3. THE WONDO GENT FORESTRY COLLEGE LIBRARY

The Wondo Genet Forestry College Library was established with the former Wondo Genet Forestry Institute in 1978. However there was no any recorded evidence that proves whether there was a library earlier to that time. One thing certain about it that was there was no any forestry or related collection.

However, the collection and the library developed after the establishment of the institute and through the 80s. Today the Wondo Genet Forestry College has one diploma holder in library science and two high school graduates. It owns a moderate library, with 7000 forestry books, 25 videocassettes, 500 journals of different titles, and 20 CD-ROM. 80% of this collection is in forestry and related areas, which of its 10% current. The considerable share that is estimated 15%

is of Silviculture, the current collection is mainly of ecology and environment, while books and documents in wild life are of insignificant share.

The college library has contacts for information with International agencies, such as ICRI, ICRAF, IVCN, SIDA, SLU and FAO in its effort to fulfil the need of its users, which are based on forestry books, journals, databases, thesis, and abstracts. The major source of information to Wondo Genet College of Forestry is survey, research, and marketing, Database, personal, institutional and documentary.

The major channels of information are publication, reports, databases on CD-ROM that is copied from AGRIS. The library can provide information or data that has six months as current. Within the given situation, its information is available, adequate and inexpensive.

3.3.4. The Ministry Of Agricultural Library

The Ministry of Agriculture main library is established under the Information and Public Relations Department. While the documentation centre is under the planning and Programming Department.

The centre has one library and documentation head, with a diploma in Library Science, a documentalist with MA in library science and Bibliography, two assistants with a certificate in library science, and a messenger who is a high school graduate.

The Federal Ministry of Agriculture Library and Documentation Service, has a total collection of 8,500 books, 25,000 magazines, 2 videocassettes, 5 CD-ROM, and 85 diskettes of information. Ten percent of this collection is in forestry, forestry related areas, and 10% of this share is current.

The greater share of the collection in forestry is a report on forestry, which comprises 5%. Current collection is mainly of journal on forestry, that consists 2%, while the insignificant share of forestry is in afforestation, that is 0.1% of the total.

The centre provides a database in forestry that has the 1996 forestry data. These data are obtained through request letters of the centre to various governmental and international organisations freely through donations, purchases and subscriptions. The purchasing power is limited and rare. The source of forestry information largely depends on external providers, and it obtains publications, reports, technical papers and books. The centre provides information to users who present their need formally in the request format of the centre.

Most of the users are agricultural and forestry experts, researchers, graduate and under graduate students, individuals from higher institutions, and consultants. Eighty-three percent of users are external while 17% are internal.

The extent of user information needs request from December 1998 to February 1999 was 159.Need requests on forestry, environment and wildlife information were 5%, 6% and 5% respectively, while those on livestock, agricultural extension, agricultural policy, and development, on fertiliser and irrigation were 13,4,8,4,3 percents. Thus the centre has answered 89% of the user need and unable to provide for the rest of the 11%.

The centre has well established contacts with UN agencies particularly with FAO, various ministries, international organisations, such as universities and colleges, EARO and other forestry centres.

The centre collects information mainly on forestry policy, forest resources, forest inventory, afforestation, reforestation, and any report on forestry.

It generates BI-annual magazines, annual reports, working and field documents, project documents etc, and disseminates these reports, documents and proceedings to different institutions and organisations. Currently the centre has one Unisys Aquanta^{Dx} + ups computer.

3.3.5. The Ethiopian Agricultural Research Library Services

The EARO information service has documentation and library services. Both units are headed by two librarians at diploma level in library sciences, and assisted by three experienced high school graduates, and a publication section with an editor who is a BA degree holder in English.

The library has 10,000 books, 5 titles of magazines, ICRAF/IBSRANM abstracts, number of journals, reports, proceedings and reviews. Around 2% of the book collections are estimated to be in forestry areas, and 90% of the collection is in nursery, and tree plantation, while the collection in Agroforestry systems is numbered and insignificant.

The research organisation library service has its contacts with international organisations such as FAO, UNDP, ECRAF and other centres, the British Council and ILRI. It has a remarkable information exchange tradition that had started in the then IAR, with, MAO, AUA, AAU, WGCF, FRC and all research centres.

The library provides a loan, reference, photocopying, duplication, and selective dissemination of information and other services daily to 20-30 internal and external users.

The library collects books, documents, Newsletters, brochures, reports, and journals on agriculture and forestry. It subscribes international scientific journals, such as forest ecology and management, European forest pathology, Agroforestry and Canadian journal of forest research from the Netherlands and Canada.

The major sources of information to the research organisation information service are research, database, and documents.

The service generates technical, manuals, reports, newsletters, progress reports and other documents but the production in forestry is limited. It often provides current information that is 2-4 months and it rates this information as available adequate and cheap. The major channel that is used to obtain information is mainly through publication reports.

The library has two NCR computers, and two LaserJet printers, a scanner, photocopier, e-mail, fax and telephone facilities.

3.3.6. THE NATIONAL HERBARIUM LIBRARY

Since the establishment of the herbarium in 1959, now the National Herbarium, efforts were geared to collect literature and various sources of vegetation information to build the library and develop the collection in order to enhance research activities.

Currently the National Herbarium Library has a trained librarian in library science. It has 400 books and 189 scientific journals of different titles. Out of which forestry accounts 95% and half of it is current. From the forestry and related areas, materials on general forestry or ecology are quarter of the total while environment and ecology consists 50% of the current. The insignificant collection is of medical herbs, which are only five books.

The Herbarium Library acquires part of its collections by purchase, gift, donations, exchange and most of it from its own publications of journal articles. Significant of the information dissemination takes place in the form of reports.

The National Herbarium Library of AAU provides information to over 100 internal and external users mainly researchers.

The materials, with much relevance to botanical literature are growing in volume from time to time. In addition to gifts and direct purchasing with the assistance from the Ethiopian Science and Technology Commission, the library has shown a significant effort in its attempt to help users.

The major source of information to the Herbarium is research and document. When the writing up of the flora would be finalised, users will be provided with adequate information on the plants that are found in Ethiopia. The flora publications will enhance efforts to produce regional flora, field guides, handbooks and helps to identify the economically important plants of the country.

3.3.7. The Ethiopian Science and Technology Commission (NCIC)

The National computer and Information Centre (NCIC) is a governmental institution which established as the result of merging the then National Computer Centre and National Scientific and Technological Information and documentation centre both working to promote computing technology and information systems and services in Ethiopia since 1987.

NCIC is organised into planning and administration, and finance services, information systems co-ordination and processing, central technical library and training departments.

The services are organised into computer, computerised information search, consultancy, electronic mail, and library services.

The technical library has collections in books, documents, periodicals, slides, videos, and microfiches.

As any area of research information, it has a forestry collection and data in different forms, which is provided to different users in the reference service. Apart from books, the service provides foreign publications.Since 1995, NCIC has started to provide information search services on different databases. Among its various data bases REFR 1, ETHCALL, REFER 2-4, EXPERT and RESPROI, which have records on the agricultural information of global nature from ILRI, the

agricultural information on Ethiopian Experts and Information on S&T research projects in major research institutions in Ethiopia are beneficial for forestry researchers and information users.

According to the survey the library and information search service is providing or estimated 10% of the actual, 50% of the beneficiary, 5% of the expected forestry user group that currently, and in the future uses the services, and the one that has the privilege of using it. It has also the capacity to provide 9% of the would be potential user.

On top of the facilities, the Local Area Newt Work has enabled the smooth flow of data and information within the system. The library is utilising the information technology components such as computers, telephones, computer input, out put, and storage devices.

The NCIC publishes digests, newsletter, specialised bibliographies, content pages, directories abstracts and accession lists, that enhance the efforts in forestry research and development information sector of the country to a considerable extent.

3.3.8. Other Libraries

Libraries such as the Addis Ababa University Science Faculty Library, and the Institute Development Research (IDR) Documentation have forestry materials which are insignificant compared to their general collections, but important.

The IDR Documentation Centre is currently serving the different research units under the Institute. Its main objective is gathering, organising, processing, and disseminating data to different user groups mainly researchers. IDR Documentation Centre owns 2000 books, 40 title

magazines, 300, title abstracts and 10 title journals of different socio- economic and gender issues. From the collections 2% is in forestry and related areas 50% of the forestry, collection is current with most of it in Agroforestry, economics, landause and vegetation, while the insignificant part is a home gardening. All of these collections are in the form of research reports, journal articles, and occasional papers.

The IDR Documentation Centre obtains most of its collections gift or donation, subscription. It answers user needs in 40% of its daily engagement, and it provides the information in publications and reports.

The Addis Ababa University Science Faculty library has 58,174 books and 17,979 journals in different scientific areas, but only 60 book in biology related forestry areas. Both libraries are not automated.

3.3.9. Service And Laboratory Facility Problems

The library service comprises the documentation centres, and these centres have no the potential to process (produce) previously, and currently collected information/data when users request.

Most of the institutions surveyed do not have publishing divisions that compile, edit and reproduce by printing as WBISPP. Except the annotated bibliography of the Forestry Research Centre, the WBISPP bibliography, the earlier bibliography of new additions of Ministry of Agriculture (1989) which is mainly of agriculture, the then IAR (EARO) quarterly literature update, which is also devoted to agriculture, there is no any compilation service that facilitate forestry scientists or any information user to browse publications on forestry within the shortest time possible. The Floral Inventory Classification and Documentation by the National herbarium

at Addis Ababa University, is a big project that will take a considerable time, money and effort in the future.

Except the imitated effort, the old AGRIS/CARIS Agricultural Database in FRC, and the best uptodate CD ROM abstract services of EARO on the works of prominent Ethiopian forestry scientists there is no document procurement service that could provide a Microfilm Microfiche, Photocopy or any material of value to forestry information users. The absence of scientific or technical information translation in any one of the institutions is also additional set back.

The lack of immediate results of forestry research are chronic problems to some users, since there is lack of periodicals or journals, proceedings, research paper copies, summaries, reports, reviews. In a situation where they are available, these materials are numbered and circulation is limited.

There are no abstracts and indexes of forestry research publications that locate information that could be published in the available scientific journals.

Computers are also numbered, all researchers have no computers for individual research undertakings. The ratio of computers to researcher except places like A.A.U. National Herbarium or the Flora project is insignificant. For many researchers it is difficult to store, process or compute and generate data on their findings, without input, central processing and out put devices. Essential software and reasonable memory capacity are very important. In particular Statistical and modelling packages are not available. The output is also unthinkable with out a printer. In most of the institutions, there are no such facilities, or even if there are, they are not with out problems.

Communication is also the other constraint. There is no Internet connectivity in the majority of the cases, let alone having a web site. E-mail, telephone, fax, teletext, are not available, or very rare. Net works are unheard technologies except at WBISPP.

Most research centres, projects, institutions and organisations suffer from problem of human resource, such as senior researchers, statisticians and biometricians.

Research efforts are constrained by absence of soil and drying room seed laboratories. Further lack of different lab equipment, such as Chematography, Atomic Absorption Spectrophotometer, Soil Sample and Nutrient Content Analysing Apparatus are major problems. On the other hand there is no forest Gene-Bank facility, and the existing storage facility is outdated, the absence of Image Analysis Facilities and Forest Mensuration equipment and lack of Chemicals from abroad are significant constraints of forestry information generation that can satisfy forestry information data user.

3.3.10. INVENTORY OF INFORMATION TECHNOLOGY RESOURCES

Computers, printers, and software (operating & packages)

Table 10-12.IT Resources of EARO, WBISPP, FRC, MoA, National Herbarium&Flora Project.

ORGANIZATIONS	COMPUTERS	PRINTERS	PACKAGES	VERSION	
EARO	Intel 286/486 Pentium Hewlett- Packard IBM Get way- 2000	Dot Matrix Laser Jet Desk Jet IBM Pro.	Novell NetWare Ms- Office Ms- Office WP Lotus 123 Visual & Base	3.12 97 4.0 5.1	 Financial MSTAT-C Minitab PASS
	150	96			
WBISPP	Pentium Hewlett- Packard	HP -Laser Dot- Matrix Laser- Jet	WP Amharic WP Ms Office Lotus 123 Dbase Digitizers ARC/INFO SPANS ERDAS PCI IAS PAMP GIs	5.1 97	MSTAT-C Minitab
Total	20	4			

ORGANIZATIONS	COMPUTERS	PRINTERS	PACKAGES	VERSION	
FRC	Hewlett -Packard IBM Toshiba Get way- 2000 Compaq	Laser- Jet IBM Pro.	Ms Office Word perfect dBase	97 5.1 3.0	CDS/ISIS
Total	16	4			
MoA	UNISYS Pentium Zeus Thomson Osborne Micro-Computer IBM Astral 386 DMC Compaq Compu carp Zenith Opus	HP Laser Laser Jet Epson LQ Smart UPS Micro-Power Micro- Pac	Ms Office Word perfect WordPerfect Lotus Dbase	97 4.0 5.1 123	
Total	60	10			

ORGANIZATIONS	COMPUTERS	PRINTERS	PACKAGES	VERSION	APPLICATION
NATIONAL HERBARIUM AND FLORA PROJECT	Impression 7 Toshiba 430 Compaq Dell Tulip MS 17684 Samtron	Laser- Jet	Ms Office Ms Office WP Excel Ventura d Base NovellNetwa re	97 98 5.1 97 4.0 5.0 5.12	Fortran
Total	12	5			

NET WORK (Only three organisations have networks. EARO and MoA have proposed and ratified WAN with their It strategy)

Table 13.Network Facilities.

ORGANI-ZATION	TOPOL OGY	NO.OF NODES	CABLES	ARCHIT-ECTURE	EQUIP-MENT	SERVER	OPER-SYSTEM	SERVICE
EARO	Ethernet	39	Coax.UTP/4 (Thick)	Star	Hubs	Acer Pentium	Novel 3.12	None
WBISPP	Ethernet	-	Cheapernet or thin Ethernet	Bus	-	Pentium	Novel 3	Digitising importing Analyses
NHEFP	Ethernet	10	Coax.UTP/4	Star	Hubs	Pentium	Novel 3	Analysis Importing

CHAPTER FOUR

4. DISCUSSION

4.1. LACK OF NEED IDENTIFICATION AND HUMAN RESOURCE INVESTEMENT AND ITS IMPACT IN PRIORITY AREAS.

The Ethiopian Forestry Research and Development priority is not defined. As survey result indicate forestry research initiation in most cases is based on researchers interest, in significant cases is demand driven, and almost all researchers confirmed as their research address national problems. These national problems are problems, the individual researchers believed them to be important and crucial to the nation.

Research problem identifications are through gap analysis based on already done research, by assessing data collected, on observation, literature review, workshops, field survey using questionnaires and carrying out discussions, feasibility studies, social economic surveys, clientele interview, considering problems raised by the local people and mandate of organisations.

Thus it is not possible to conclude that the research problems were identified on the basis of stakeholder participation and carried out as national priorities with out a clear research strategy that defines priorities on basis of requirement analysis upto recently..

Forestry scientists as the survey reveals are mainly engaged in what they call current forestry research area, which is forest management, Silviculture and farm forestry, while much attention is denied to protection and ecology. Considerable number of scientists are

working in different areas of research, while where majority of professionals engaged is much less priority area. In some areas that appeared as the non-prioritised area the need for human resource is very high,

Why most of the scientists are not engaged in areas of priority, at the present? As one can learn from the practical situation it is due to larger number of professionals working in the different forestry research organisations, and working in research they think useful or for the areas they are trained for.

The results reveal that the nation has been unable to invest in human resource development, particularly in education and training of forest professionals that can answer the demand in the proper area of research. Secondly, lack of manpower allocation and inadequate management of forestry research of the country is responsible to such resource and effort mobilisation to areas of less importance.

According to scientists, planners, managers and other professionals, the important areas that have to be seriously considered are Conservation, Rehabilitation, followed by the Forest-Eco System, Regeneration, and lastly Plantation. Thus current area of research engagements are not priorities.

The research efforts made, although beneficial in many cases, can not be said to have addressed national problems. In short the considerations in forestry research and development information generation were not based on user need.

4.2.NEGLIGENCE TO USER FEEDBACK AND INABILITY OF THE SYSTEM TO DEFINE PRIORITIES.

On the question regarding the purpose of forestry research information generation, scientists gave different reasons, such as project progress requirement, management awareness, bridging information gap, and to serve end user need. Others justified, as their research is mission oriented. These different goals show the absence of strategy, plan and program that can govern and guide the direction of the overall forestry research and development. Individual researchers interest over shadowed national interest. Moreover, it shows absence of all encompassing research management and disintegrated efforts, which may facilitate duplication and replications.

As significant number of scientists assume, the highest number of forestry information user need area to be in Farm Forestry, Silviculture, forest product utilisation and Forest Management areas. The assumption does not indicate the truth, since the information need is only for current area of priorities, or where substantial portion of the human resource is allocated.

It is in the area where majority of researchers are engaged that considerable number of research activities are seen, whether it answers national need or not. These needs are not the needs of key-stake holders. Had research activities been national needs, the Ethiopian forestry sector would have achieved the necessary goal and the existing problems would have been solved.

Considering areas of inadequate data, during the survey it is confirmed by scientists as the research in indigenous species followed by past forestry research. This shows as much effort is not done in indigenous species, research results of past forestry research activities were not properly handled, and there were no much needs in these areas. If there were needs, it could have influenced researchers to initiate and identify problems in indigenous species.

Most of the scientists also think that these areas are not priorities. The reason for such assumption is that these most scientists were not trained for it. Thus, areas with inadequate number of professionals or that lack at all have no information. One can say there could only be dormant needs since there is no any awareness about research need.

On the other hand, the situation with the inadequate data can be reasoned by the user need assessment of researchers during information generation. Who are these users they are talking about? In majority of cases these are researchers at the same level who need base line data. Otherwise, it is not possible to talk about users since they are not identified. Most of the scientists carry out discussions at department level, others use personal contacts with extension agents and farmers, insignificant number of researchers use workshops, and seminars, the rest, few communications with regional offices, and exploit field tours. Why different methods? Because there is no any established researcher user linkage system. Do these formal and informal discussions represent the bulk of the forestry information user.

Does the forestry researcher know the forestry information user and his need? Is there lack of self-contentment that constitutes forestry information needs? Do these needs are needs

that disclose knowledge gaps in the situation of users (Cronin, 1980). Were the need priorities and clearly defined? Were users precisely and purposely identified? Not all scientists are aware of these and other questions.

Most scientists believe, as user-feed back is important to their research. Minorities ignore the significance of feed back due to lack of awareness. There were attempts to rationalise negligence, unawareness lack of feed back with absence of forum, experience, communication, and an established researcher-user system, which raised earlier. However, one thing is clear. The forestry research scientist of Ethiopia had no information on stakeholder requirement. The reason behind the is the inability to establish forestry system in a defined, precise and purposeful way. Methods such as peer appreciation, the demand for research results, citations or letters of requests from friends, do not tell about the bulk of the users, except limited circles.

4.3. ABSENCE OF RESEARCHER-USER LINKAGE MANAGEMENT.

Is it possible to argue that the forestry research carried out so far addressed national problems? Is it possible to answer, since most of the forestry research of the country are institutionalised and "*mandated*?" But, it is not safe to argue as the earlier mandates can properly answer for the ever-changing challenges of institutions. Can these mandates give the power of choice as change to the institutions, such as changes in technology, fund, human resource, and changes in natural factors?

Important questions such as who are and would be our potential users, or why all initiate and invest in such project was not concerns of forestry research managers and a research tradition.

End-user identification can not be done after research results. Identification of users and their needs together with communication has to be carried out prior to research project formulation. User requirement identification analysis is proper method that facilitates the success of a given forestry research. The success of a given research is not only its completion, but in its usefulness. The information becomes important and valuable only when it is usable to the beneficiaries (Atherton, 1977) Lack of identifying user need and user groups is a bottleneck in an attempt to solve the existing forestry information gap.

It is the belief of most distinguished scientists that there is knowledge gap in the Ethiopian forestry research and development information..

The absence of management that facilitates researcher user interactions to establish linkage, and to develop the institutional structure to meet changing needs and entrust responsibilities that empowers in building researcher user linkages (FAO, 1992) were not considered at all.

4.4. LIMITED CHENNEL AND LIMITED PUBLICATION.

Researchers were asked to estimate the number of users of forestry research information they generate. In a favourable situation 44 scientists estimated, as it does not exceed 50. Twenty-four answered 50-100 in the best conditions, and another 24, from 100-200. Beyond these figures it is rare to see 200-300 as according to six researchers. Only one scientist estimated users of his out put to be more than 500. The reason behind this is that all channels the researchers used are limited. These channels were not well established systems. Their materials are also very much limited in numbers. The efforts are also trapped with defeatism

and negligence. Although 75% of the researchers claim as they have published their outputs, the circulation is only to insignificant number of users.

Most of the publications (40%) are in the decade between 1988-1998, while the rest (27%) were between 1978-1988, and few (2%) are recent. Why most publications are in the period between 1989-1998? Because, there was research expansion, development of human physical and financial resource. Better attention was given to forestry during these years by the government.

The establishment of Wondo Genet Forestry Resource Institute (1978) to Wondo Genet College of Forestry (1989) can mark the first phase, when major developments in institutional and professional changes were seen.

4.5.ABSENCE OF RESEARCH REWARD AND ITS NEGATIVE IMPACTS ON INFORMATION GENERATION.

The absence of reward systems for researchers in cash or any other form, lack of seminar and workshop, special review and user assessment to monitor the strength of researcher - user linkage (Ruttan, 1987) were bottlenecks to reach out users. The participation of users in research design and implementation are fundamental considerations that were practised by the Ethiopian forestry research and development information generators.

The majority of respondents revealed as economic reward affects them negatively, while some denied its impact on their research undertakings. While dozens of the scientists have the opinion as it is a reason for low motivation, other groups suggested loss of interest, brain

drain to other organisations for better pay, and unwillingness, loss of brain productivity, and withdrawals from centre, the remaining have expressed their frustrations. These feelings and actions were seen in low research output, discontinuation of projects, carelessness in experiments, inadequate, unreliable, information. Thus, professionals need more education, better salaries, promotions, good facilities, and modern laboratory equipment to produce more and to generate usable data.

4.6. PROBLEMS OF INFORMATION GENERATING FACILITIES AND SERVICES

Computers and other facilities are not available. Researchers use computers whenever they get the chance, while some have no any access since their first employment. Most of the researchers started using computers since the end of the 80s and beginning of the 90s.More than half complained as their centres do not own their own, and about quarter told-out dated, disabled, and maintenance problems, considerable number ignored the question.

In number of centres and departments, there is computer and facility problem. In research centres, it is difficult to process data. To compute without input central-processing and output devices is a hurdle to the majority of scientists. Essential Software and reasonable memory capacity of computers statistical and modelling packages are very important.

In most of the institutions communication facilities are very much limited. There are telephone, fax, and E-mail problems. Except very few, the majority do not have Internet connectivity.

Lack of laboratories and lab equipment is fundamental bottlenecks to generate forestry information in Ethiopia. Many scientists complain about lack of soil and drying room, seed laboratories, Chematography, Atomic Absorption spectrophotometer, soil sample and nutrient content analysing apparatus, forest gene-bank facility, image analysis facility, forest Mensuration equipment and of essential chemicals that are needed to generate research information.

Scientists can not reach out for the research outputs of other scientists, since the library services that comprise documentation centres do not furnish them with any. Except few, most of the services do not have publishing divisions that compile, edit, and print. Document procurement services that provide microfilms, or microfiche. Reproduction is not known at all by most of the institutions. Journals, summaries, reports, and reviews are numbered. No abstracts and indexes that can locate information that could be published in the available journals. Except CD-ROM service that provide abstracts of articles and monographs published in Sweden, Denmark, Norway, England, France and in limited number in Italy (FAO) mostly in English, and partly in Swedish, French, Portuguese, and few in Arabic. These articles are research outputs of distinguished Ethiopian Forestry researchers, who are prominent and of good repute in Europe, but little known at home.

Most of the information in the libraries of the respective institutions has five years or more. The majority of the research centres are located very far from the centre, where there is no any communication facility, let alone internet service, E-mail, fax, or telephone facilities. Current research news, or any other means is limited to those who are in Addis Ababa. In the absence of a forestry research information central database management or

a resource sharing need facility, it is not possible to be safe from replication and duplication of forestry research.

Lack of technical, computing, communicating, skilled-man power, and fund constrain research results. Projects delayed or discontinued due to computing facilities and civil war problems were very few. The manual computing tradition is still persistent. Loss of records, lack of precision and accuracy, wastage of time and resource is the result of such data handling system. Forestry research project duration at times reaches twenty-five years. To achieve and examine the results it needs patience, tolerance and commitment, since it comes after years of toilsome labour. Each information, every grain of truth, fact and figure should have to be recorded, data must be updated, now and then, the experiment has to be carried out when ever necessary. Keen observation is very essential. Computing, communicating and resource is very important.

During a forestry research undertaking, priority is given to data gathering stage by the majority of researchers secondly to processing and then to analysis lastly to dissemination. Similarly it was also made clear as much money is needed during data collection by most scientists less for processing and insignificant amount to analysis and very little to dissemination. The priority to the stages and financial demand goes in harmony. However, it shows as little attention is given to processing and dissemination. The two research stages are highly related with information value, need, flow and use.

Information needs of researchers in one or the other way are related with other forestry or related area research outputs. Thus as far as there is resource sharing need facility, there is no need to invest much on data gathering. Normally there are two information gathering

ways in research such as forestry. These ways are survey method, that establish base-line, experimentation and monitoring that would be collected gradually, and show the difference from the base line. However, in the forestry research sector there is base line-data as the survey revealed. Most scientists prefer the field survey since they are curious about the available data due to inappropriate handling while others exploit base line due to financial and human resource, and facility problem, and some GIs and other facilities. The usage of the Geographic Information System (GIs), in integration with Information Analysis System (IAS), by exploiting a proper forestry database management system through a resource sharing need facility is more efficient and practical instead of resource wastage. It is in such computerised way alone, that it is possible to reduce cost of base line data search, processing, and analysis time and avoid dissemination bottle-necks.

In the forestry research sector, there are programmes and project oriented information problems. An organisation that gathers document and distribute forestry information is important to support a forestry project oriented institution that takes most of its time to collect information that solve particular problems (World Bank, 1992).

With respect to these needs, all scientists face problems. To collect factual data and test their hypothesis a field survey is essential, and the need to invest is inevitable. It is also difficult to get usable, adequate and valuable data to establish the problem, conclude, and recommend and for reference purposes. Since information flow is highly restricted earlier, research was not based on need and user identification.

Finally, the Ethiopian forestry information user groups could be said input-output processors. Majorities of researchers have explained as they get most of their information

from the professionals at the same level, and the rest formally from their departments. Considerable number of researchers have their opinion, as the users of their out put are other researchers and forestry students, significant number of researchers have a conviction, as their users are higher learning institutions and others think as their data is used by managers, policy makers, and planners, similarly number of researchers assume as their research out put is used by different organisations and communities.

4.7. ETHIOPIAN FORESTRY RESEARCH AND DEVELOPMENT INFORMATION USER NEED.

The forestry information need pattern of the society, as seen from the survey, is characterised mainly by planning forestry and other projects, formulating polices, making management decisions and particularly running day to day activities that cover range of areas. The need specification that is categorised under the second wider area embraces setting up research priorities. Forestry information needs that are classified under the drawing of specification, design, test, adjust and schedule, process, and know material requirements for production or plantation fall under the third category, that help to decide whether to continue or stop projects.

The last insignificant specification is the need to identify source of finance, mobilise funds or budgeting. The reason for this last pattern significance is due to lack of any cost benefit analysis data in the sector. Thus these need specification pattern embraces wider range of forestry information user.

The source for forestry information user is mainly the library or documentation and the second largest sources are books on forestry, and the third source is previous research that could be accessed in one's own area, superiors, and information that is obtainable through formal request of one's own office, and an insignificant source is found out to be organisational network, while subscription is insignificant.

Only 25 researcher are able to reach out for information that is assumed recent in comparison to information of a decade.

Today the global villagization is building success after success, the information society is expanding the information technology with incredible pace. Scientific research is getting momentum. As a scientist one has obligations to know, what is happening around the world, his environment, and his area of engagement unless the danger is intolerable, costly and painful. Thus, information access is very important.

On the other hand, the survey has revealed that the forestry information user need is highly dependent on work environment, followed by user activity. Some 15 percent user need is changing from time to time, while another 15 percent believed as the need is based on reading material. Since usual user information need is practical in most of the cases, it is safe to conclude, as it is based on activity and environment which becomes very high when compared with other varying needs.

The forestry information is assessed by the user as relevant but inadequate. The relevant but inadequate forestry information that is provided by the information service of the user organisation is highly related to user mission. Since user need is to identify a problem and

test hypothesis, part of the information is important to answer these needs although 75 percent of it is obsolete.

When a user tries to get this information it is proved as privileged groups deny him from access. However, the majority of users do not know these privileged groups except 27 percent of users accuse Managers and planners, while 11 percent, the gatekeepers or information specialists.

Almost all users do not have satisfaction with computing and communication in their area, and none judged that the Ethiopian users believe that ongoing information generation of forestry research is inadequate, and unsatisfactory. On the question of language preference, since the information is scientific, 66 percent of respondents preferred English while 34 % Amharic.

As it made clear during the survey that, the decentralisation of research in respect to the Federal Regional Administrations has created a problem from huge data to some extent. Since Amharic is state language data gathered from vast regional governments such as Oromia were not used to formulate policies, regulations, decisions or for statistical purposes in Amharic. Currently the Advisory project that is supported by GTZ under the Natural Resources Management and Regulatory Department suffers from adequate, available, reliable, and timely data, but unusable, since translation is difficult.

4.8.THE ETHIOPIAN FORESTRY INFORMATION USER GROUP.

The categorisation of the user group of a given information services is of problematic as compared to definition. Users can be classified as users of a given information service for

a defined time (actual), as would be users (potential), as privileged group (expected) and as gainers (beneficiary) in Organisational context (Pao, 1989). Others classify them as Researchers, Practitioners, and Technicians, Managers, Planners, and decision makers in relation to scientific and technical information services (Atherton, 1977).

The earlier classification is limited in scope science it excludes some, namely students, and lecturers. Other scholars identify users with two criteria in respect to objectives, i.e., in context to socio-professional and socio-psychological criteria. The criterion defines professional status, area of activity, purpose of using the service and user behaviour in respect to the information environment. Thus user groups such as students are in the first category, managers, researchers, development workers, producers, service givers, those who are engaged in civil service, agriculture, and industry in respect to education, status, profession in the second category and, those who need information for social purposes as third (Guichat and Menou, 1983).

The user identification in this study has used a triangulation method since a single approach does not help to include all user groups. Triangulation helps to improve measurement (Neuman, 1994).

Thus, the Ethiopian forestry Information *USERS* are identified as follows. (However, each forestry research and development Strategic, program, and annual planning must do stakeholder requirement analysis).

1.Governmental Institutions

All administrative regions- regional, zonal,and woreda bureau of agriculture.

2.Governmental organisations

A.Environmental protection authority

B.Wild life organisation.

C.Ethiopian Electric Light Power and Authority

D.Ministry of Post and Telecommunications

E.House construction and Urban dwellers organisation

F.Ministry of Tea and Tobacco

1.Investors in development exports and import of forest and wild life production,

2.Factories,

3.Industries (Forest industries) sawmills, and joiners,

4.Vocational training colleges,

5.Higher learning Institutions (Education, Research and extension),

6.Forest Research Organisations,

7.Non Government Organisations-who are engaged in conservation. Afforestation, Reforestation Agroforestry, Non timber forest production, utilisation, Full wood etc,

8.Rural communities Farmers (food, feed, wood, non wood products, spice, medicinal herbs, incense)

9.Urban communities-all city dwellers (food, construction, furniture, nonwood products, fuel wood, spices, medicinal herbs, gums incense, ornaments, recreational parks…)

Thus the Ethiopian forestry information users are actual, potential, expected and beneficiary, or the researchers, practitioners, managers planers and decision makers of these establishments, or those engaged in development, civil service, agriculture, industry (Pao, 1989, Atherton, 1977: Guichat and Menou, 1983, Devadson and Lingum, 1990)

CHAPTER FIVE

5.CONCLUSION, AND RECOMMENDATIONS

5.1.CONCLUSION

The Ethiopian Forestry Research and Development information user study has been carried out with the limited time, finance and facility. The survey has identified organisation and institutions with their forestry activities Their human, financial, scientific and technical facilities, their production and need, services they provide, the needs they exist to fill, and extent of their choice to change were examined. The statues, number training and behaviour of scientists with respect to forestry information users were studied.

Secondly, the sources of forestry information, the pattern of flow and access, the extent of information technology application are assessed. Thirdly, different forestry information user groups were identified. The needs of important stakeholders investigated. Users are also treated as input-output processors.

Forestry research and development are discussed from historical, institutional, scientific, economic and educational views with respect to importance of information and technology importance is discussed. The Ethiopian forestry research and development information is in a trap. For its smooth flow reorganisation of the system on the basis of stakeholders need identification and national priority is essential. The Ethiopian forestry information system must be designed and reviewed with respect to structural, stakeholder or national need, resource capacity of the country.

Structural - The forestry research and development is retarded due to forestry research structure. Officially it is not structured into basic forestry research that provides forestry information and knowledge of the country for application, applied forestry research that helps in solving particular forestry problems, adaptive forestry research that for particular forestry situations of the country, and strategic forestry research which is beneficial to solve, and identify research priorities of the country.

Stakeholder or national need - Lack of self-contentment constitutes the forestry information needs, that disclose the gap, in situation of users (Cronin, 1980). Forestry information gap analysis helps in identification of stakeholder. In the absence of user need analysis, national demand or priority of the sector was not defined.

Although not often true, some forestry research are said to be mandate or mission oriented. Since they are very narrow in scope, myopic in objective and uncertain in gaols so they end up in wastage of time and scarce resources.

Since the need of the key stakeholders is the national need that has to be priority area, without the participation of these important user groups in the strategic programming and annual planning of the various forestry research, there would not be a successful research output. That is why we see confusions, and insignificant achievements and very wide information gap between researchers and users.

Resource capacity - the resource capacity of the nation is very much limited. The Ethiopian forestry research and development investment is not different to the nature of forestry investment of the developing countries which accounts only 12 % of the world (Mergen et al, 1988)

The Ethiopian forestry research and development is very insignificant compared to other sectors of agriculture the family of the poor nations of her type she gets very small bilateral or multilateral fund for the forestry sector. Most of the research and development activities are done by the meagre allocation from the regular public budget and intermittent funds that can not solve at all the rampant and persistent forestry problems of the nation.

Thus, there is very little investment in forestry education and training of professionals in area of chronic problems.

Lack of appropriate infrastructure, enough and modern scientific equipment, information technology facilities, the absence of reward and benefits had constrained to establish a forestry research and development system that works in the priority area of the nation to and generate valuable, usable, timely and accessible forestry information to its user groups.

Further, there was a lack of strong research management for a long time. A working forestry research and development information management that agrees to the needs of the most important stakeholders is a solution to the existing national forestry problems in particular and to the economic development in general.

Scientists need forestry information in their particular areas. Figures, methods, models and designs, are necessary to know what has been done in their research areas. Most of their needs are of current awareness, day to day activity (operational) and of problem identification. Most of the existing information services are not able to provide sources on such needs. Thus, the forestry

information services have to undertake requirement analysis that would be beneficial to a particular forestry research project planning in order to meet user needs.

Finally, the material acquisition policy of forestry information services must be clearly defined, to establish an appropriate purchasing and producing that agrees to user needs. Sources of materials, and services such as books, bibliographies, indices, abstracts, documents, research reports, and periodicals or journals that provide immediate forestry research and development results must be facilitated.

5.2.RECOMMENDATIONS

The Ethiopian forestry information system had the roots of its problems in the lack/inadequacy of major resources as well as in the weakness related to planning, implementation and management of forestry research and development efforts. Efforts within the last thirty years were significant but uncoordinated and confined to limited areas. To strengthen and co-ordinate forestry research, more than ever, the rights and duties of forestry research as a whole have been transferred to the Ethiopian Agricultural Research Organisation established under proclamation No.79/1997 in June 1997 (Federal Negarit, 1997).

In order to meet challenges of its new responsibilities and to benefit from the current development of information technology, EARO has developed Information Technology Strategy and Medium-Term plan (Abdul-Hadi et al., 1999). The strategy proposed radical change in the information technology and resource development within four years (1999-2003). It is a rigorous and very wide strategic plan containing different recommendations. The recommendation is partly based on the interview that the working team responsible for preparing the strategy

document carried out with different officials and researchers in EARO and Managers/Heads of some Research Centers. From forestry research, only the Head of Forestry Research Center was interviewed.

Almost all of the individuals interviewed belong to other sectors of agricultural research and training. Clearly, the strategy development lacks requirement analysis of stakeholders in the field of forestry. Information on Ethiopian forestry research and development has its own stakeholders and needs that have to be due attention in the design and development of a national forestry information system.

Therefore, based on the results obtained from the present study, the following recommendations are forwarded with respect to the existing situation and current structure of information on forestry research and development.

52.1. Identification of information needs of stakeholders

The success (acceptance and reputation) of any research or development organisation is measured by the satisfaction of stakeholders/end-users with the information generated by the organisation. Therefore, the primary tasks of research or development organisations must be to identify the actual and potential stakeholders/end-users and to carry out analysis on their information/technology requirements.

5.2.2. Development of Strategy and plans for forestry research

To address the challenging problems facing the forestry sector in the country, there is an urgent need to develop strategy for forestry research with the active participation of all stakeholders.

The development of such a strategy should be based on:

- the review of past and present research activities and achievements;
- analysis of gaps, issues or constraints related to forestry research and development;
- identification of strategies that can help to bridge the gaps and resolve the issues or constraints;
- identification and prioritisation of the most appropriate research programmes and sub-programmes as well as research activities;
- identification of the anticipated outputs from the research activities and the envisaged beneficiaries. A well thought and appropriately developed strategy could ultimately provide the necessary information/technologies that would help to tackle the problems at hand. In this regard, the commendable on-going effort of EARO to develop the strategy for forestry research (EARO, 1998) has to be encouraged and supported.

Once the strategy that clearly sets out the direction of forestry research is developed, the next step is to design realistic short-, medium- and long-term plans. If the designed plans are to be implemented effectively and efficiently, the participation of beneficiaries/stakeholders in the planning process is of utmost importance. In addition, researchers must understand their mission, goal and objectives of their research, and these have to be clearly defined in the planning process of the research. The research activities, the envisaged achievements and target beneficiaries from the outputs of the research should have to be clear and precise to the researchers.

5.2.3. Capacity Building

Any organization involved in the management of information is responsible to undertake a chain of activities, i.e. collection, storage, retrieving, processing, generation, compilation, publication

and dissemination of information. All these activities require enough and qualified personnel and appropriate facilities. However, most of the organizations that generate information related to forestry have critical shortage of qualified personnel and poor facilities. Therefore, there is a great need to improve the capacity of organizations that generate information in the field of forestry, both in terms of adequate number of qualified personnel and appropriate facilities.

5.2.4. Establishment of Center for Forestry Information Management (Analysis)

To bridge the gaps in information management related to forestry research and development, it is recommended that a center responsible for forestry information management be established. The center shall:

- be organized under EARO
- be run by group of professionals (i.e. information scientists, information analysts, information need identifiers (INI), computer scientists, computer programmers and technologists, statisticians, biometricians, etc.).
- collect, analyze and evaluate all available information/data in the field of forestry.
- undertake preparation of selected valuable documents, condensing, abstracting, indexing extracting, etc. to generate and facilitate techniques that can help to locate materials easily and rapidly for services to stakeholders/end-users.
- Prepare and provide information required for planning, logistics, human and financial resources management and experimental designs.
- have a unit which handles all types of data and statistics on forestry research and disseminates the outputs.
- Provide forestry computing services.

5.2.4.1.Computing Services- must be established at all forestry research centers, Since the majority of researchers lack access and skill to compute, it is a problem to realize a successful research out put. In addition computing will save time, money labor, and it helps in precision, accuracy, accessibility and retrieval.

1. Processing, graphics, desktop publishing, and using different software appropriate to the need must be give as training through the computing services with facilities to all researchers.

2. Management Information system is very important to facilitate ledgers, accounts, inventory, purchasing, and other requirements. The use of integrated management information system is important to facilitate research management with vital information.

A microcomputer-based program budgeting system (PBS) that is developed in respect to the forestry research organization structure, the PBS user need, and project cycle is very important (Goldsworthy, 1987)

The microcomputer based program budgeting system developed by the International service for national Agricultural Research (ISNAR) can be customized by the forestry research organizations (Marcoth, 1987).

3.There should be all materials that facilitate Designing Space - Time models of solar radiation, wind, rainfall and temperature etc. Which are books, climatic and rainfall data, station coordinates, models, and analysis of topographies. Statisticians and statistical packages are very important. The necessity of statistics in particular to forestry research is unquestionable (Berg, 1980)

Biometrics is equally important with statistics. Design experiments, Statistical Genetic sample surveys, modeling spatial statistics must be facilitated.

Geographical Information systems, Remote Sensing and Information Analysis systems must be installed with out delay and technicians have to be trained.

5.2.5.Information Generators -Users Communication

The Ethiopian forestry Research and Development information would be successful if and only if scientist - user linkage is properly designed and effected.

Forestry information users should have to be provided with their needs, and scientists must get a feed back from their users.

Thus the Ethiopian Forestry Management should have to facilitate a researcher-user linkage .Lack of interaction between forestry research scientists and forestry information users had been persistent and fundamental problem (Temu,1987)

- Users must participate in the forestry research and development planning.
- Users feed- back helps to customize technologies to local traditions.
- Users feed back enhances and builds research capacity.

Channels of communication with forestry Information user communication to be improved.

1. The Forestry research and Development information has to use the mass media (Newspapers, Radio and TV), Seminars, Research - User forums, Conferences, demonstration, publications, Workshops etc,

2.Information flow must be safe, uninterrupted and permanent. Information must flow from scientist to extension workers, who have direct contact with the end user (top-down), and, the information of the end user to the scientist (bottom-up),

3.Information exchange between forestry researchers and forestry researchers and forestry and development organizations must be built internally and externally,

4.Further the choice of change or challenge in terms of establishing a forestry researcher user relation must be managed and prepared to strengthen interaction and link,

5.A unit that can be entrusted with researcher user communication management is essential (FAO, 1992),

5.2.6.Necessity Of Resource Sharing Need Facility.

Inorder to facilitate the forestry research and development information generation and user access:

- All decentralized personal computers of individual researchers must be integrated with each forestry research center local area network (LAN).
- All forestry research and development local area networks should have connectivity to the Umbrella Organization (EARO) would be Wide Area Net Work (WAN) according to the architectural design of the Information Technology Strategy and Medium-Term Plan of EARO (Abdul-Hadi et al, 1999:35).
- Not only the networks of the forestry research and development centers, but also other organizations and projects which can benefit forestry researchers and from forestry research, must collaborate to be integrated to the proposed Wide Area Network of EARO, such as WBISPP, Fuelwood Project, Biodiversity Conservation and Research Institute (BDCRI), WUARC, Natural Resources Management and Regulatory Department (NRM & RD), The

National Herbarium and Flora Project, (AAU), The Ethiopian Heritage Trust, The Ethiopian Wild Life and Natural History Society, Wondo Genet College of Forestry, Alemaya University of Agriculture (AUA), etc., inorder to form a national forestry research and development net work.

- Further integration of the WAN of EARO to establish a research system network coordination with the National computer and Information Center of the Ethiopian Science and Technology Commission, the Pan African Development Information System (PADIS) and with the would be Wide Area Network of the Ministry of Agriculture is essential.

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APPENDIX1(List of interviewed staff)

Dr. Demil Teketay	-	Director, Forestry Research (Senior Scientist).
Ato Deribe Gurmu	-	Head, Forestry Research Centre.
Ato Abebe Kirub	-	Head, Information Service (EARO).
W/t Surya Abdulwhid	-	Librarian (WBISPP).
W/t Tirsit Wuhib	-	Documentalist (MOA).
Ato Ahmed Bedri	-	Librarian (FRC).
Ato Taddesse Wedneh	-	Documentalist(IDR).

APPENDIX2(Questionnaires)

SCHOOL OF INFORMATION STUDIES
FOR AFRICA (SISA)
M.Sc.I.S. DEGREE PROGRAM

N.B. This questionnaire is designed to top, middle level management or other officials of the organisation, institution or research project.

This is a questionnaire on The Ethiopian Forestry Information USERS. The aim of the questionnaire is to know about the Ethiopian Forestry, Information Environment. The result provides useful information to the would be National Forestry Information System Design, strategy and research that contribute to the economic development.

1. Name of Institution/Organisation

2. Year of Establishment

3. Address - Telephone

P.O. Box

E-Mail

Fax

Location

(Please attach if you have a Brochure or chart)

4. Objectives 1. _____

2. _____

3. _____

4. _____

5. Aims and Functions of the Organisation:

1._____

2._____

3._____

6. Forestry Research or other projects under taken (please indicate the time)

1._____) 19___ 19____)

2._____) 19___ 19____)

3._____) 19___ 19____)

4._____) 19___ 19____)

(Please attach the forestry research/project lists and other information if you are unable to write it here).

7. What are the publications of the Organisation (Mark in the box)

Books_____Technical_____ Periodicals____Research_____

Papers_____Others

(specify)_____

8. Is there a Forestry Information/Documentation Centre? __Yes__No.

8.1.If yes, what is the nature of the collection on forestry subjects that are covered?

8.2. If No.! Is there any collection on forestry at your centre? ___Yes ____No.

8.3. If Yes! What percent? ____%

8.4. Is the forestry collection current? ____Yes _____No.

9. The total number of volumes_____

9.1. Number of current periodicals on forestry received_____

9.2. What special forestry materials are available in the centre? (mark)_____

(a) Research Reports_____ (d) Indexes _____

(b) Technical Reports____ (e) Abstracts_____

(c) Translated periodicals____(f) Foreign Publication. ____

(g) Another_____

10. What type of forestry information services is being offered by the Organisation? (You can indicate one or more).

___ Reference service___Referral Service___Consultancy Services.

___ Data Service ___ Selective Dissemination of information (SDI) ___ Literature searches.

___ Current Awareness Service ___ Technical Enquiry Service___

Other services.

11. Does the Organisation market forestry Information? How? Please explain briefly.

_____

12. Who is the forestry information USERS of the Organisation? If users are more than one indicate the percentage in the line.

(a) The Actual group that uses the information services only for a given time____%

(b) The Potential group that would use the information services for the future____%

(c) The Expected group that has the privilege of using the information services and intention of using it _____%

(d) The beneficiary group that gain advantages from the Information Services _____%

13. Why? (Please write a short answer)._____

14. Is there an information Net work or a database? _____ Yes____No.

15. What type of Network? (Please specify)___LAN___WAN___INTRANET

___ETHERNET___INTERNET.

16. Which of the following Information Technology components are available at the centre (Mark in the available component)

____ Microelectronics _____optical electronics

____ Computers _____Electronic office equipment

____ Telephones _____Computer controlled

____ Computer mediated services _____Software

____ Computer input, output, and storage devices. ____ Control Systems.

17. What functions are exercised at the centre?

___ Recording of Information

____Communication/dissemination

___ Collection of information

___ Processing of Information

___Interpretation of information

18. Please list the type and quantity of computers and other machines at the centre (You can attach the list if unable to write)

1. _____3_____5_____

2. _____4_____6_____

19. Any other information (please write in the space below)

* We respect and appreciate your co-operation.

THANK YOU!

SCHOOL OF INFORMATION STUDIES
FOR AFRICA (SISA)
M.Sc.I.S. DEGREE PROGRAM

N.B. The questionnaire has to be filled by the chief documentalist or librarian and other people working in the information centre.

This is a questionnaire on The Ethiopian Forestry Information USERS. The aim of the questionnaire is to know about the Ethiopian Forestry Information Environment. The result would provide useful information to the would be National Forestry Information System Design, strategy and research that contribute to the economic development.

Name of your Organisation/Institution

1. Your educational qualification

2. Any other special training

3. Experience

4. Your position in the Organisation

5. The nature of your job _____

6. What are the major objectives of your Organisation?

a. _____ b._____ c.

d. _____ e._____ _____

7. How the Organisation is structured? (Departments)

a b c d e

(Please attach if you have organisational chart or brochure).

8.With which Organisation/Institutions you have contacts for information?

a._____ b._____ c.

d._____ e._____ f.

9. What type of forestry information your Organisation usually need?

a._____ b._____ c.

d._____ e._____ f.

10. What are the major sources of information to your Organisation?

a) Internal sources b) External sources

(a.1) Survey (b.1) Personal

(a.2) Research (b.2.) Institutional

(a.3) Marketing (b.3) Documents

(a.4) Database

11. How your Organisation obtain these information/data (what major channels do you use? E.g. network, publications reports, phone talk,

E-mail,) please state here_____

12. Do you often get current/recent information/data?

a) Information that has a year____ b) More than a year ___

c) Six month____ d) Month ____ e) days____

13. How do you rate the information?

a) Available, adequate but not costly

b) Available and adequate but not reliable

c) Not available, adequate and reliable

14. For how long do you engage daily in forestry information related activities.

a) Solid day b) 2-8 hours c) 4 hours d) less than 4 hours

15. What information do you generate? (E.g. data report, journal article...) please state here

_____

16. How do you disseminate your results? (Reports, workshops, etc.)

_____

17. The information/documentation/centre in your Organisation/ as minimum number of users.

a) 500 b) 100 c) <1000 d)_____ (please write)

18. Have you got an Information technology facilities in your Organisation a) yes-- b) No.____

19. If yes

a) How many computers

b) What type of computer

c) Type of server and number

d) Type and number of printers

e) Other storage facilities

f) Scanners

g) Any other facilities

20. What type of net work you have installed?

21. Are the user terminals adequate and effective?

22. What is the estimate of total volumes of

Books?_____Videocassette? _____ Manuals? _____

Magazines?_____ Abstracts?

Diskettes?_____ Microfilms?_____ Journals?

Cartridge tapes?_____ CD-ROM?

23. What percentage of your collection is in forestry and related areas? (Please write it in percent).

24. What percentage of your collection is current? (Of two years)____

25. Which forestry area has the greater share of your collection? ___ _____ What present?

26. Which forestry area of your current collection has the greater share?_____

27. Which forestry area of your collection has the smallest share? What percent

28. How do you acquire materials?

a) By purchasing_____ b) Gift or donations _____

c) Subscription_____ d) Exchange or loan _____

29. Do you produce most of your own collections? ___ Yes____No.

What present of your data/information (is your own)_____%

30. Are the materials you are subscribing?

a) International_____ b) National____

c) Regional_____ d) International, National & Regional e)National&

Regional_____ f) International and Regional

31. The educational level of manpower in your information centre is

_____ % Less than high school

_____ % High School graduate

_____ % Certificate in library education

_____ % Diploma in library

_____ % College graduate

_____ % MSc. and PhD.

32. How often do you answer Internal and External forestry information user need:

_____ Less than 50% of the time

_____ 50-75% of the time

_____ More than 75% the time

_____ Not at all

33. In what form you supply information to your users?

a) Data base_____ b) publications_____
c) Books_____ d) Proceedings and Reports_____

e) Abstracts_____ f) New letters_____

g) Microfilms___ h) Reviews_____

Any other comment_____

THANK YOU!

SCHOOL OF INFORMATION STUDIES

FOR AFRICA (SISA)

M.Sc.I.S. DEGREE PROGRAM

N.B. The questionnaire has to be attempted by directors, managers, and researchers in research organisations and institutions.

This is a questionnaire on The Ethiopian Forestry Information USERS .The result would help to strengthen/co-ordinate the National Forestry Information System Design, which in turn will play an important role in research as well as in development, sustainable utilisation and conservation of forest resources in the country. Ultimately, it would contribute to the economic development of the country. Therefore, you kind co-operation by filling this questionnaire is crucial in this regard.

1. Name of Research Organisation
2. Year of Establishment
3. Address - Telephone

   P.O. Box

   E-Mail

   Fax

   Location

   Branches

(Please attach if you have a brochure or organisational chart. If you are a director or a manager).

4. Your educational qualification
5. Any other special training_
6. Experience_
7. Your status in the Organisation

8. Major objectives of your research/project

a. _____ b.

c. _____ d.

e. _____ f.

9. In which area of research/projects you are engaged?

(Mark one or more of your answer/s)

In Silvicultural

b. In Farm Forestry

c. In Forest Management

d. Forest economics and policy_____

e. Forest protection

f. Forest Ecology

g. Forest Soils

h. Seed (Research)

i. Forest product utilisation

j. Others (please specify)

10. a. How long is the duration of your research project(s)?

_b. How many of your research projects are completed?

11. a. How many of your research projects are on going?

b. How many of your research projects are discontinued (If any)?

12. Have you succeeded in completing your research projects before the proposed duration? Please include the reasons_____

Have you been delayed in completing your research project at the proposed duration?_____Yes _____ No.

If yes, why?_____

13. Is the fund provided for your project adequate?

_____ Yes _____ No.

14. If yes, do you think that the data you have collected is sufficient since the project is large?

Yes ____ No,

15. If no, since the research is small and limited, do you think it is impossible to collect adequate data?___ Yes ___ No.

16. The reason for collecting insignificant data is

a. Redundancy in trials within the subjects

b. Unmanageable number of trials within the subject

c. Complexity of trials in number and status

d. The amount of fund allocated to the project

e. Lack/shortage of technical supportive staff.

f. Distance of trial sites.

g. Damage by different agents (natural, human e.g. negative attitude of people to research activities, animals, etc.)

h. Lack of motivation of the researchers.

i. Lack shortage of transport facilities.

j. Lack/shortage of equipment etc.

k. Level of qualification of the researchers.

l. Others (specify please)

17. Do you get technical and scientific facilities to your research/project? ___ Yes___No.

18. What are these scientific and technical facilities that you do not get? (Please enumerate if any)

19. Is there an adequate transport and telephone facility in your project area? __ Yes ___ No.

20. If yes, which facility has to develop in respect to your need?

a. Both transport and telephone

b. Transport only

c. Telephone only

21. Since you joined the particular department, Research project, to which sector this institution or organisation gave priority?

a. To Silvicultural Research

b. To Farm Forestry Research

c. To Forest Management and Economics

d. Forest Economics and policy

e. Forest Protection

f. Forest Ecology

g. Forest Soils

h. Seed (Research)

i. Forest Product Utilisation

j. Others (please specify)

22. In the given situation as forestry professional which area do you think must be given high consideration? (You can show the priorities by giving numbers from one to seven).

a. To trees of economic value

b. To the forest ecosystem

c. To regeneration

d. To plantation

e. To reserve inventory

f. To conservation

g. To rehabilitation

23. Do you feel, as there is a knowledge gap between the different sectors of forestry research? ___ Yes ___ No.

24. If yes, Why_____

25. If No, Do you get all necessary information or data that are needed during your research undertaking?__ Yes___No,

26. What would you suggest for an effective, efficient, forestry research and management planning?

a. Developing a central data bank with access to all forestry sectors

b. Developing a national information network that facilitates informationresource sharing

c. to remain with stand alone attitude in each sector with out information exchange publications of each sector

27. In which area do you think data is inadequate? (You can mark upon one or more by giving priority of inadequacy e.g.1,3,6..)

a. On the forest reserves

b. On climatic species/matching & identification

c. On indigenous species

d. On indigenous seeds

e. On fuel wood

f. On sociological area

g. On past forestry research

28. Whenever need arises, how are you obtaining data on different Geographical locations?

a. By Geographical Information system facility (GIs).

b. Using a field survey

c. From previous data in your data bank

29. Have you ever assessed user need to the information you generate? _____ Yes _____ No.

30. Roughly to how many users of your data you have supplied information? (Mark the answer in the space)

a) 10-20---- b) 20-30---- c) 30-50--- d) 50-100---

e) 100-200----f) 200-300---- g) 300-400----

h) 400-500--- i) more than 500-----

31. Who were these groups?

a) Researchers_____ c) Forestry students_____ b) Managers/planers_____

d) Organisations_____ e) Universities & Schools_____

32. What type of information/data is often asked?

a. Silviculture____ c. Forest management & economics

b. Farm Forestry____ d. Organisations

e. Contract research_____f. Forest product utilisation_____

g. Of other aspects such as

33. The information you provide were

a. reliable

b. timely

c. adequate

d. reliable, timely & adequate

e. only available

34. In which stage of your research do you need more money?

a. during data collection

b. during data analysis

c. during processing

d. during dissemination

35. Do you think that you have enough information in your sector but the disseminating bottlenecks? ___ Yes___ No.

36. To which area do you give priority? (Interms of time and finance)

a. Data gathering

b. Data processing

c. Data analysis

d. Data dissemination

(Please indicates the bottle necks/problems).

37. Which type of data generation from your experience attracts adequate funding from donors?

a. Natural Resource information_____ b. Natural Resource rehabilitation information_____

c. Reserve Forest survey information____ d. Reforestation information

e. Deforestation information_____ f. Development oriented forestry projects_____

38. Please state if any not mentioned in Question 40._____

39. For what purpose do you generate information? (Please write briefly)_____

40. The research or project you have done or doing was/is initiated because of:

a. Your research interest in the area_ b. the fund that already allocated for other research in the area by donors

c. Its being included as one of the area in the programme d. sudden call of attention form other researchers e. its being driven by donor pressure_____f.its being demand driver national problem

41. Do you often address national problems in your research?

___Yes ___No.

42. If yes, such as_____

43. Do you say the information you generate answer the changing needs of new forestry challenges?_____ Yes ____ No.

44. If yes, what are these new forestry challenges? (Please write briefly)

45. Do you use computers to your research or any related activities?_____ Yes ____ No.

If yes since when 19

If no why (please write the answer briefly)

46. What are the methods that you use to identify your research problems?

47. Have you ever discussed the potential research problems with adequate/end-users?

If yes, how

If no, why not?

48. Have you ever checked, in any way, if the research problems you have identified and already been researched on? If yes, how

49. Do you receive feedback from users of your research results? if yes, how and what type of feedback? if no, why not?____

50. How do you disseminate findings/results from your research activities?

51. How you published your results

. by compiling annual reports

. by publishing them in national periodicals (Bulletins, Magazines, Journals, proceedings, etc.)

. by publishing them in international periodicals._____

. never reported them (why?)

52. How many articles have you published?

53. When did you publish most of them_____ (Forestry)

54. How do you rate forestry information of Ethiopia?

a. Excellent

b. Poor

c. Good

d. Very Good

55. If you have any other suggestion regarding forestry Information system Ethiopia

We appreciate your help!

DECLARATION

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

TEFERA BELACHEW METAFERIA

MAY, 1999.

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

18/05/99

Demel Teketay (Dr.)

April, 1999

Sisay Fissaha (Ato)

April, 1999

የአዲስ አበባ ዩኒቨርሲቲ
አዲስ አበባ ፣ ኢትዮጵያ

ADDIS ABABA UNIVERSITY
Addis Ababa,ETHIOPIA

SCHOOL OF INFORMATION STUDIES FOR AFRICA (SISA)

ቀን Date 15 June 1999

ቁጥር Ref.No. SISA/148/91

To: Professor Theodros Solomon
Dean, School of Graduate Studies

From: Getachew Birru
Dean, SISA

Subject: **Students Recommended for Graduation**

Eleven students in this year's graduating class defended their theses before examination committees at SISA from 31 May to 5 June 1999.

In its meeting of 15 June 1999, the SISA Graduate Commission reviewed the overall performance of the candidates. Of the eleven theses, ten were accepted as presented, with grades ranging from 'Good' to 'Excellent'. However, the other thesis – that of Ebrahim Kassa – was subjected to some changes suggested by the External Examiner.

The overall results of the candidates and the FGC's recommendation on their graduation are as follows:

Name	CGPA	Thesis Grade	FGC Action on Student's Graduation
Abebe Ejigu	3.36	Very Good	Recommended
Asmamaw Atnafu	3.50	Excellent	Recommended
Dereje Teferi	3.59	Excellent	Recommended
Engida Hailye	3.68	Very Good	Recommended
Kibruyisfa Debebe	3.27	Good	Recommended
Libsneh Redda	3.45	Good	Recommended
Mesfin G/Michael	3.91	Excellent	Recommended
Tefera Belachew	3.14	Good	Recommended
Wondimeneh Mammo	3.45	Good	Recommended
Zewdie Gudeta	3.73	Good	Recommended
Ebrahim Kassa	3.45	Satisfactory, with suggested changes	Recommendation, pending

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