

THE UGANDA AGRICULTURAL INFORMATION SYSTEM:
A STUDY OF THE NATIONAL AGRICULTURAL DOCUMENTATION
AND INFORMATION CENTRE (NADIC) KAWANDA RESEARCH STATION.

BY

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A dissertation submitted to Makerere University, Kampala
in partial fulfilment of the requirements for the Degree
of Bachelor of Library and Information Science.

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August, 1992

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(i)

DEDICATION

TO MY MUM AND DAD.

ABSTRACT

This study was conducted at the National Agricultural Investigation and Information Centre (NAIIC) as a research project. The background, objectives, activities, services, problems, achievements and established future strategies of a leading Agricultural Information Centre in Uganda and a National Agricultural Information Centre for Africa and Asia. All these were researched about with the major view of establishing the situation of Uganda's Agricultural Information System and to suggest recommendations for future improvement as well as to assess whether capability in information gathering and dissemination which will enhance future agricultural development.

The above objectives were investigated through literature survey of both published and unpublished work and through interviews.

DECLARATION

This work has not been accepted in substance for any degree, nor is it being currently submitted in candidature for any degree other than Bachelor of Library and Information Science of Makerere University, Kampala.

Kindyomunda

(iii)

ABSTRACT

This study was conducted at the National Agricultural Documentation and Information Centre (NADIC) to establish its background, objectives, activities, services, problems, achievements and established future strategies as a leading Agricultural Information Centre in Uganda and a National Coordinating Centre for AGRIS and CARIS. All these were researched about with the major view of establishing the situation of Uganda's Agricultural Information System and to suggest recommendations for future improvement so as to attain greater capability in information gathering and dissemination which will enhance further agricultural development.

The above objectives were investigated through literature survey of both published and unpublished texts and through interviews.

The findings show that NADIC, which was established to control the flow of agricultural information by coordinating all the information centres, has embarked on all the activities required of it and can even boast of some achievements. However, it has been met with a number of short-comings which, if not checked, might paralyse the prevailing progress. Some few solutions have been offered by FAO and more is expected from the Government and National Agricultural Research Organization (NARO).

The dissertation is concluded with recommendations which further suggest means of not only strengthening NADIC but also establishing an effective National Agricultural Information System (NAIS)

(iv)

STATEMENT OF ORIGINALITY

The conception, research, organization and writing of this dissertation are entirely that of the candidate KINDYOMUNDA ROSEMARY.

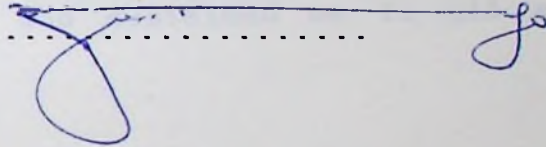
It has been carried out at the East African School of Librarianship under the supervision of MR. KIGONGO-BUKENYA IMN. MLS (LU) M.LIB(UW). All quotations are distinguished and identified by references.

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ACKNOWLEDGEMENTS

I wish to convey my heartfelt gratitude to some distinguished people who contributed a lot to the compilation of this dissertation.

Firstly, I thank my supervisor Mr. Kigongo-Bukenya for his undivided patience in directing, correcting and advising me.

I wish to thank Mr. Mugasha, the University Librarian and the Staff at Kawanda Research Station Documentation Centre in particular Mrs. Lwanga Ester, the Head of NADIC; the documentalist Mrs. J. Adupa; and the Librarians Mr. Asedri and Mrs. Nsimbi and others who assisted me greatly in securing the required information.

I also recognize Mr. and Dr. Tashobya, Mr. Musinguzi, Mr. R. Turyahabwe and Mr. Nzabanitta for their moral and financial support.

Finally, I thank God who sustained me in all my endeavours.

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ABBREVIATIONS USED.

1. AACR₂ Anglo-American Cataloguing Rules. Edition 2.
2. ACC AGRIS Coordinating Centre
3. AGLINET Agricultural Library and Information Network (FAO).
4. AGRICOLA A database of the American Agricultural Library.
5. AGRIN A local Agricultural Database (Uganda)
6. AGRINDEX A printed output format of the AGRIS database.
7. AGRINF A local database of Uganda's Agricultural Information Centres.
8. AGRIS International Information System for Agricultural Science and Technology (FAO).
9. AGROCOV A multilingual Agricultural Thesaurus (FAO & CEC).
10. APU AGRIS Processing Unit.
11. CABI Commonwealth Agricultural Bureaux (International) (UK)
12. CARIN Database of Uganda's Agricultural Research Information.
13. CARIS Current Agricultural Research Information System (FAO).
14. CCC CARIS coordinating Centre.
15. CCF Common Communication Format
16. CD ROM Compact Disk Read Only Memory
17. CEC Communication of European Communities
18. FAO Food and Agricultural Organization of the United Nations.
19. IAEA International Atomic Energy Agency
20. IITA International Institute of Tropical Agriculture.
21. ISNAR International Service for National Agricultural Research.
22. LMB Lint Marketing Board (Uganda)
23. NADIC National Agricultural Documentation and Information Centre (Kawanda).
24. NADIN National Agricultural Documentation and Information Network (Uganda).
25. NADIS National Agricultural Documentation and Information System (Uganda)
26. NAIS National Agricultural Information System.
27. NAL National Agricultural Library (America)
28. NARO National Agricultural Research Organization (Uganda).
29. NARS National Agricultural Research System
30. NGO Non-Governmental Organization
31. PADEV A database of PADIS
32. PADIS Pan African Development Information System
33. PMB Produce Marketing Board (Uganda)
34. SDI Selective Dissemination of Information
35. UFRO Uganda Fisheries Research Organization

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- 36. ULIST A Local Database of Periodicals in Agricultural Libraries (NADIC)
- 37. UNESCO United Nations Educational Scientific and Cultural Organization.
- 38. UPS Uninterrupted Power System Unit
- 39. UTRO Uganda Trypanosomiasis Research Organization.

CHAPTER 1

INTRODUCTION

This is discussed under the following:-

- Statement of Theme and Objective
- Definition
- Scope
- Methodology
- Limitations in Methodology
- Structure
- References.

1.1 STATEMENT OF THEM AND OBJECTIVE

The development of a country depends on resources and the efficient exploitation of these resources depends on the availability of relevant information. Similarly, the development of any sector, whether commercial, health, industrial or as in this case agricultural, also depends on the available information as J. D. Adupa also suggests in reference to the agricultural sector:-

"Agricultural development has to continuously rely on the availability of relevant, up-to-date and reliable data and information"¹.

This development can be achieved through the exploitation of the existing agricultural resources which in turn can be done through the improvement on the methods of farming, introduction of improved and high quality crops

and animals or even through improving on the storage facilities. Information on such ways of exploitation can be got by researching or making use of information from already established researches.

However, in most cases, it is difficult, expensive and time consuming for one institution or country to carry out all the necessary research for the needed information.

This brings in the concept of research coordination which can be referred to as the harmonious integration of research findings or results for the purpose of getting better results after relevant comparisons. Lack of research coordination can be a great problem as has been the case in the Uganda's agricultural sector:

"Uganda has been lagging behind to the detriment of its research workers as they are not exposed to their counter-parts and their findings. This has often brought about unnecessary repetition of research, since applicable research results are already available perhaps even in a neighbouring country"(2).

For easy coordination of research results, there is need for an information system which allows flow of information between the different information units which make up the system. One centre within the system can serve as a focal point for coordinating all the information units at the National level and also participate in the Regional and International Information Systems.

In the case of Uganda's agricultural sector, such a system is not yet fully developed. However, the government is pursuing a policy of dynamic agricultural development and as a consequence recognized the need to develop an information system that will allow easy access to scientific and technical information. This will enable professional and non-professional people to have access to national, regional and international agricultural sources of Information.

In effect, a National Agricultural Documentation and Information Centre(NADIC) has been established at Kawanda Research Station. It serves as a focal point for all the agricultural information units in the country as well as participating in two international systems. The International Information system for Agricultural Sciences and Technology (AGRIS) and the current Agricultural Research Information System(CARIS).

Basing on this discussion, the main objective of this study is to examine the activities of NADIC as a National Agricultural Information Centre and those activities performed in the fulfilment of the obligations as a participating centre of AGRIS and CARIS. The result will be to establish what has been and is yet to be accomplished weighing it against problems.

The aim of the study is to assess the situation of Uganda's Agricultural Information Services as a key factor to the development of the agricultural sector as well as the country's economy.

1.2 DEFINITION

From the title and introduction of the dissertation, there are words and phrases of words which need to be defined in reference to the study's aim and objective.

An Information System is a group of information units, centres or organisations merged together with an arrangement for resource sharing. However, before sharing there is need for the production of these resources. In this view, the Encyclopedia of Library and Information Science gives this definition.

"... that set of aspects of a general system (a natural phenomenon, a physical contrast or a logical contrast) that are identified as information producing"(3).

The same Encyclopedia further explains that:

"Information Systems - or environments for which the goal is to make people aware of what is available or going on - are the products of two merging forces; the increasing abundance of an organised record of human experience (knowledge) and the technology that permits the acquisition, storage and retrieval of such records"(4).

On the other hand, the Librarian's Glossary defines a Documentation Centre thus:

"... a place where publications are recorded, preserved, summarised, abstracted and indexed; where bulletins relating to such material are prepared for distribution to those interested; where research is undertaken; bibliographies are prepared and copies and translations made"⁽⁵⁾.

Such a definition summarises the activities of a Documentation Centre. In this case NADIC is a National and at the same time an Agricultural Documentation Centre which implies that it carries out such activities to agricultural information materials produced all over Uganda.

An Information Centre is defined as a section of a research bureau or documentation centre which gives information about books or on a subject which the organisation providing the facilities of the centre is concerned⁽⁶⁾.

This implies that NADIC is concerned with the retrieval and dissemination of relevant agricultural information to interested individuals, institutions or organisations in the country.

1.3 SCOPE

In reference to the objective of the study, the dissertation covers the historical background of NADIC by discussing briefly the structure, objectives, activities and location of the original Kawanda Research Centre Library.

The study also reviews the need to establish NADIC, its objectives and its activities at National level and at the International level in relation to AGRIS and CARIS. This implies that some introductory information about these two systems has to be given since NADIC, as their participating centre carries out some of its activities in line with the objectives of the mentioned AGRIS and CARIS.

Then, a detailed review of the problems encountered by NADIC in its struggle to achieve its goals and the achievements and future established proposals are given. Finally all the findings are outlined and future strategies proposed.

1.4 METHODOLOGY

These are the ways used in carrying out the study or used in securing relevant information about the topic of study.

The main method used was the literature survey. Books, periodicals and papers presented at seminars, conferences or about projects were consulted.

The next method used was interviewing. Unstructured interviews were conducted among the relevant personnel at NADIC and Agricultural Information Units. Consultants in the fields of Agricultural were also approached for supplementary information especially about the current situation, problems and future strategies of Uganda's Agricultural Information System.

1.5 LIMITATIONS IN METHODOLOGY

Since NADIC is still in its infancy, there is very little published literature about it. As such, general agricultural information materials applying mostly to developing countries was consulted. The only exact information about NADIC and other centres was from papers presented at some seminars and some documents from projects.

Interviews were also very expensive due to the absence of relevant personnel who were always out in the field or very busy. This made data collection a very costly exercise considering the repeated visits and transport fares.

1.6 STRUCTURE

The body of the dissertation has been divided into 6 main chapters with a major introduction to the study the first chapter.

This introduction gives the objectives and aim of the study, definitions of some terms and phrases in the title the scope or coverage of the study and the structure or arrangement by which the findings are discussed. Methodology and limitations encountered in applying it are also discussed.

Chapter two is divided into two sections. Section A gives a brief background of NADIC by discussing the location, structure, activities, resources and users of the original Kawanda Research Station Library. The section further examines the need to establish NADIC and the need for this NADIC to participate in AGRIS and CARIS. Section B examines the background of AGRIS and CARIS, their objectives, how they coordinate their activities with their participating centres and their legislature framework in the member countries.

Chapter three examines the status of Uganda's Agricultural Information Services by discussing the activities and services of NADIC as the heading centre. These are discussed under collection building, coordination, information processing, communication, technology and services offered.

Chapter four examines the problems of NADIC together with the general problems of the Agricultural Information System.

Chapter five gives possible solutions to some of the problems, discusses some achievements by NADIC and also the established future strategies as proposed by the Government and the National Agricultural Research Organization (NARO).

The last chapter, as the conclusion outlines all these findings in its first section and gives future recommendations for the Agricultural Information Services in Section B.

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6. Ibid p.328.

CHAPTER 11

ESTABLISHMENT OF NATIONAL AGRICULTURAL DOCUMENTATION
AND INFORMATION CENTRE (NADIC) AND PARTICIPATION TO
AGRIS AND CARIS.

SECTION A.

2.1 BACKGROUND TO NADIC.

Kawanda Research Library located at Kawanda Research Centre was established in the late 1950's with the main purpose of supporting the research and developmental activities of the Research Station and the Ministry of Agriculture at large through the timely provision of relevant literature.

The intended users included research scientists, students and other interested individuals from Ministries of Agriculture, Cooperatives, Forestry and Fisheries and from organizations such as Produce Marketing Board (PMB) and Lint Marketing Board (LMB).

The information supplied was about subjects like animal production, fisheries, forestry and agroforestry, environmental protection, agricultural economics and extension, statistics, biometrics and related disciplines with the main emphasis on crop production.

As the Research Station expanded, more stations of its kind were established in different regions of the country (see map 1) each with its small library unit. These stations, though under the same Ministry, hardly coordinated with one another and even with other stations in neighbouring countries.

Consequently, considering the disadvantages of such a situation, the need for a kind of cooperation or system of information exchange and resource sharing, especially about research activities, was realised by the concerned bodies. This harmonious integration of research findings usually leads to better and relevant results due to comparisons. It also checks on the unnecessary duplication of research activities which is time consuming and expensive.

On the other hand, Uganda like any other developing country, the agricultural sector is the main source of the National income and food. Agricultural Information thus becomes a necessity for developing and increasing production as is it put by Adupa.

"Agricultural Information has become one of the most crucial inputs/resources for increased agricultural production....."(1)

However, for efficient utilization of this information, there is need for an agricultural information service which is strong and relevant to the level of development of the agricultural sector in any country. This supported by D'Ambrosio who urges that:-

"In any case, the efficiency of the appropriate agricultural information services is a necessary condition to achieve positive results. Obviously therefore, the strategic choices and decisions of authorities responsible for agricultural development must fit as far as possible existing situations and should also be such as to guarantee continuous, appropriate and flexible information activity"(2)

2.2 ESTABLISHMENT OF NADIC

Consequently, the Government of Uganda, in pursue of a policy for dynamic agricultural development, recognized the need to develop a kind of information system which allows easy coordination and dissemination of scientific and technical information. Several requests for assistance from Agricultural Institutions were sent to the Food and Agricultural Organization (FAO) which decided in 1984 to carry out a survey of Information Units in the Agricultural Sector with the view of advising the Government on matters of strengthening of agricultural information infrastructure.

As a result, a project report containing recommendations on the establishment of Agricultural Information and Documentation Services at Kawanda Research Station, as the first step towards the establishment of a National Agricultural Information System (NAIS) was prepared by FAO's consultant Mr. Michael Menole and submitted to the Government in 1984.

The main objectives of the project was thus to set up NADIC at Kawanda, equip it with the necessary facilities, act as the National AGRIS and CARIS Centre and provide training to staff at Kawanda and others working in Government Libraries.

2.3 OBJECTIVES OF NADIC

Eventually, NADIC was established in 1989 and charged with these objectives.

- i) Creating and maintaining a bibliographic database of National Documents, both retrospective and current, by initiating participation in AGRIS.
- ii) Creating and maintaining a database of completed and on-going research projects by reviving participation in CARIS.
- iii) Creating and maintaining a Union List of periodical holdings in Agricultural Libraries.
- iv) Raising Library collections from within the country and outside.
- v) Compiling and maintaining a Union catalogue of these documents.

- vi) Providing access to local and International Agricultural Literature through library services and literature search from the databases.

With NADIC, now it is possible to access national, regional and international agricultural information which is indispensable for proper formulation, implementation and evaluation of agricultural research and development programmes.

SECTION B.

2.4 BACKGROUND TO AGRIS AND CARIS.

At present, it is difficult to hold any discussion about NADIC without mentioning FAO's International Agricultural Information Systems, AGRIS and CARIS. This is not only due to FAO's assistance in the establishment of the centre but also to the fact that NADIC is a National Coordinating Centre for these systems and in effect carries out some of the activities required in that capacity. This calls for a brief explanation about the background, objectives and functions of these systems.

AGRIS and CARIS were launched by FAO after it recognized the need for bibliographic control in the field of Agricultural Information as per article 1 of its constitution; functions of the organization. Function 1 states that:-

"The organization shall collect, analyze, interpret and disseminate information relating to nutrition, food and agriculture...."(3)

In this respect, FAO's Information and Documentation activities have been geared to the development of specialized bibliographical, statistical and numerical databases or banks and the development of International Cooperative Information Systems.

2.41 PRINCIPLES OF AGRIS AND CARIS.

The two are based on the principles that:

- i) each country participates voluntarily in the system by providing input of the relevant information produced in the country within its boundaries.
- ii) each country draws information from the systems according to its own needs.
- iii) Countries participate through National and Regional Centres and
- iv) FAO maintains the AGRIS Coordinating Centre (ACC) and the CARIS Coordinating Centre (CCC).

2.42 THE INTERNATIONAL INFORMATION SYSTEM FOR AGRICULTURAL SCIENCES AND TECHNOLOGY (AGRIS)

This is a system which serves the information needs of developed and developing countries alike on a cooperative basis. It became operational in January 1975 and has since then developed into a worldwide network of National, Regional and International participating centres.

Its main objective is to make the information vital to agricultural and rural development easily accessible throughout the world. This has been achieved through free circulation of scientific and technical information on agriculture and equitable sharing of knowledge among every country of the world.

AGRIS bases on the concept that each country participates through a National Centre designated by its government with the latter serving as a source of strength. In this case, NADIC is the National Centre with the Government of Uganda serving as a source of strength.

As such, NADIC, like any other National Centre, has the responsibility of identifying, collecting, processing and submitting all the conventional and non-conventional literature in the country. It in turn retrieves, from the system, relevant data from other participating centres.

This implies that the creation of input and utilization of output are decentralized and functions of participating centres which in turn form the foundation upon which AGRIS rests.

FAO maintains the ACC at its headquarters in Rome with an AGRIS Processing Unit (APU) outposted at the International Atomic Energy Agency (IAEA) in Vienna where processing and maintenance of the database are carried out. The ACC establishes and maintains contact with participating centres and monitors the input and output services. A chart showing the technical process of AGRIS is shown in Appendix 1.

The scope of AGRIS coincides with the scope of FAO and thus that of NADIC. It covers agriculture in general, geography and history, education extension and information, administration and legislature, economic development and rural sociology, plant science and production, animal science and production, fisheries, agricultural machinery, natural resources and environment and other auxillary disciplines. The output on these subjects appears in two formats; the monthly printed AGRINDEX and corresponding magnetic tapes.

Apparently, AGRIS offers all countries, from the least developed to the most advanced, a mechanism for information exchange which is ensured by the non-stop interaction between the users and the system which is advantageous to countries like Uganda:

"Developing countries benefit much from the AGRIS system by sharing locally produced information on science and technology amongst themselves, but, in order for rapid development in agriculture to occur, transfer of scientific and technological information from the more advanced to the less advanced is an absolute necessity"(4)

2.43 CURRENT AGRICULTURAL RESEARCH INFORMATION SYSTEM (CARIS)

This is another International Information System which basically deals with the gathering of information on on-going research activities in the fields of Agriculture in FAO member countries.

Presently, throughout the world, large numbers of research projects are being carried out by many researchers endeavouring to find solutions to a multitude of problems. What happens in most of the developing countries is that some results are never published or made available to other researchers in the same field. Such unknown projects lead not only to constant research duplication but also to lack of proper planning and management of research and poor cooperation:-

"What is needed is to establish an information system where all research activities of a country are bibliographically controlled and through which interchange of research data could be possible on an international level"(5).

CARIS therefore, provides developing countries with a mechanism to exchange among themselves and with developed countries, information on their respective on-going research activities.

The scope of CARIS is the same as that of AGRIS but in addition CARIS provides its users with information for:-

- i) Formulation of research programmes to meet National and Regional needs and priorities.
- ii) Evaluation of research programmes.
- iii) Formulation of research projects involving cooperation between countries.
- iv) Identification of expertise in a given field and location of researchers working on similar projects,
- v) Prevention of wasteful and costly duplication of research efforts and,
- vi) Exchange of experience and assessment of requests for funding.

In essence, CARIS answers such questions as; what is being done?, who is doing it?, and where is it being done? From such, FAO describes CARIS as:

"..... an information support to research activities, a tool to research planning and management, and source of information for technical cooperation among developing countries".(6)

CARIS is also composed of National (like NADIC) Regional and International Centres with the CARIS Coordinating Centre (CCC) located at FAO headquarters. Each member country contributes through its National Coordinating Centre, information on all projects being carried out within its boundaries and in turn has access to all contributed information and takes whatever is needed. CARIS upholds the fact that:-

"Research is vital to progress and information is essential to research"(7)

It becomes quite clear now that in Uganda, with NADIC as a coordinating centre for such strong International Information Systems, it will be possible to access all the relevant information which can be useful to policy makers, planners, researchers and extension workers in agricultural fields and also farmers.

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CHAPTER 111

STATUS OF UGANDA'S AGRICULTURAL INFORMATION SYSTEMS

3.1 INTRODUCTION:

It should be emphasized that a sound Agricultural Information System is essential to the development of agriculture in general and the operation of agricultural research. However, this requires the development of a focal point in the system. This central unit would have the responsibility of providing guidance, support and centralized services to the network of individual units.¹

Therefore, the situation of any information system can be reflected in the activities and services of this central unit which coordinates all the other units in the system.

3.2 ACTIVITIES OF NADIC

During its establishment in 1989, NADIC was charged with the main tasks of identifying, selecting, recording, processing and storing for use, both national and foreign documents relating to agriculture and to provide access to these documents through several ways. In response to these, NADIC, now with the Library Unit, documentation and microfiche sections, is engaged in several activities.

3.21 COLLECTION BUILDING

NADIC has embarked on raising the Library collection, to provide users with quality and quantity information. Authors in the agricultural fields are encouraged to write and bring their publication to the centre so that they can gain recognition once these publications are exported to the International Systems AGRIS and CARIS.

However, due to ignorance, some potential writers are not aware of the benefits of depositing copies of their documents at the Centre. In reaction to this, NADIC engages in publicity programmes on radio and television in several languages. Seminars and workshops are organized whereby participants are invited from all Agricultural Institutions, Research Stations and interested organizations. Papers are presented on all relevant areas including the different roles of information and NADIC in particular to the development of the different areas.

On the other hand, NADIC sends its personnel in the field to check on the existence of documents or unrecorded expired and on-going research projects.

The centre also secures funds for the purchase of necessary documents and for the payment of subscriptions for different journals and databases.

From the international scene, the centre requires most of the publications from donations from such sources:-

- i) FAO under the normal Uganda quota.
- ii) British Council under the book programme
- iii) Technical Centre for Agricultural and Rural Cooperation (CTA),
- iv) Ohio State University and,
- v) Many other International and Regional Organizations like the International Service for National Agricultural Research (ISNAR), USAID and others which respond to appeals.

By virtue of being a Coordinating Centre for AGRIS, NADIC receives several information materials from FAO which also include non-book materials.

- i) AGRIS database on the CDROM (Compact Disk Read Only Memory) from 1986 - 1990.
- ii) AGRINDEX (printed version of the AGRIS database) for the years 1985 to-date

- iii) AGRINDEX on microfiche, the accumulated index
- iv) Microfiches for documents about Uganda, some are full documents and others are bibliographical lists from David Lubin Library at FAO in Rome.
- v) Photocopies of articles from FAO, only 15 per month.

NADIC has also acquired documents which had completely disappeared from the country but could be traced from foreign institutions. Such documents are from:-

- i) Japan; print outs from their database, of records relating to Uganda.
- ii) International Institute of Tropical Agriculture (IITA); records from their database relating to Uganda and works done by Ugandans at the Institute.
- iii) From the National Agricultural Library of America (NAL) from their database AGRICOLA.
- iv) From the Pan African Development Information System (PADIS) from their database PADEV.

3.22 DOCUMENTATION

NADIC is responding to the call for starting the documentation and information activities in response to the immediate users needs for improved information service. This is being tackled by the creation and maintenance of databases of various national documents relating to Agriculture.

Through its participation to AGRIS, a database AGRIN has been created and it documents old and current articles, books, reports, conference papers, theses and other non-conventional literature in the broad sense of agriculture. This will result in the production of a union catalogue; a valuable tool in information exchange at both national and international levels. Current documents on AGRIN are exported for inclusion in the AGRIS database in Rome.

As a National Coordinating Centre for CARIS, a database CARIN has been created. This holds the expired and on-going agricultural research projects. A directory of such projects in Uganda is expected as a product from this database. Information on current projects is exported to the CARIS system.

In response to the objective of the production of a Union List of Periodicals, a database ULIST has been created and it records periodicals held in the Agricultural Libraries in Uganda. At present, journal holdings at Kawanda, Namulonge and Makerere University Library (Africana Section) are on record.

There is also AGRINF, a database of the agricultural information resources available in Uganda. It gives information on which institution handles which information.

3.23 INFORMATION PROCESSING

For any kind of information system to be successful, its different units should be using the same methods and standards in information processing to facilitate internal information exchange. This becomes even more advantageous when it comes to the exchange of information at the international level between developed and developing countries with compatible formats.

This standardization (controlled vocabulary, input format and selection rules) and appropriate current information technology are therefore necessary, not only to support the indigenous science and technology activities but to enable developing countries to interact with information networks in developed countries⁽²⁾.

Since NADIC participates in AGRIS, it uses the same format for the processing of bibliographic information on the AGRIN database as used in the AGRIS database whose outputs are the AGRINDEX (hard copy) and the corresponding AGRIS magnetic tapes.

In the AGRINDEX, each bibliographic citation contains all the necessary bibliographic elements needed to locate a publication and to assess its relevance to the users' subject of interest.

Each citation element is assigned a sequential reference number (RN) by which it is referred to in the indexes. The RN is composed of two digits indicating the year of publication in AGRINDEX, a hyphen and 6-digit sequential numbers e.g RN 88-997554.

In the main entry section, citations are grouped by subject categories within which there is arrangement of geographic or commodity by numerical code. Citations not related to any specific geographic term or commodity are grouped before those which are so related.

Each citation concludes with a set of AGROCOV descriptions by which it is indexed. AGROCOV is a multilingual thesaurus which provides terms which express concepts of subjects and thus helps in retrieving citations on a specific subject. In AGRINDEX, these descriptors are

divided into two groups by the sign "/". Terms listed before this sign are those under which the document can be found in the subject index and those after the sign provide additional information on the subject of the publication.

Collation, language and notes are always indicated on this input sheet and the provision of an abstract is optional and their availability is mentioned at the end of the citation.

An example of such an input sheet is shown in appendix 11. This is filled by staff at all AGRIS input centres like NADIC and sent for processing at ACC which results in the production of the AGRINDEX and the magnetic tapes. Since the format is the same, it becomes easy for the staff at the centres to interpret the information contained in the AGRINDEX and the tapes which are sent to them.

Similarly, with the information on AGRIN processed in this way, it becomes easier for NADIC to access and export information from and to the AGRIS database respectively. Both AGRIS and AGRIN databases can be searched by:

- Personal Author e.g Mwesigwa B.
- Corporate Author e.g International Livestock Centre for Africa.
- Subject or Keyword(s) e.g Farming Systems; cereals

- Subject Category e.g A50 Agricultural Research
A40 Plant ecology etc.

Likewise, as a participating centre for CARIS, NADIC is involved in the information processing about research projects to coincide with the methods used in compiling the CARIS database whose output is the CARIS Directory.

The information needed includes the country code number, institution code number and name, title of the project, objectives, language, researcher's names, starting and duration dates of projects and the AGROCOV descriptors.

Such information is filled on the CARIS input sheets (as one shown in appendix 3) by participating centres of CARIS and sent to the CCC for merging and compilation of the CARIS Directory. With the information on CARIN database at NADIC processed in this way, interaction between CARIS and NADIC is eased.

The ULIST database is compiled in such a way that it can be searched by subject, title of periodical and name of publisher. The AGRINF database is searchable by name and address of the institution, time of operation and scope or coverage of the available information materials.

The Library Unit of NADIC uses the Universal Decimal Classification Scheme (UDC) for classifying and the Anglo-American Cataloguing Rules, Edition 2 (AACR₂) for the cataloguing of the library holdings.

3.3 INFORMATION TECHNOLOGY

At present, its true to say that man's ability to disseminate information accurately to millions of people around the world has increased. Everyday new Scientific and Technological Information is generated and the environment under which it is exchanged is rapidly changing⁽³⁾.

This is more attributed to the production of modern equipment. Now devices such as computer systems, microfilms, and telecommunications have been developed to handle information with efficiency and facilitate the harnessing and making accessible to users large volumes of information.

This kind of information technology is fairly a new concept in Uganda's information services particularly in the Agricultural Sector. During its establishment in 1989, NADIC received some modern equipment from FAO which includes a micro-computer, an external disk drive, a CDROM drive, a microfiche reader, a photocopying machine and a UPS (Uninterrupted Power System) Unit.

NADIC also has software for the programmes such as micro CDS/ISIS which is a software of the United Nations Educational, Scientific and Cultural Organization (UNESCO) Library and the Word Perfect Programme.

3.4 NETWORKING

This is the linking together of institutions mostly with similar objectives so as to facilitate resource sharing through coordination. On the other hand, resource sharing, in the language of information management, means collective use of information of all types by various end users from a central coordinating unit or from within a network component at a reduced cost with easy accessibility⁽⁴⁾.

During the establishment of NADIC, it was highly envisaged that as a central unit, it will assist in linking all the related centres as is stressed by Birungi P.:

".....This could form the focal point for information on agriculture, linking and lending support to other agricultural information units especially those attached to research stations. This network would have the element of agricultural extension information for farmers...."(5)

Such a network can be viable where there are better communication facilities. In Uganda, like in many developing countries, communication networks such as telephone, rail and postal services are still in a poor

state. However, now that most of the main roads have been rehabilitated, NADIC can now communicate with the identified Agricultural Institutions (shown on Map 1) with Library or Information Units by road and rail. This distant communication is mainly for document delivery services, retrieval of information and collection of valuable documents like research projects. Agricultural Information Units which are already in NADIC's network for improved resource sharing include those under the Uganda Trypanosomiasis Research Organization (UTRO), Uganda Fisheries Research Organization (UFRO), Entebbe Animal Health Centre and more especially Namulonge Research Centre.

For more interaction, NADIC organizes seminars and workshops whereby participants from these institutions exchange information on their activities, services, achievements and problems.

Though on-line services from foreign or international systems are not possible at present, NADIC is able to exchange bibliographic information through the use of magnetic tapes, microfiches and diskettes. This is due to the presence of the few modern equipment at the centre. For example NADIC is now in position to interact with AGRIS and CARIS whereby the micro computer is used in inputting the information to be exported to AGRIS and CARIS

databases. NADIC in turn receives the global database through the AGRINDEX, AGRIS magnetic tapes and microfiches. The availability of the CDROM and the microfiche reader assists in accessing information from these materials.

Likewise, NADIC benefits from other Information Systems by extracting relevant information from databases like PADEV and AGRICOLA but this is almost a one-way traffic because NADIC is always at the receiving side.

3.5 SERVICES OFFERED BY NADIC

With the availability of the mentioned resources and facilities, NADIC is now able to offer a variety of services to its users.

The Library Unit provides regular library services. Users get access to National and Foreign documents both indirectly through lists of new acquisitions, catalogues and indexed or directly through various arrangements for access to the Library and its collections.

The centre provides literature search on the local and foreign databases, a service which seems to be well rendered and appreciated by users but is limited by the availability of one computer. At request by a user, any original information cited in the AGRINDEX or AGRIS

magnetic tapes, the Centre requests for a reprint from the author or through local library sources, National Libraries and Documentation Centres or from member Libraries of the AGLINET (a network of Agricultural Libraries, Worldwide).

With the availability of the microfiche reader, the Centre assists users to access information on microfiches from various databases.

Other services offered include referral, current awareness, answering of inquiries and Selective Dissemination of Information (SDI). Photocopying services to users also facilitate the dissemination of information.

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CHAPTER 1V

PROBLEMS FACING UGANDA'S NATIONAL AGRICULTURAL
INFORMATION SYSTEM WITH REFERENCE TO NADIC AS THE
CENTRAL UNIT.

4.1 INTRODUCTION

Developing countries have realized that information has become the "chief raw material and the principle product of modern economy" and hence the development of science and technology needs to be considered as integral to development⁽¹⁾. Its common knowledge presently that research is a necessary ingredient of the development process. It is through research that we can identify problems, set priorities, determine the development process and assess the risks involved in planning.

On the other hand, without a strong and responsive information base, quality research cannot be undertaken and the necessary advancement in the fields of Agriculture are restrained. This is what is happening in developing countries like Uganda which are faced with numerous constraints in the process of developing adequate information capabilities which in turn threatens the ability to develop science and technology.

"Uganda's current capacity to organize and manage varied information needs is beyond the present personnel, financial and organizational capability⁽²⁾".

This is a generalized statement considering the tremendous political, economical, social and physical problems that are incurred in the establishment of a strong National Agricultural Information System (NAIS) which is essential for the effective handling of the burge in today's information flow.

4.2 PROBLEMS

4.21 1. POLITICAL UPHEAVALS

Uganda has a number of Agricultural Institutes and Research Stations that have been developed over the years. The NAIS should be based on the conventional Libraries and Information Centres located in these individual stations in the Agricultural Ministry and other related Ministries and at Makerere University. Unfortunately, during the political upheavals in the recent past, most of these stations suffered physical damage and losses. Activities like research programmes have run down and damage to premises and equipment have further eroded the capacity of these stations. Several of the Libraries were looted for example Kawanda Research Library. This destruction of library and information facilities has isolated the NAIS from the world body of knowledge. This implies that there is need for the rehabilitation of these centres before the establishment of a sound information system.

4.22 LACK OF INFORMATION RESOURCES

This is a prevailing problem in the existing Agricultural Libraries and Information Centres which is also due to other problems.

4.221 INFORMATION PRODUCTION

There is poor generation of agricultural reading materials, a common problem in developing countries due to illiteracy, ignorance, multilanguages and poverty. Such problems lead to poor production of local and relevant literature.

There is lack of an effective book trade infrastructure. The few existing publishing firms are not well equipped with the necessary materials like printing machines as they have to be imported. In effect, capable authors prefer to publish their works in developed countries where they can gain more income and recognition.

4.223 ACQUISITION

Due to the above constraints, most of the agricultural literature and output of research is produced on cheap paper which are mostly rejected for publication. This grey literature is otherwise a genuine source of information and the most valuable but difficult to locate and acquire in libraries since they are always scattered in individual office collections, home collections and some branch libraries throughout the country.

Still on acquisition, there is lack of an effective bibliographic control machinery in the country as a whole and in the agricultural sector in particular. For example in the field of research, despite administrative requirements, many research results remain unreported or exist only in files. Lack of effective legal deposit laws make it impossible to locate and acquire relevant National literature.

Uganda, being a landlocked country, it is difficult to purchase and acquire documents by Ugandan authors or about Uganda but published from outside and even relevant foreign documents. Restrictions on the importation of library materials at customs Departments put a strain on the little financial resources.

As a result of such problems, most agricultural libraries and information centres have a poor state of reading materials most of which is outdated mostly from donations and gifts from developed countries. Such materials are mostly irrelevant to our local problems as compared to indigenous reading materials as Abidi argues:-

"These locally produced texts can ensure increased irrelevance in comparison to imported material written for a different lot. Even, otherwise, complete dependence on donated reading material may sometimes lead to ideological subjugation"(3)

Local problems should always be tackled by local information for better solution with relevant imported information only consulted if the country of origin faced or is facing similar problems.

4.23 LACK OF COORDINATION

With the little collection in individual libraries and information centres, there is prevailing lack of coordination a problem which can be mostly attributed to poor means of communication. There is no proper coordination or exchange of information between the identified Agricultural Institutions with NADIC as their focal point. This poses a serious problem especially in the fields of research. There is a risk of duplication of research resulting in wastage of both human and financial resources if the research information is not widely disseminated. It is also possible to have parallel research in progress on similar themes ultimately depleting scarce research funds⁽⁴⁾.

At its stage, NADIC as focal point cannot effect efficient coordination between the existing Agricultural Information Units. These, as a result, develop independently which is detrimental to the development of a strong NAIS:

" Considering the small overall size of the Uganda's economy, it will not be desirable to allow uncoordinated development of libraries in a number of locations. This was what happened in the past with the result that most existing library and information units in the Agricultural Sector could not be viable without a strong central unit. This is the main reason for the breakdown of the Agricultural Library, Information and Documentation services in Uganda. This approach has also impeded the development of a viable and suitable Agricultural Information System"⁽⁵⁾.

This lack of coordination delays efficient and timely supply of relevant literature to researchers and other users according to their needs. According to Mr. Kigongo-Bukenya, this problem of coordination has led to too many ineffective services and also duplication of resources making information provision very expensive yet unsatisfactory⁽⁶⁾.

4.24 LACK OF INFORMATION PROCESSING TECHNIQUES.

Generally in the existing Agricultural Information Units, there is a problem of poor or completely lack of information processing and disseminating techniques.

At present, NADIC is the only unit engaged in some information processing with the formats coinciding with those of AGRIS and CARIS at the International level. This makes information exchange between NADIC and the databases

of these International Information Systems a lot easier whereas this is not possible between NADIC and the information units within Uganda. This implies that even the foreign information received at NADIC cannot be easily and quickly distributed to other units due to lack of a National Standard format of information processing as corrected in the introduction of the Common Communication Format (CCF):

"With the use of a single National Standard Exchange Format in a nation, Information exchange within a country is facilitated technically and economically"(7)

This is not only a National problem but also an unwelcome situation to developing countries which in most cases experience the same problems of development. Lack of a single format in such countries makes difficult the sharing of the otherwise available information from the developed countries.

According to Munyua, this lack of compatibility in the less developed countries creates gaps between developed and developing countries⁽⁸⁾ which are in the real fact "information rich" and "information poor" countries respectively.

4.25 LACK OF MANPOWER RESOURCES AND USER TRAINING

This problem of information processing is mostly due to lack of trained manpower. There is general shortage of competent and professionally trained librarians and information scientists. At NADIC for example, there are only two qualified librarians and five trained documentalists.

In other centres, most of those assigned duties of information management functions are unqualified and untrained. Various factors including lack of training opportunities have been responsible for this situation. Overseas training in industrialized countries is becoming more and more expensive and in most cases it is not tailored to the requirements of developing countries where information needs are different and typical.

Worse still, there is prevailing lack of career opportunities. This can be through continuing education which, in the context of a profession according to Abidi, is a means for career development and a method for safeguarding against professional obsolescence⁽⁹⁾. Continuing education assists the concerned individuals to have an opportunity and facilities to add to his stock of knowledge to make up for the shortcomings and deficiencies.

This is especially more helpful in the field of information management whereby there are rapid developments and changes in the ways and means of acquiring, processing, storing and disseminating information.

Lack of such simple motivation techniques has led to less attraction and poor maintenance of the few existing qualified personnel for efficient running of an Agricultural Information System.

The other related problem is lack of user training. NADIC is the only centre which offers training to its regular users especially researchers. Otherwise strange users and most users from other centres are not equipped with knowledge about the ways by which they can retrieve information for themselves especially using modern equipment like computers. As a result users solely depend on information personnel which causes delays in accessing information as there are few trained information scientists.

4.26 POOR HOUSING CONDITIONS

Most agricultural library and information services in Uganda are faced with the problem of poor accommodation. This makes it difficult to acquire and store the required amounts of reading materials and the more delicate modern equipment for information handling like computers and above all provide enough room for readers and required staff.

NADIC is housed in the old library building with a small reading room and office space. The situation is even worse in other centres like severe Research Station which suffered the blows of the civil wars.

4.27 POOR INFORMATION TECHNOLOGY AND MEANS OF COMMUNICATION

At present, the advancement in technology within the developed countries, which in most cases serve as a source of information, has staged a big problem to developing countries which as usual have to depend on imported information.

Due to poor communication systems and general lack of technical knowledge, it becomes difficult for developing countries to access information from the databases of developed countries very readily.

"Development of satellites and efficient telecommunication systems has accelerated the rate of accessing international databases on-line by use of connections between two computer systems. Such a system is not practical at a time like this in Uganda because of problems associated with it such as : costs of operation, need for highly trained technical operators and need for reliable telecommunication systems"(10)

Most of the outputs of the automated systems are electronic in nature and in Uganda, there is lack of necessary hardware for accessing information on tapes, disk, diskettes, microfilms and microfiches.

Out of the identified stations with agricultural library services, NADIC is the only centre with a functioning computer. Despite the fact that NADIC cannot assist in disseminating information to other centres technically due to lack of computer terminals, this single computer is not enough for the input and output services at NADIC. This causes delays in providing users with the required information at the centre thus even more unrealistic to expect the effective supply of information to small information units scattered throughout the country.

As already mentioned, information services in developed countries have become heavily dependant upon the use of large on-line databases to provide users access to needed bibliographic, directory type, numeric and full-text information. The extension of these on-line services to developing countries is inhibited by the high cost of international communication and lack of suitable telephone networks⁽¹¹⁾. For instance, in Uganda, such telephone networks leave a lot to be desired and thus it is unrealistic to expect the same network between the existing agricultural information centres in the near future. Moreover, it is not quite surprising to find that even since 1989, telephone facilities have not been installed in the NADIC building which should be linking all the other centres.

4.28 LACK OF POLITICAL SUPPORT

Another major problem facing information services in general and agricultural information services in particular in Uganda is lack of political support. Generally insufficient attention has been paid to the need to maintain and strengthen information services as an essential component of the institutional support to agricultural development.

Most of the required efforts from the Government are instead reserved for donor assisted projects where supply of books, journals and access to information services is provided. However, this does not provide continuity of support or maintenance of services⁽¹³⁾ since such offers are limited to the specific project needs and to the duration of the project. For example NADIC was established under a project jointly financed with FAO whose support is anytime draining to a close. It is thus clear that if this centre is to survive for the provision of better information services, substantial investments and continued support from the Government will be needed.

Lack of political support has also resulted in lack of a policy governing agricultural information services. The Agricultural Sector currently does not have a standing policy and clear direction for the development of an agricultural information system to support agricultural research and extension services.

4.29 NATURAL CALAMITIES.

Geographically, Uganda is situated in the tropics. This subjects various kinds of information materials and equipment to the effects of excessive heat and pests. For example, at the Animal Health Research Station Entebbe, there is a danger of severe pest infestation and environmental damage despite the efforts to control these pests with some insecticides. On the other hand, the Ministry of Agriculture (Entebbe) offers very minimal information services since its library collections were destroyed by fire in 1985. All these problems call for the establishment of better but expensive storage facilities.

4.30 LACK OF CAPITAL

By critically examining the enumerated problems, it becomes clear that most of them originate from one major problem - lack of money.

Due to poor economy, there is no money for developing a better book trade infrastructure and for the establishment and maintenance of a sound communication network which includes telephone, postal and road services.

To the concerned bodies, the establishment of a sound Agricultural Information System appears a grandiose project, too expensive to implement without assistance from donor agencies. As a result, there are no funds for the establishment and maintenance of information centres,

purchasing and maintenance of relevant information materials and equipment and training and maintenance of personnel.

In effect, all these hinder progress in the information services which need efficient, timely and continuous economic backing for continuous information supply.

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CHAPTER V

SOLUTIONS TO SOME PROBLEMS, ACHIEVEMENTS
AND ESTABLISHED PROPOSALS FOR NAIS.

5.1 SOLUTIONS.

The Ugandan Government together with FAO combined efforts which led to the establishment of NADIC as a step towards the strengthening of information and documentation services in the country. NADIC now serves as base which backs undertakings in quality research and necessary advancements in the field of Agriculture.

In reaction to the numerous problems that affect the establishment and maintenance of a sound Agricultural Information System, some solutions have again been offered through the assistance of FAO.

5.11 INTERNATIONAL INFORMATION EXCHANGE AND TRANSFER.

The participation of NADIC to FAO's International Agricultural Information Systems, AGRIS and CARIS, has been welcomed as a solution to some problems.

Through the databases of the two systems, NADIC can interact with the information networks of other developing countries which is essential for the exchange of information about similar problems and situations prevailing in such countries. At the same time, this exchange is facilitating the transfer of scientific and technical information from the more advanced countries which relevant for the rapid developments in Agriculture.

However, this solves to some extent the problems of lack of coordination at the international level such that Ugandan researchers and other users can interact with their counterparts elsewhere in the world, but this coordination is very limited within the country between the different Agricultural Information Centres.

5.12 ACQUISITION.

AGRIS again provides a solution to the acquisition of the non-conventional publications which constitute a high proportion of Agricultural literature due to the poor publishing industry in the country. The AGRIS Coordinating Centre has established various ways and means of ensuring the acquisition, processing and dissemination of non-conventional literature which are effected through the National Coordinating Centres like NADIC.

Access to the AGRIS database has greatly reduced the problems of locating works of authors from developing countries which are published from developed countries. AGRIS ensures that each member country inputs its National Literature (which includes all relevant literature published in that country and acquired through legal deposit laws). As such, material can be easily located by searching the AGRIS database or by use of the AGRINDEX with the result that any document or work by a Ugandan can be obtained and acquired for use by fellow Ugandans.

5.13 INPUT SERVICES.

The AGRIS system also permits data input in different media, including the more simple forms such as typewriter work-sheets and punched paper tapes. This has the advantage of facilitating the immediate integration of the output of less developed countries, which are technological backward, into the international systems until such time as they can develop sufficient technology to produce magnetic tapes and OCR (Optical Character Recognition) format⁽¹⁾.

5.14 PERSONNEL TRAINING

Lack of trained personnel has been labelled the major problems affecting information processing. To this, the Technical Cooperation from FAO is directed towards supporting the key National Institutions training Information Scientists which are supported by each Government of each FAO member country.

As far as training for AGRIS input is concerned, the project which led to the establishment of NADIC offered an in service training course to the staff at NADIC and from other Agricultural Sector Ministries who are involved in the Agricultural Information System. This training particularly covered data entry and searching the AGRIS database on CDROM, compiling databases using the MICROCDS/ISIS software and producing bibliographies.

AGRIS further organizes workshops and seminars in different member countries where staff from different National Coordination Centres are invited for further training and sharing of experiences.

5.15 EQUIPMENT.

Most of the modern equipment at NADIC were offered by FAO which fortunately include a micro computer and a CDROM drive which are presently facilitating the access of information from other databases and inputting to AGRIS and CARIS databases.

This is as far as FAO has helped in solving some of the problems.

5.16 POLITICAL SUPPORT

On the other hand, according to an interview with the head of NADIC, it was stressed that the present Government especially the Ministry of Agriculture has realised the need for Agricultural Information especially in the areas of research. As such, more efforts are directed towards the improvement of Agricultural Information Services and more especially in strengthening the mother centre NADIC which now reports its financial affairs straight to the Ministry instead of the administration of Kawanda Research Centre.

This political support to Information Services can also be backed by the words of the Vice President Dr. Samson Kisseka, who in his opening speech at the seminar on Development of a National Information Documentation Network for Uganda held in Kampala in 1990 where a paper on Information for Agriculture was also presented, said that:

"The development of National Information and Documentation Network is not only essential but it is timely and will receive government support"(2).

With such political backing, such problems like lack of policies and lack of funds can be easily solved. These few mentioned solutions have provided a base on which the establishment of NAIS can stand and also led to some achievements that NADIC can boast of at present.

5.2 ACHIEVEMENTS OF NADIC.

On first impression, one would be tempted to conclude that Uganda has no Agricultural Scientific and Technological Information Services. But this is far from the truth, the latter statement can be supported by the prevailing advances in the strengthening of NADIC despite the problems facing Uganda's economy and the NAIS in particular. These efforts can at present be witnessed from some achievements made at NADIC in different areas.

5.21 COLLECTION BUILDING

As regards the materials, the size of the collection of the library unit has been raised and now consists of more than 8,000 monographs, 900 bound periodicals, 150 current periodical titles (including journals, technical bulletins and annual reports) and several reprints. These have been acquired mostly through donations and purchase and now with the use of UNESCO coupons more is expected. Also with increasing publicity, people are responding to the call of utilizing the Centre for depositing their works.

Other information sources include mostly bibliographic tools (mostly non-book materials) from several databases like AGRICOLA, PADEV and AGRIS. The CDROM drive and the micro-computer at NADIC allows Ugandan Agricultural Scientists and other users access to such databases on magnetic tapes and diskettes and it is hoped that in the near future, it will be possible to access other important databases like CABI (database of Commonwealth Agricultural Bureaux International) and KITS by subscribing to them. This interaction between international databases serves as a source of a variety of up-to-date Agricultural Information most of which is relevant to Uganda's Agricultural Development problems.

2.22 DOCUMENTATION SERVICES.

According to the interview held with the documentalist J. D. Adupa, Information Documentation activities are showing rapid progress as the result of the installation of the four databases AGRIN, CARIN, ULIST and AGRINF.

The AGRIN database has helped in the identification and rearranging the collection of National Documents. At present, those documents at the Library Unit of NADIC and from Namulonge are already on the database while work is continuing to other Agricultural Information Units in the country. All these efforts are geared to the production of the Union Catalogue which is essential for Agricultural Information Exchange. On the other hand, input from AGRIN to AGRIS database has started bearing fruits as some Ugandan records have began to appear in the AGRINDEX and very soon on the CDROM outputs.

The CARIN database has also been strengthened and now holds more than 108 research projects records since 1991 from which some are being exported to CARIS database. The CARIN database will facilitate in the production of a National Directory of Agricultural Research Projects, a tool which will help greatly in the exchange of Research Information both at national and international levels.

5.23 COORDINATION

As the focal point, NADIC has already started on the main task of linking other Information Centres. At present, despite the poor means of communication, the head of NADIC maintains that NADIC is coordinating the Information Units of Namulonge Research Station, UTRO, UFRO and Entebbe Animal Health Centre. By road and by post, resources sharing between these centres is becoming possible and efficient coordination even to other centres is expected once NADIC has been strengthened materially and financially.

Though most of the achievements are strained by the numerous problems, NADIC has at least started on all the activities required of it in the fulfilment of the objectives specified in the project which established it.

5.3 ESTABLISHED FUTURE STRATEGIES

5.31 GENERAL PROPOSALS BY THE GOVERNMENT

The Government of Uganda recognized the need to develop an Information System that will allow access to Scientific and Technical Information for improved agricultural production. As a result, NADIC was established by a project which is now to be followed by another project document which will be prepared seeking to develop a system and a network of Agricultural Information in Uganda.

5.311 DEVELOPMENT STRATEGIES:

According to Mr. Mugasha, a consultant in this field, this development will involve such stages;

- i) Establishing the NADIC within the Research Division of the Ministry of Agriculture; a stage which has already been achieved.
- ii) Integrating the Libraries of Ministry of Agriculture, Research Stations and other Units of the Ministry (possibly including the registries) with NADIC to form the National Agricultural Documentation and Information Service (NADIS).
- iii) Establishing functional links with other libraries in the Agricultural Sector, adopting common standards and methodologies to form the National Agricultural Documentation and Information Network (NADIN)

Once NADIN has been attained, it will be possible to say that a sub-system the National Agricultural Information has been formed with a National note at Kawanda. This sub-system will consist of all Agricultural Libraries under the following Ministries including their parastatals: Agriculture, Animal Resources and Fisheries, Cooperatives and Marketing, Environment, Wildlife and Tourism and the Faculties of Forestry and Agriculture in Universities.

A chart for the proposed Agricultural Information Sub-System is shown in appendix VI.

5.312 INCORPORATION OF NAIS INTO NATIS

However, this system will not be developed in isolation. The Government has also put in more efforts to coordinate and improve the Information Services in Uganda as a result, the National Information Advisory Agency Committee (NIAAC) has been established. This NIAAC prepared a report "The proposed establishment of National Information System (NATIS) and National Information Policy : guidelines for Uganda. At present, the establishment of the Agricultural Information Sub-System is being carried out along the lines outlined in both the committee's report and Professor A. Neelamegham's paper: "National Policy on Information Systems and Services for Uganda : a proposal" which was presented on a seminar on the establishment of NATIS in Kampala in 1989.

5.32 DETAILED PROPOSALS BY NARO

Since NADIC was established under the wing of the Research Division of the Ministry of Agriculture, the Uganda's National Agricultural Research Organization (NARO) has developed more detailed strategies for NAIS. These are based on the fact that a dynamic Agricultural Research System should provide a means for a sustained flow of information from various National, Regional and International sources to enhance support for research⁽³⁾.

This can be achieved through the establishment of NAIS, a system which is essential for the fulfilment of the NARO research strategy and plan. This system should at the same time be compatible with and complementary to the proposed National Agriculture Plan and Program.

The overall objective of NAIS will be to provide support for Agricultural research by the efficient and timely supply of relevant information to scientists and other users according to their needs. This will be achieved by the creation of a National Agricultural Library System which in practice is an integrated network of Libraries in Agricultural Research Institutes and Universities and these would be coordinated and managed by a Central Unit which will constitute a focal point for the National Documentation and Information Service.

NADIC has already been established as the Central Unit and charged with the preparation of a proposal for the development of the NAIS.

In the context of current situations, several institutional options for the establishment of a NAIS have been considered resulting in the choice of one. This is the development of local units in phases after the Central Unit has been made fully functional.

The Central Unit would have responsibility of providing guidance, support and centralized services to the network of individual units. This option has the merit of capitalizing on the strong developments at the Central Unit whilst building up local library and information facilities sufficiently to enable to serve an increasing proportion of immediate local needs.

5.321 ROLE AND OBJECTIVES OF NAIS

The primary role will be to draw together the resource base of National Agricultural Research System (NARS) Information specialists and facilities to collect, process and disseminate pertinent Agricultural Information to serve the needs of researchers within the NARS and to make information available for use by agricultural extension specialists and other users.

NAIS will serve to standardise information collection, cataloguing, documentation and dissemination services as well as establish equipment specifications where possible and applicable. Such a system will allow better utilization of the limited financial resources allocated for the development of information services.

NAIS will also establish and maintain linkages with Regional and International Agricultural Information systems and databases in support of Agricultural Research in Uganda. The general objectives of the NAIS will be to:-

- i) develop and sustain an effective and efficient Information System that can provide continued support to agricultural development.
- ii) develop an interactive and cooperative information collection and dissemination network among the NARS member Institutes and concerned Government bodies and Non-Governmental Organizations (NGO's)
- iii) design and implement a computer based system in support of the collection and management of naturally generated agricultural information including published, non-published, conventional and non-conventional materials.
- iv) maintain a database to compile, on regular basis, an Agricultural Bibliography, a Directory of Agricultural Research Projects and a Directory of Agricultural Scientists and Technologists in Uganda.
- v) provide guidance and assistance in information unit development and short and long term training of information specialists of the NAIS units.

More of the objectives are manifested under the proposed activities of the enlarged and strengthened Central Unit, NADIC.

The organizational structure of NADIC will basically include the Library, Documentation, Publication and Reprography sections which together with their functions are shown in Appendix V.

The NAIS will be developed as a cooperative two-way information flow with the overall management as the responsibility of NADIC and other suggested committees which include the Technical Advisory Committee, Standardization Committee and Cooperative Acquisition Committee.

However, considering the current economic conditions, it is envisaged that a longer time frame (5-10 years) will be required to fully design, develop, implement and institutionalise all activities necessary for the creation of an efficient and productive NAIS.

All in all, these are just proposals or strategies which need to be funded so as to put them into practice. If NADIC is to survive and provide all the enumerated activities, substantial investments and continued support will be needed as Kigongo-Bukenya also argues:

"At the end of the day, the real growth of scientific and technical information will depend on the Government's attitude which should influence the adoption of the National Policy, setting up the legal basis and providing the necessary resources"(4)

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CHAPTER VI

SITUATION OF THE UGANDA AGRICULTURAL
INFORMATION SERVICES : FINDINGS AND
FUTURE RECOMMENDATIONS.

INTRODUCTION:

This study set out to examine the situation of the Uganda's National Agricultural Information System (NAIS). Information has been gathered about the several Agricultural Information Centres but most of the attention has been paid to NADIC which heads the Agricultural Information Services in the country. As such, the study examined in detail the background of NADIC, its activities in effecting the required services and the problems that are met at the Centre. Solutions to some problems have been discussed together with the achievements made by NADIC and the established future proposals of NAIS by the Government and the National Agricultural Research Organization (NARO).

This chapter as a conclusion, outlines these findings in Section A and future recommendations of the NAIS in Section B.

SECTION A.

FINDINGS

1. ESTABLISHMENT OF NADIC

For improved Agricultural production and advancement, the Uganda Government recognized the need to develop an Information System which could allow easy coordination of scientific and technical information. Since such a system has to be coordinated by a single body or centre for the purposes of managerial efficiency, NADIC was established as the first step towards the establishment of the National Agricultural Information System (NAIS). At present, NADIC is responsible for availing interested organizations or individual users with the relevant information from National, Regional and International sources.

22 PARTICIPATION OF NADIC TO AGRIS AND CARIS.

The established NADIC is a National Coordinating Centre for FAO's International Agricultural Systems, AGRIS and CARIS. NADIC serves as an AGRIS liaison office and an input centre thus has the responsibility of effecting technical interaction with the AGRIS system and reporting all and inputting some agricultural literature produced in Uganda to the AGRIS database NADIC and in turn retrieves from the system any relevant information from other member countries of AGRIS.

As a Coordinating Centre for CARIS, NADIC contributes information on on-going agricultural research projects in the country and in turn has access to all contributions from other member countries and takes whatever is needed.

6.23 ACTIVITIES OF NADIC

NADIC is presently engaged in raising the library collection through purchase, subscription and encouraging authors in the field of Agriculture to deposit their works at the Centre. More publications come from donations and bibliographic records from several databases, regional and international. The work of documentation has been picked up. At present, four local databases have been installed with the methods of information processing coinciding with those for AGRIS and CARIS databases for the efficiency in interaction between NADIC and databases of these systems. Communication between NADIC and other internal Agricultural Information Centres is mainly by road while interaction between NADIC and databases of regional and International Information Systems is through the exchange of bibliographic information by use of magnetic tapes, microfiches, diskettes and hard copies.

Consequently, the Centre offers regular library services, literature search on the local and foreign databases, referral services, current awareness, SDI and photocopying services.

6.24 EQUIPMENT

The concept of modern technology is still a new concept of NAIS and Uganda as a whole. Out of the identified eighteen agricultural information units, it is only NADIC with a micro computer, and a CDROM drive which enables input and access of information. This hinders exchange between these units due to lack of terminals and also delays in the international exchange due to the availability of a single computer in the whole NAIS.

6.25 PROBLEMS

NADIC as a heading centre is facing a number of problems in effecting its objectives as well as maintaining the NAIS. These problems range from poor and inadequate collection of both local and foreign literature, poor acquisition methods, poor information processing methods, lack of trained personnel, poor housing conditions, poor technology and lack of political support which has led to lack of information policies and poor funding. Such problems hinder the progress of establishing an effective NAIS.

6.26 SOME SOLUTIONS AND ACHIEVEMENTS

Some few remedies to the problems have been provided through FAO. Through NADIC, the National Coordinating Centre for AGRIS and CARIS, Agricultural Scientists in Uganda are able to exchange valuable information with their counterparts in other developed and developing countries.

AGRIS facilitates in the acquisition of the prevailing non-conventional literature which constitutes the greatest part of agricultural information produced in the country. The systems have also assisted in the training of personnel in the relevant information processing methods.

With some equipment from FAO, NADIC can now allow users access to several local and foreign databases. The microcomputer also enables input to the AGRIS and CARIS databases. This exportation of current documents and research projects has promoted Uganda's literature to the international scene.

6.27 ESTABLISHED PROPOSALS.

Due to the need for a strong information system, the Government has considered another project which will aim at developing a system and network of agricultural information within the research division of the Ministry of Agriculture. This will be done in several stages with the first stage of establishing NADIC already accomplished. At the closer scene the National Agriculture Research Organization (NARO) opts for the development of local units in phases after the Central Unit has been made fully functional. This Central Unit (NADIC) will then have the responsibility of providing support and centralized services to the network of individual units. NARO further proposes the structure and activities of the NADIC as a Central Unit.

SECTION B.

6.3 FUTURE RECOMMENDATIONS.

6.31 COLLECTION DEVELOPMENT.

There is need for improvement in the present collections in the identified Agricultural Information Units. Heads of these centres should aim at acquiring, adequate, up-to-date and relevant literature both local and foreign. This will give the various users a variety of alternatives some of which might suit their purposes.

6.32 INFORMATION PROCESSING

A single format should be adopted by all the Agricultural Information Units in the country to allow maximum compatibility for exchange purposes such that each unit is able to convert an exchange - format record from an internal - format record and vice-versa. This national format should again be compatible with other International formats to facilitate international information exchange. This solves the technical and economical problems of preparing several computer programs to accommodate the translation of records from one format to another and also the problem of completely inhibiting exchange if some Centres or Units do not adopt any format.

6.33 STAFF DEVELOPMENT AND USER TRAINING

Efforts should be directed to the production and maintenance of trained and experienced personnel who are responsible for running the individual units and the whole system. Further training opportunities within and abroad should be availed and more incentives should be considered in attracting and maintaining qualified personnel.

6.34 TECHNOLOGY

Concerned bodies should not allow lagging behind where development matters are concerned while something could be done. The main concern on this point is availing necessary facilities and equipment which can assist in improving on the present means of communication between the various units and the Central Unit. These facilities may include electricity, telephones and to a greater extent each unit should at least have a terminal computer for the effective and efficient interaction within the system.

6.35 COORDINATION

Despite lack of the facilitating equipment, the existing units should always endeavour to share whatever is available between them. This mainly applies to supplying information about the acquisition of new materials and about current research projects being carried out and recorded at the parent Agricultural Centre. This checks on the duplication of efforts and wastage of time and resources elsewhere.

6.36 ACCOMMODATION

For efficient services, if possible adapted buildings should be as much avoided. This is especially important where storage of the delicate modern equipment is concerned. Functional buildings which are specifically designed to cater for the desired services, personnel, users and equipment should be erected if funds are available.

6.37 POLITICAL SUPPORT.

For quicker and easier establishment and effective maintenance of NAIS, a lot if not everything is expected from the government. This serves as a source of all the necessary resources especially funds for running all the long and short term priorities and programmes and provide continuity of support and maintenance of services. It is also upon the government to set up the legal basis or the standing policy and give clear direction for the development of an Information System to support agricultural research and extension services. The Ministry of Agriculture should also consider the issue of even distribution of these information units throughout the country so that any one in need of agricultural information can get it easily without a lot of expenses.

CONCLUSION.

Since agriculture is the back bone of the economy of Uganda, the need for information will increase and information will remain the necessary tool for further agricultural development. Considering what has been done and is yet to be done in improving the agricultural information services in the country, it becomes clear that a lot of effort and resources are required for not only strengthening NADIC the Central Unit, but also establishing a sound and effective NAIS capable of handling and disseminating scientific and technical information. Only then will users in Uganda be able to fully utilize local and international information resources.

Map showing some Agricultural Research Institutes whose Information Units will be under the Agricultural Information System.

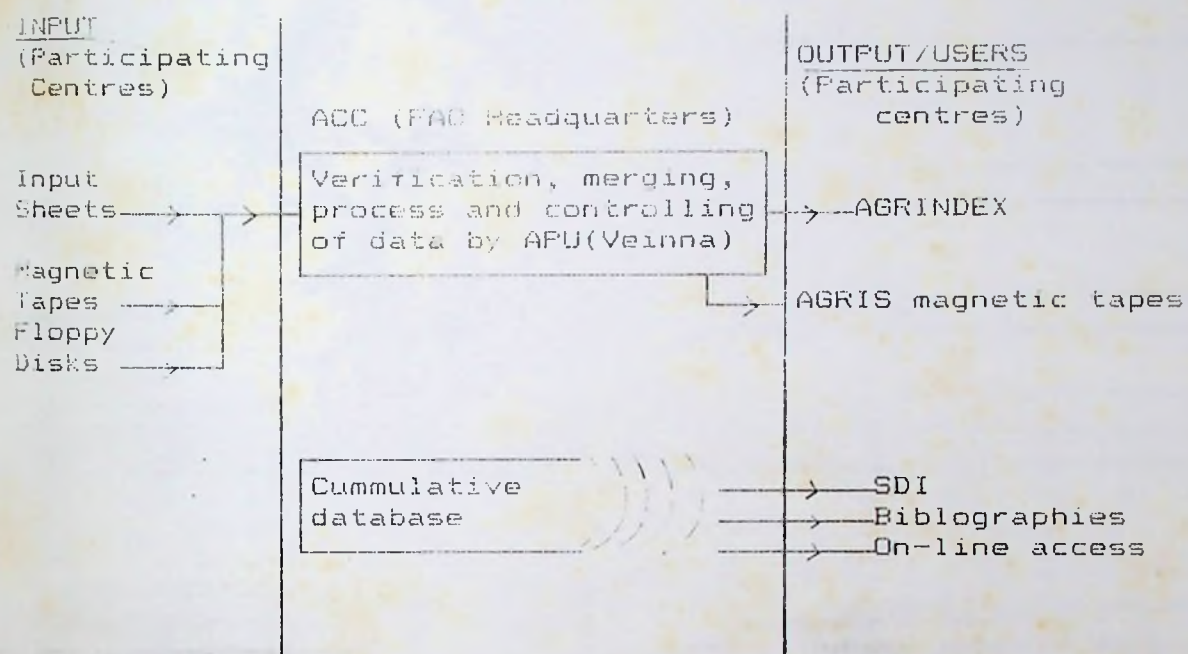


KEY

- x - Research Institutes
- ▲1 - Kawanda Research Station
- x2 - Namulonge Research Station
- x3 - Namalele Research Station
- x4 - UPRC
- x5 - Entebbe Animal Health Research Inst.
- x6 - Serere Research Station
- x7 - Melungye Research Station.

APPENDIX I

THE AGRIS TECHNICAL PROCESS



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Area		111			
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	Secondary elements	201			
Author(s)	Name	210			
	Place	211			
	Date	213			
Original title (script)	Main Title	230			
	Secondary elements	231			
Edition		250			
Report/Patent Number		300			
Serial Number(s)		310			
ISBN/IPC		320			
PRINT	Place of Publication	401			
	Publisher	402			
	Date of Publication	403			
Edition		500			
Language of text		600			
Notes		610			

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Index terms from local sources	820	
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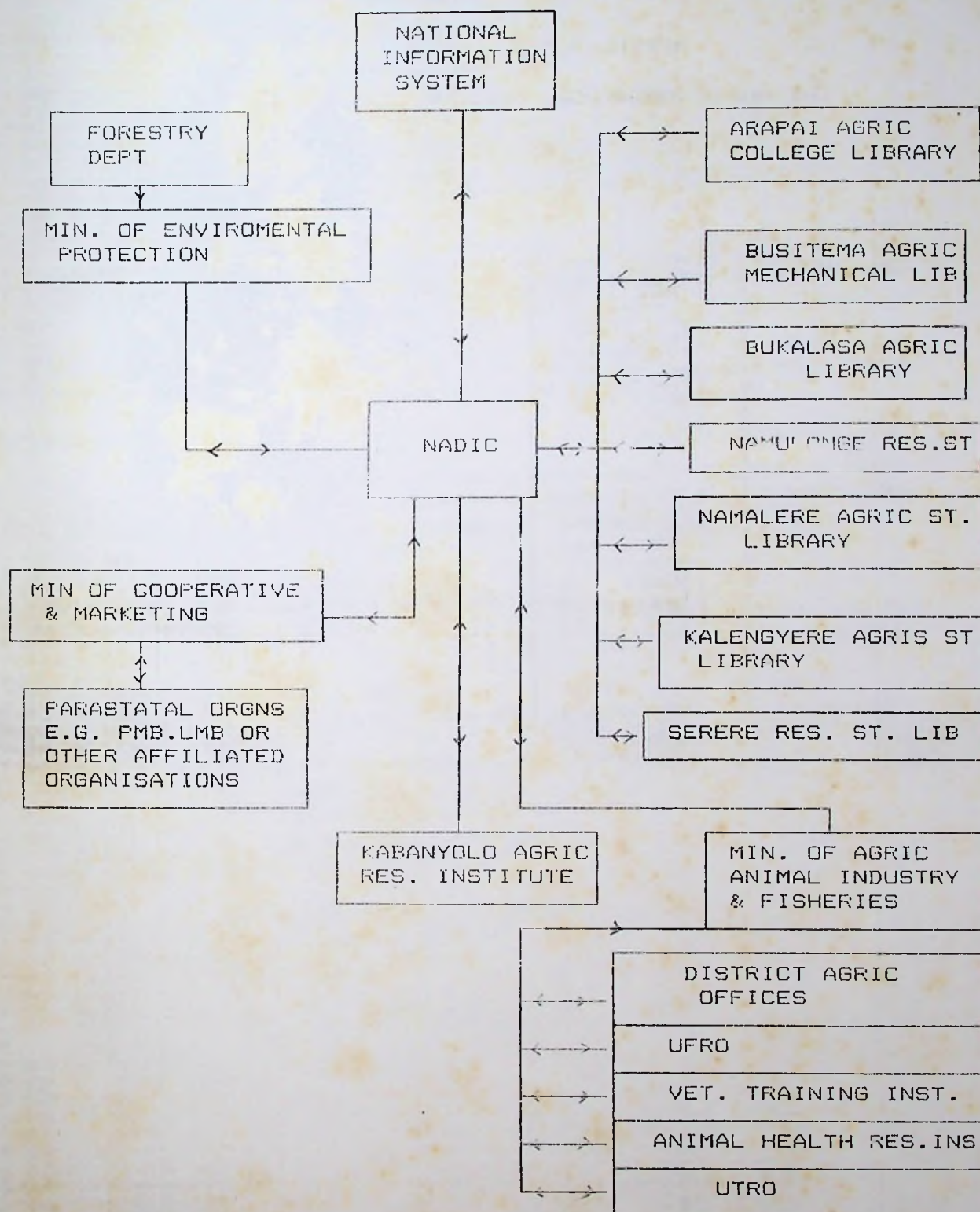
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APPENDIX IV

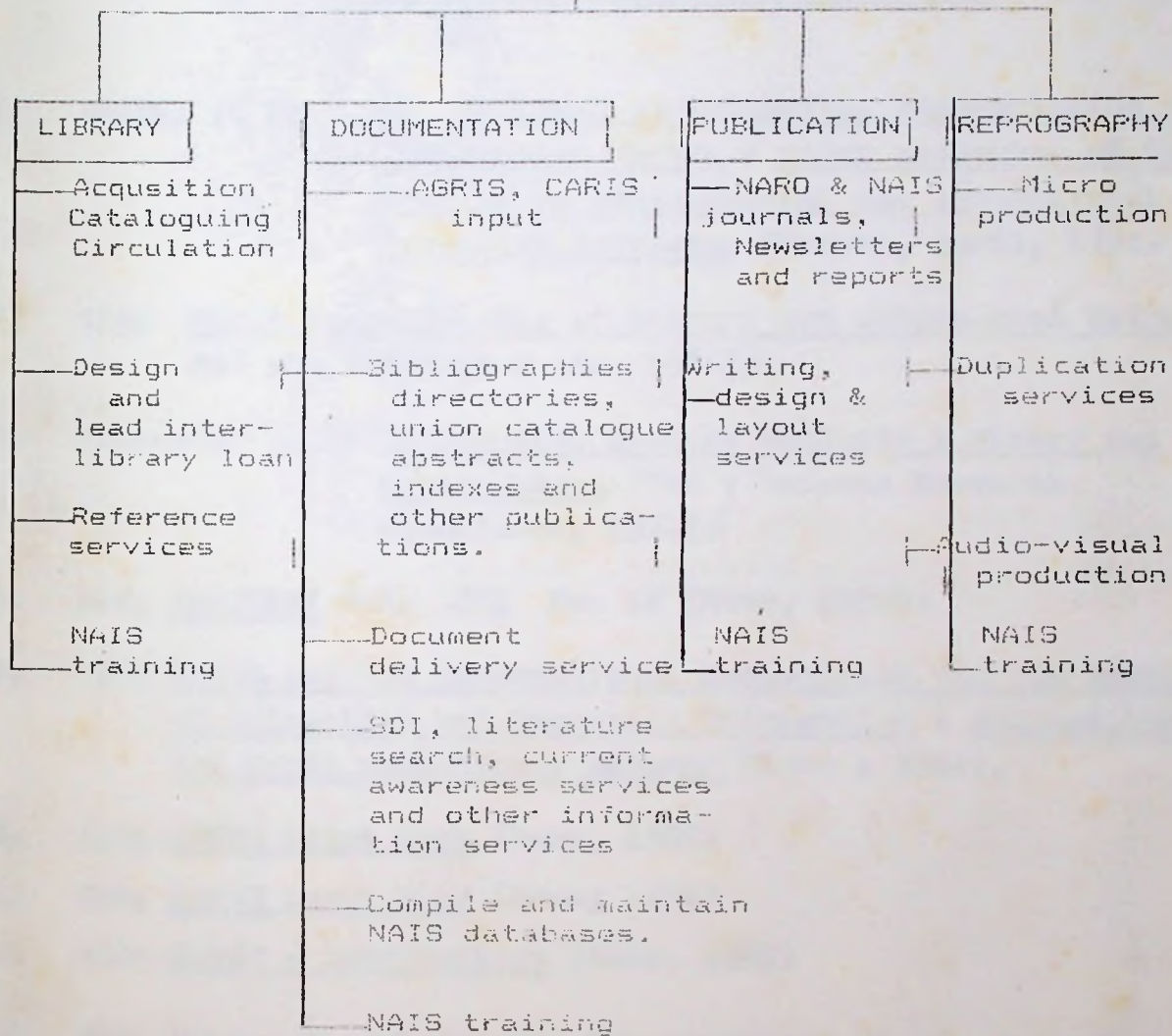
A CHART FOR THE PROPOSED AGRICULTURAL INFORMATION SUB-SYSTEM.



APPENDIX V

NARD

NADIC



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