UGANDA SCIENCE DIGITAL LIBRARY

Project proposal

Collaboration Programme between the Libraries at University of Bergen and Makerere University

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1 PREAMBLE

This document is an outcome of collaborative efforts between the University of Bergen and Makerere University. It aims at soliciting funding for setting up a Uganda Science Digital Library at Makerere University. This project will be broad based and will to accommodate all information on science nationwide.

1.1 EXECUTIVE SUMMARY

The proposed Uganda Science Digital Library will house scientific information from all science institutions in the country. The materials to be collected will go as far back as possible. The major objective is to have a digitized science information database that can be easily accessed worldwide. Among the specific objectives the most important one is to develop a mechanism for science information collection, storage, and reservation of all national documents and other formats of data for future use. A reasonable nucleus of relevant documents already exist in the Makerere University Library especially in the Africana/ Special Collections Section through the Legal Deposit Act which enables it to legally acquire indigenous output collection of dissertations, theses and seminar proceedings. The Makerere University Library has three collaborative partners in the project: University of Bergen, Sida/SAREC, and Carnegie Corporation. The project will start with a pilot study to obtain some experience on data collection, practical digitization, scanner software, Open Access software and legal aspects on storing full text documents. The pilot study will be evaluated by the end of 2004. Provided sufficient funding the main project will be launched in 2005.

1.2 INTRODUCTION

Like many industrializing countries, Uganda's economic growth will depend on the success of applying science and technology to achieve a technology-based economy. The availability and free flow of scientific information based on research is a sure way of successfully applying science and technology. Faced with this reality, the government established the Uganda National Council of Science and Technology (UNCST) as a mechanism of rationalizing the integration of science and technology in social economic development through explicit science and technology policies. UNCST was established as machinery for advising government on all matters relating to scientific and technological activities necessary for the proper development of the

country. It was established by statute no. 10 1990 as a corporate institution under the Ministry of Finance and Economic Planning (MFEP) replacing the National Research Council (NRC) established in 1970 by a Cabinet decision to guide and coordinate research and experimental development throughout Uganda.

Accordingly UNCST was given the mandate to initiate scientific research, gather research results and compile information gathered from research findings. It also has the mandate of coordinating institutions sponsoring and conducting research in the country, be it public or private institutions as well as donor sponsored research carried out in Uganda. Uganda government has positive attitude towards national scientific information. The willingness of the government is shown in its activeness in the Action Plans regarding Science and Technology (S&T). Uganda government Action Plan on S&T is embedded in its willingness to participate and contribute to International Action Plans on S&T. According to Vision 2025 1998[1] one of such international action plans was The Vienna Program of Action on S&T for development 1979 which stated that: “The primary responsibility for development of Developing Countries rests upon those countries themselves”. Other Action Plan Conferences in which Uganda has participated and contributed include:

- The African Regional Plan of Action for the Application of Science and Technology to Development 1970.
- The First Conference of Ministers Responsible for the Application of S&T to Development of Africa, CASTAFRICA 1 1974.
- The Lagos Plan of Action (1980 – 2000) and the Final Act of Lagos.
- Program of Action for the Industrial Development Decade of Africa 1982
- CASTAFRICA II 1987
- Meeting on Programs in Science and Technology in Africa 1988
- Priority Africa – UNESCO Program of Action 1990 – 1995

The recommendations from these meetings cover mainly three themes:

- The setting up of institutional structures (Government ministries and Councils of S&T) to carry out S&T development.
- Deployment of human and financial resources devoted to S&T.
- The popularization of S&T.

It is such declarations that stimulated the developing countries into striving to formulate strategies of initiating development based on S&T. This explains Uganda's effort to set up NRC of 1970 followed by UNCST of 1990.

Institutions involved in science information gathering

Makerere University Library Service is one of the institutions in the country that gathers national information including scientific information. The library, which is also a national reference, has a substantial collection on science. It has also has specialized science libraries in its set up. These are:

i. Sir Albert Cook Library serving the Medical School, Mulago Hospital Complex and as National Medical Reference Library.
ii. Agriculture research library of the Institute of Agricultural Research, Kabanyolo.
iii. Veterinary Medicine Library of the Faculty of Veterinary Medicine.

These branch libraries of Makerere University Library that specialize in scientific information collections are some of the good existing scientific information centres. They can be networked with the proposed science digital library to form a National Science Digital Reference Library.

1.3 SCOPE OF THE PROJECT

The proposed Uganda Science Digital Library will house scientific information from all science institutions in the country. The materials to be collected will go as far back as possible.

1.4 STATEMENT OF THE PROBLEM

Scientific information in Uganda is scattered, duplicated, poorly organized, and difficult to access and in most cases, poorly utilized. The major problem is lack of a national policy on information in general and scientific information in particular. There are gaps in the overall scientific information structure. The linkage between the institutions involved is very poor. The scientists themselves are not linked, and they cannot share their findings to help them define Research and Development priorities. Scientists are not facilitated to mix with international researchers to compare notes. This leads in some of the areas, to substandard research. Science has not yet been popularized to attract widespread interest and support from the entire population. The research that is

done in the country in most cases has no link with the unique and isolated development goals in the country. The resulting situation is that the research system in Uganda is weak and not clearly integrated in the national development priorities and plans. There is no single identified place with well-preserved information that can be approached for coordinated scientific information.

For many reasons, both retrospective and current scientific research information on Africa in general and Uganda in particular is rarely indexed in international bibliographic databases. This problem is further exasperated by the inaccessibility of such material within the country and this creates the problem of dissemination of such information. This inability to locate indexes, abstracts, and full text of indigenous scientific information for inclusion into international electronic databases is frustrating to students, staff and researchers in the concerned disciplines and fields. It gives rise to lack of visibility for scientific information by local and international scholars. It is in this spirit that Uganda Science Digital Library is being proposed to serve the University and the nation at large.

1.5 OBJECTIVES

The major objective is to have a digitized science information database that can be easily accessed worldwide. The specific objectives are to:

1.5.1 Develop a mechanism for science information collection, storage, and reservation of all national documents and other formats of data for future use. This is to be facilitated by abstracting, indexing and classifying information resources for database production both in electronic, print format and microform for users.

1.5.2 Facilitate the establishment of national, regional and global linkages.

1.5.3 Strengthen the institutional capacity of the library in the Faculty of Science and provide visibility and accessibility to science research of Ugandan scientists in general and scientists at Makerere University in particular.

1.5.4 Create a network of scientific information databases in participating institutions.

1.5.5 Set up an appropriate and efficient information dissemination system, which is accessible to all users.

1.5.6 Sensitize the public about the value of science information for study and research.

1.5.7 Strengthening the research and scientific information capacity of the science-based faculties of Makerere University in particular and other scientific research institutions in general.

1.6 JUSTIFICATION

Uganda as a nation that has recognized that it owes social development to well researched and coordinated scientific information needed to have a hub of national scientific information. This hub has to be planned and developed. As seen from the background, such a hub of scientific information has never been developed. The information available is scattered and hard to use for any organized developmental work. Makerere University in collaboration with the University of Bergen, Norway, have realized this need and have put in efforts to see it done to meet the objectives mentioned above. It is a justified cause for Makerere University as a leading academic institution to champion this kind of work for the nation.

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Makerere University Library Services is justified to undertake this project for the following reasons: -

1.6.1 The project's aims and objectives fall within the mandate of the library's mission of being an excellent provider of information for study and research to the University staff, students and the Ugandan community at large.

1.6.2 One of the Library's priorities stated in the Strategic Plan 2001/05, is enhancing access to information resources taking into account specialized interest groups.

1.6.3 A reasonable nucleus of relevant documents already exist in the Makerere University Library especially in the Africana/ Special Collections Section through the Legal Deposit Act which enables it to legally acquire indigenous output collection of dissertations, theses and seminar proceedings.

1.6.4 The library has established an electronic catalogue that can be accessed throughout the campus Intranet and Internet. This project will enable the

production of full text content whose Meta data exists in the electronic catalogue.

1.7 SUPPORTING RESOURCES

1.7.1 The Library will soon have the capacity to input on CD-ROM the information generated for the proposed database that could be subscribed to by other interested resource centers before they are linked to the Internet.

1.7.2 The library has the professional expertise in collecting, organizing, storing, preserving and disseminating information resources and this is being harnessed by the Information Communication Technology (ICT) emphasis.

1.7.3 The Library has the capacity to provide linkages and outreach scientific information dissemination and document delivery services to staff, students and researchers both within and outside the country.

1.7.4 The library has collaborative partners in development that have offered to provide technical assistance that will enhance the establishment of the Uganda Science Digital Library namely: University of Bergen, Sida/SAREC, and Carnegie Corporation.

1.7.5 The library has an ICT Section with two librarians and three supporting staff who are qualified in ICT and related applications.

1.8 EXPECTED RESULTS

The major out come of the project will be:

1.8.1 Establishment of a Uganda Science Digital Library

1.8.2 Creation of a scientific information database

1.8.3 Training of at least ten library staff

1.8.4 Linkages and resources of science information

1.8.5 An efficient scientific information disseminating system

1.9 PROJECT DESIGN AND IMPLEMENTATION

1.9.1 Implementation priority sequence:

iii. Assessing the availability of scientific materials to be included in the Uganda Science Digital Library
iv. Collecting the identified materials.
v. Building the digital library database
vi. Launching the digital library and publicizing it for public use
vii. Usage of scientific materials

The Uganda Digital Science Library will be set up in the Faculty of Science at Makerere University. The Faculty has a population of about 4000 undergraduates, 200 postgraduates and 200 teaching staff.

In preparation for this Service the Faculty of Science has set aside a temporary room to house the digital library. The proposed Science Digital Library will be established in collaboration with University of Bergen Library. The library will house a database of materials gathered from Makerere University to begin with and from Uganda Government Ministries, research and academic institutions and NGO's. When established, Uganda Science Digital Library will be networked electronically with all institutions engaged in scientific research to ensure that the available science information is widely accessed.

1.9.2. The proposed components

The proposed Uganda Science Digital Library project shall have three components namely:

i. Science database of information resources currently uncoordinated and scattered in various governmental, non-governmental organizations and institutions in Uganda.

ii. Existing research publications at Makerere University.

iii. Microforms held at Makerere University Library.

1.9.3 Implementation

a. Pilot study
i. Prepare a list of information sources
ii. Recruit and train research assistants in data collection
iii. Format for describing each collection.

b. Capacity and competence development

i. Building awareness through workshops

ii. Staff training and retraining

- Attachments
- Training workshops

iii. Study tours: at least two members of the project team will undertake a short study tour to advance their knowledge in digital libraries.

c. Installation of hardware and software

d. Testing of the equipment and software

e. Testing of the system at Intranet level

f. Uploading of databases and enabling Intranet and Internet access especially to the collaborating University of Bergen Library.

g. Dissemination of information workshop

h. Monitoring and evaluation of the project

i. Quarterly and annual reporting systems

j. Collecting and making an inventory of science theses and dissertations which are on microform.

k. Digitizing microforms

1.9.4 Implementation capacity to set up a Uganda Science Digital Library at Makerere University

The following is the required capacity:

i. Project Implementation Committee - 7 people

ii. Project consultant - 1 person

iii. Project Manager - 1 person

iv. Librarians - 2 people, and Library Assistants - 4 people

v. Library and staff in Science faculties at the University of Bergen and Makerere University – 2 people.

vi. DBMS developer consultant - 1 person

vii. ICT Technical staff (operating systems and LAN management) - 3 people

ix. Data entry clerks - 3 people

x. Professional information scientist (editing and quality control specialists) - 3 people

1.9.5. Equipment

i. Furniture
ii. Hardware
iii. Software
iv. Electrical stabilization equipment
v. Photocopying machine
vi. Vehicle
vii. Back-up facilities
viii. Air conditioning equipment for
ix. Scanners
x. Digital camera
xi. Computer accessories
xii. Consumables, small spare parts and other accessories.
xiii. Microfilm camera
xiv. Microfilm readers

2 PILOT STUDY

Bergen University Library is currently preparing a project setting up an Institutional Archive for The University of Bergen. This archive will contain publications and research from the employees of the University, mostly in full text. A software package is already installed and tested, and a service is planned to be operative on June 15th. The software chosen is a web application called DSpace, an open source product developed by Hewlett Packard (HP) and Massachusetts Institute of Technology (MIT).

A pilot project is starting this summer, where Bergen University Library will publish various documents for a few chosen communities at the University. Makerere University Library will be one of the communities, letting the staff at Makerere University Library publish digitized documents, while the service is run by Bergen University Library.

i. Initial studies
    a. Copyright issues need to be assessed.
    b. Which document formats are to be supported.
    c. Prepare a list of information sources. Material from different parts of the Makerere Library collections should be selected; these should also be in various formats. Choose documents of different sizes and number of pages. Choose from pictures, theses, articles, manuscript, valuable historic documents etc. to get experience with digitizing varied material and making it available on-line.
ii. Recruit and train research assistants in data collection. Prisca Tibenderana has during her stay in Norway received initial traning in using both the registration- and the administration module of DSpace, and will be able to train other staff at Makerere University Library. If this additional training is needed, staff members from Bergen University Library can assist with this.
iii. Scanning of the selected material to be digitized
iv. Metadata registration and uploading of files into Dspace
v. Cataloguing of the material in the libraries catalogue, including urls to the resources
vi. Information to the rest of Makerere University Library
vii. Evaluation of pilot project

3 IMPLEMENTATION OF COMPONENTS

The format for describing each collection will be carefully considered and planned, in a small pilot project, to prepare for the collection stage.

3.1 COMPONENT A: Database of Ugandan Scientific Information Sources

3.1.1 Introduction

There is limited access to scientific information generated in Uganda, thereby limiting Uganda's research presence in the international sphere.

3.1.2 Objective

The objective of this component is to establish a science information database and create a digital library of existing materials currently scattered in Uganda. This will facilitate easy access to such information locally and globally.

3.1.3 Subdivision of Component A

For smooth implementation, this component will further be subdivided into small manageable tasks that can be handled one at a time.

3.1.3.1 Collection level: Collecting data on scattered information resources and registering these data in a database at a collection level.

The objective of this level is to establish a database of the most important Ugandan collections of scientific documents. This database will not contain descriptions of individual documents only; it will contain the various collections, their main parts and properties. This database will serve two main purposes:

a) A high level inventory of current and retrospective scientific information resources in Uganda. This inventory will be of permanent value and should be kept and updated after the present project is terminated. It may also be linked to the future national bibliography or nation wide library catalogue as a high level description of institutions and collections. The collection description will be made available on the Internet, which will be a basis for selecting resources for further treatment in Level 3.1.3.2. and 3.1.3.3

b) Some of the record fields for describing a collection will be:

- Owner of the collection (name of institution)

- Contact points (postal address, contact persons, telephone, e-mail etc.)
- Description of each part of the collection:

- Type (manuscripts, maps, books, these, etc.)
- Size
- Discipline/subject (biology, medicine, etc.)
- Locally produced documents/ publications.
- Journals
- Indicators of value /importance
- Catalogue status (no catalogue, card catalogue, online)
- Availability (interlibrary loans, photocopy, copyright clearance etc.)

3.1.3.2 Document level: Selecting important collections and cataloguing their contents at a document level.

The objective of this level is to create an online catalogue (database) of important scientific documents that are available in Uganda institutions, in particular Makerere University. This catalogue will be an integral part of Makerere online library catalogue, but will also be searchable as a separate database component. The items in this database will be catalogued to a high standard with classification codes and keywords, enabling it as a source from various Internet information services. This database may also serve as a nucleus of or an addition to a future Uganda National Bibliography. The selection of documents to be catalogued will be based on the inventory of collections generated by level 2.1.3.1. All cataloguing will be performed in or be compatible with the new Makerere library system. The cataloguing of items in the Uganda Science Digital Library will be coordinated with the cataloguing of items received under the Legal Deposit Law.

3.1.3.3 Full text level: Selecting important documents and digitizing them, i.e. converting them to an electronic full text format.

The objective is to enhance the availability and archival security of important scientific documents by complete digitization, i.e. by converting their full text content to a standardized electronic format. These documents will be linked to the catalogue developed in level 2.1.3.2, and made available on Internet both through the online catalogue and through other information services. The selection of documents to be

digitized will be based on the information gathered in level 2.1.3.1 and 2.1.3.2. and set of criteria developed earlier in the pilot project. The digitization of full text in this level will be preceded by a pilot project in order to gain competence and evaluate different technical approach for digitization.

3.1.4. Methodology

i. A pilot project will be carried out at each level and questionnaires will be designed and tested.

ii. Findings from the pilot project will be used in the implementation of the the major project

iii. Questionnaires will be administered to science-based faculties at Makerere University, other institutions of higher learning, research organizations and NGOs

iv. Reporting of findings and recommendations.

3.2 COMPONENT B: Local Current Research Publications at Makerere University

3.2.1 Introduction

Makerere University Library in collaboration with University of Bergen Library will provide technical support in establishing and developing a Uganda Science based database that will:

- Provide information to researchers, university staff, collaborators and the public about on going scientific research activities in Uganda.
- Provide measurable indicators to the University authorities and funding agencies on scientific research progress in Uganda.

3.2.2 Expected Results

A national database for documenting ongoing scientific research activities and their results will be developed. This database based at Makerere University will consist of several modules;

i. Ongoing scientific research activities will be generated. This will state the progress of the research, institution(s) where the research is being conducted, principal researcher, funding agency, etc.

i. Publications of recently concluded scientific research results on/about Uganda.

ii. Recorded scientific talks/ lectures, dynamic and static images.

iii. Abstracts of PhD and Master Dissertations/Theses in scientific fields conducted in Uganda.

iv. Press releases on scientific developments in Uganda.

vi. Annual project reports.

vii. Establishment of a Science journal to be initiated by the Faculty of Science.

viii. A web-based interface to enable local and international accessibility to scientific materials.

3.2.3 Execution Plan:

i. Design of the specifications of data structures and database routines

ii. Development of database interface

iii. Data entry

iv. Database editing and validation

v. Testing and adapting the new system

vi. Monitoring, evaluation and review of the project

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5 THE BUDGET

ITEM	PARTICULARS	Quantity	Estimated Unit cost (US$)	Estimated Total cost (US$)
A. PILOT STUDY EXPENDITURE				
1. Computers and accessories	PCs	3	1,200	3,600
	Scanners	2	300	600
2. Personnel	2 people (1 fulltime, and 2 halftime)	1 m/y		
3. Staff exchange	Training and eval. trips	3	5,000	15,000
Sub-Total				**19,200**
B. CAPITAL EXPENDITURE				
1. Computers and accessories	Servers	2	45,000	90,000
	PCs	10	1,200	12,000
	Laptops	2	2,500	5,000
	Network heavy duty printers	2	5,000	10,000
	Heavy duty scanners	2	10,000	20,000
	Digitizers	2	10,000	20,000
	Microfilm camere	1	10,000	10,000
	Microfilm processors	1	10,000	10,000
	Microfilm duplicator	1	10,000	10,000
	Mircroforms and assocaited chemicals	10	500	5,000
	Software		5,000	5,000
2. Other related equipment	Vacuum cleaner	1	500	500
	Air conditioner	1	3,000	3,000
	Storage rack	1	500	500
	M3 security equipment and accessories	1	5,000	5,000
	Server rack	1	500	500
ITEM	**PARTICULARS**	**Quantity**	**Estimated Unit cost (US$)**	**Estimated Total cost (US$)**
3. Power backups	Heavy UPS	2	10,000	20,000

4. Transport	Vehicle	1	45,000	45,000
5. Furniture	Cupboards	2	250	500
	Cabinets	4	250	1,000
	Chairs	20	50	1,000
	Tables	20	300	6,000
6. Office equipment	Photocopier	1	5,000	5,000
	Fax	1	250	250
	Intercom/Telephone	1	2,000	2,000
7.Audio- visual support equipment	LCD projector	1	6,000	6,000
	Overhead projector	1	1,000	1,000
	Projector screen	1	100	100
	T.V.	1	700	700
	VCR	1	250	250
Sub-Total				**295,300**

C. OPERATING EXPENDITURE

1. Print back-ups	Books	5	5,000	25,000
	Journals subscription	5	5,000	25,000
2. Data Collection	Scientific objects	5	10,000	50,000
	Documents	5	5,000	25,000
	Artifacts, etc.	5	5,000	25,000
3. Preservation	Chemicals	5	2,000	10,000
4. Linkages/Staff exchange	Travel to & from abroad	5	5,000	25,000
	Consultancy facilitation	5	5,000	25,000
	Staff up-keep on exchange	5	10,000	50,000

ITEM	**PARTICULARS**	**Quantity**	**Estimated Unit cost (US$)**	**Estimated Total cost (US$)**
5. Maintenance costs	Vehicle	5	5,000	25,000
	Electronics	5	1,000	5,000

	equipments				
	Computers and software licenses		5	1,000	5,000
	Other equipment		5	2,000	10,000
6. Publications, Publicity and public relations	Bi-annual Uganda Science Journal		5	6,000	30,000
	Radio		5	1,000	5,000
	T.V.		5	1,500	7,500
	Website design & maintenance		5	500	2,500
7. Workshops/seminars/ conferences/ training	Workshops/seminars	5years x year	2 per	5,000	50,000
	Conferences (local and International)	5years x year	1per	5,000	25,000
8. Administrative Costs		5 years		5,000	25,000
Sub-total					**450,000**
GRAND TOTAL					**764,500**